A Critical View of Sustainable Architecture in Turkey: A Proposal for the Municipality of Seyrek

By

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The translations are mine—so are the errors in the pages below.

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ABSTRACT

This dissertation aims at developing a sustainable design process prioritizing locality in social, cultural, ecological, political, economic, technological, legalistic, and architectural terms. To this end, it aims first of all at developing an approach for elimination of misconceptions—primarily informed by technological, morphological and numerical indicators—about what constitutes the concept of sustainability in architectural practice today and therefore starts out from a critical historical overview of approaches and practices for sustainability in the world and in Turkey. The thesis undertakes the critique of sterile projects in sterile environments and calibrates the replicable and exemplary aspects of international and national sustainable design practices so as to introduce, promote and guide realistic, practicable, and case-specific sustainable architectural solutions. The specific focus in both the critical evaluation of extant sustainable practices abroad and the proposed process for the municipality of Seyrek in Menemen, Izmir, Turkey, is the distinction between the assets and needs of industrialized northern geographies and southern geographies which are in the process of industrialization and which are frequently misguided by economic exigencies imposed by the industrialized north. As a village located in an Important Bird Area, in the vicinity of a Ramsar Site and on the edge of a First-Degree Natural Conservation Area, the case area in question provides a trenchant example for the study of the meaning of sustainability in a southern socio-politico-economic zone and a challenge for the architectural designer. Seyrek is a mirror of global as well as local problems today. It is located in the middle of Gediz Delta, the large agricultural land as well, and on the edge of several specialized industrial districts of the urban sprawl of Izmir. Placing the analysis of the case area in the context of the wider framework of international policy, the thesis proceeds to propose specific design tools for a sustainable housing development project in a crucial typical new residential segment of the semi-rural settlement of Seyrek.

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ÖZ

Bu tez sosyal, kültürel, ekolojik, politik, ekonomik, teknolojik, hukukî, ve mimarî bağlamda yerelliği öne çıkaran sürdürülebilir tasarım süreci geliştirmeyi hedefler. Bu anlamda ilk olarak, günümüz mimarlık pratiğinde, sürdürülebilirlik kavramının ne ifade ettiğine dair—çoğunlukla teknolojik, morfolojik ve sayısal göstergelere dayalı—yanlış anlamaları ortadan kaldıracak bir yaklaşım geliştirmeyi amaçlar ve bu nedenle, dünyada ve Türkiyede sürdürülebilirlikle ilgili yaklaşım ve uygulamaların eleştirel tarihini yazarak başlar. Tez, 'sürdürülebilirlik' adına steril çevrelerde steril projeler yapıldığı savından yola çıkar. Yurtdışında ve ulusal bağlamdaki sürdürülebilir tasarım pratiklerinin tekrar edilebilir ve örnek teşkil eden yanlarını gözeterek, gerçekçi, uygulanabilir, ve yere özel sürdürülebilir mimarî çözümler ortaya çıksın, desteklensin ve yol gösterilsin diye uyarlar. Hem yurtdışındaki mevcut sürdürülebilir pratiklerin eleştirel ele alınışında hem İzmir, Menemen ilçesinde yer alan Seyrek Belediyesi için önerilen süreçteki belirgin bakış, endüstrileşme sürecini tamamlamış kuzey coğrafyalarının varlık ve ihtiyaçları ile henüz endüstrileşme sürecinde olan ve aslında kuzey ülkelerince empoze edilmiş ekonomik öncelikler sayesinde sık sık yanlış yola sapan güneyinkiler arasındaki farktır. Önemli Kuş Alanı içinde, Ramsar Alanı yakınında ve I. Derece Doğal Sit Alanı bitişiğinde yer alan bir köy olarak çalışma alanı, sürdürülebilirliğin anlamını güneyin sosyo-ekonomik-politik sınırları içinde irdelemek için çarpıcı bir örnek, tasarımcı için ise başlıca bir sorun sahasıdır. Seyrek, yerel olduğu kadar günümüz küresel sorunlarının da aynasıdır. Yerleşim, aynı zamanda geniş bir tarımsal alan olan Gediz Deltasının ortasında ve İzmir kent çeperindeki birçok sanayi bölgesinin yanı başında yer alır. Çalışma alanının analizi daha geniş uluslararası siyasal çerçeve kapsamında konumlandırılırken, tez yarı-kırsal Seyrek yerleşiminin iskâna açılan dikkate değer tipik parçasındaki bir sürdürülebilir konut projesine özel tasarım araçları sunar.

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CHAPTER 1
INTRODUCTION

1.1. Definition of the Problem

Because Turkey is a country in the process of industrialization—or, in the more contemporary conception this dissertation will pursue, a *southern* country—emphasis in the discussion of any facet of life has been in this country always placed on economic progress. Yet this priority given to progress in the economic sphere inevitably causes both physical and social disruption. Environmental degradation, ecologically devastating resource depletion, uncontrolled urbanization with lack of infrastructure, growth in low income population accompanied by the loss of traditional cultures and the dissolution of social ties may only represent a small portion of the harm caused by making economic well-being the only target.[1]

In Turkey, many decisions which are at odds with concern for sustainable development continue to be taken so as to attain the high income level of 'developed' economies as soon as possible. For instance, if it is financially profitable, the sale of a naturally vulnerable tract of land—*Doğal SİT Alanı*—is given the highest priority, thus giving rise to land clearing and biodiversity loss. When there is an interest in conveying direct economic benefits to unemployed persons, together with the lack of a caring strategy and supportive government policy toward the agricultural sector, the agricultural lands on the urban fringe can easily be transformed into new industrial or residential development areas. Even though, for example, Turkey today faces an energy crisis, especially where electricity is concerned, the country has not developed any strategy for energy efficiency. The indicator of being more 'developed' in Turkey is still being evaluated by the criterion of the increase in energy demand and energy consumption per person, which, as pointed out, is assumed to be the sign of

[1] As is known, the North-South distinction came to replace in the last decade the distinction between developed-developing as well as between west and east. The history of this replacement is beyond the scope of the present introduction, but will be taken up at the beginning of Chapter 2 below as well as throughout this dissertation. Suffice it to say for now that the newer binarism is a product of the end of the Cold War, the end of the West-East distinction, the new self-critique of socialism, and the emergence of post-colonial critical studies. For discussion of the new binarism see Amin (1990), Angotti (1996), Beladi et al. (2000), Clapp (1998), Currie et al. (1999), Foroohar et al. (2002), Murphy (1990), Muscatelli and Vines (1991), Nossiter (1981), Riding (1981), Therien (1999), and Van de Klundert and Smulders (1996).

economic growth and industrial production.[2] What is worse, the trend in energy production has been toward building new dams which destroy the natural and cultural wealth of the land, or new thermoelectric power plants which damage the health of living beings without any concern about using nonrenewable energy sources. Private production of energy at the individual dwelling scale is still not permitted.[3] To sum up, the so-called 'free market economy' seems to weigh more heavily in decision-making than ecological, cultural and even some economic issues in Turkey.

It is generally believed that any steps taken in Turkey toward sustainability will place additional strain on the already fragile economy. In other words, the discourse of sustainability in Turkey has not become integrated into the government's development policies, because it is thought that the sustainable development approach will hamper their efforts to achieve higher GDP (Gross Domestic Product) growth rates and to eliminate poverty as quickly as possible.

Similarly, sustainability has not become a matter of interest or a commonly conceded concept in the architectural practice of Turkey, either. When surveying the existing examples of sustainable architectural practice in Turkey, the following findings come to light:

1. Sustainable architecture is still in its infancy. So far, very little attention has been paid at the national level. Therefore the concept of sustainability has been dealt with in limited scope and with only a few examples by individual efforts.

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[2] The report prepared by the Ministry of Energy and Natural Resources (*Türkiye 1. Enerji Şurası* 1998, p. 1.25), scrutinizing the interaction between the energy consumption in Turkey and economic growth, conveys that, "change of 1% in income between 1970 and 1990 has caused a 1.11% increase in energy consumption. [...] The greater rate change between 1980 and 1990 caused a steep rise of 1.71%. It is estimated that this change will result in an increase around 1.05% in the coming years." The stress of the report on numeric data corresponds to the assumption that the rise in income level of the community will as a matter of course bring about a rise in the level of energy consumption. Besides, energy demand has been already estimated to rise steeply in the process of industrialization. Yet the increase in the energy demand can be balanced, or even reduced as seen in the instances of the International Energy Agency (IEA) countries, with the growing efficiency in energy sector by adapting the recent technologies and new systems into the production processes. If "the amount of energy used to produce one unit of gross domestic product (GDP) (being an indicator for energy intensity)," can be reduced, the energy demand will also drop (Nijkamp and Adriaan 1994, p. 17). For example, "between 1996 and 1998 overall IEA energy intensity fell by more than 2.5% per year on average" (Unander 2001, p. 2). Thus it is crucial to build a strategy which will not merely fulfil the rising demand but also decrease the energy intensity of the Turkish economy and use energy efficiently ("Energy Efficiency in Economies in Transition" 2003).

[3] See items 2.a and 3.c.1 in *Elektrik Piyasası Kanunu, Kanun No: 4628, Kabul Tarihi: 20.2.2001, RG [Official Gazette], 3.3.2001 - 24335 Mükerrer* (2001).

2. There are very few architectural practices in which the sustainable viewpoint is the main starting point for the design. The others are buildings whose initial design problem is not sustainability, yet the key concepts for sustainable design are adhered to unconsciously.

3. Because of their scope and location, most of the examples do not confront the difficulties of what it is to practice sustainability within the context of Turkey. There is almost no project concerned with the physical deterioration of current settlements, social transformations or disruptions, affordability problems, environmental degradation, and so on, because they are located either on university campuses, untouched natural environments or far from any existing settlements. Sustainable architectural practices in Turkey, therefore, are mostly sterile projects located in sterile environments.

4. The precepts posed by the concept of sustainability have not been scrutinized or comprehended properly. The perception of what it means to build in a sustainable manner manifests itself more in the design of environmentally friendly and technologically advanced energy-efficient buildings. In brief, the concept of sustainability is rather treated, by definition, morphologically in the architectural practice of Turkey.

In the meantime, sustainable architecture has just started to become a rising issue of academic interest in Turkey as well as all over the world. There has been a noticeable increase in the number of academic studies on the subject in the last fifteen years beginning with the declaration of the Brundtland Report in 1987. These studies deal closely with the concept of sustainability, or may be related to it implicitly. The majority of them focus on the energy efficiency and energy conservation concerns in design. Others take up environmental items involving the relationship between the building and nature, environmentally friendly approaches and climatic design principles.[4]

At any rate, it is notable that there are minor reputable studies in Turkey and, given the Earth's present perilous situation, each is a worthy contribution that enables transfer of the present values to future generations. However, the other countries have taken farther steps than Turkey in the last decade toward the implementation and integration of sustainability in architecture.

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[4] See Appendix A for an overview of academic theses and dissertations produced at Turkish universities engaging the concept of sustainability in disciplines of design.

The crucial inference to be made here is that an extremely wide ranging and adaptable scope is encompassed by the concept of sustainable development. It accommodates the viewpoints of many groups from different levels and sources of income, nationality, geography and culture. After conducting a literature search and categorizing the explicit proposals and their assumptions, it can be concluded that sustainability is far from a single coherent ideology. Likewise, the variety in building solutions indicates how the concept of sustainability is open to broad interpretation. Perusing the myriad of articles, reports, books and projects on the subject of sustainable architecture abroad, a bewildering array of contrasting building types is found, employing a great variety of different technologies and design approaches. The other names, such as 'environmental design', 'green architecture', 'ecological architecture', 'environmentally friendly architecture', 'energy design', 'energy-saving architecture', 'energy-efficient architecture', 'energy-conscious architecture', 'low energy building design', 'bio-architecture', 'bio-climatic architecture', 'climatic design', 'smart design' and 'intelligent building design' often given to 'sustainable architecture' justify this highly diverse set of interpretations of what a sustainable place might represent.

It is commonly recognized that sustainability in architecture is a disputable concept, yet much of the contemporary respect for the sustainable architecture of the world comes from a preference for sidestepping the definition of sustainable architecture by depending on some of the sustainable practices, viz. the sterile sustainable projects in sterile environments, and omitting the others. A unilateral definition, i.e. the global definition imposed by the prominent mainstream of architectural publications of the industrialized North, fits the economic and social systems of the so-called developed world and tends to disregard or discard nearly all examples drawn from the South.[5] This discrimination by definition, at the same time, implies a confrontation between the sustainable architecture of the North and the South. It is reasonable to argue that the conditions in the southern countries require a sustainable design approach different from that followed in the northern countries. Therefore the projects are unavoidably different. Nor ought one mistake this postulate of difference for an ideological distinction. They may

[5] The promotion of a global definition can be clearly observed in the prominent mainstream of periodical publications such as *Architectural Review, Architectural Design, Architecture and Urbanism, Detail, Techniques & Architecture* and the prominent mainstream of publishing houses such as Laurence King, Prestel, Academy Editions, E & FN Spon, and Architectural Press.

be constructed as owing to geo-cultural differences, justifiable in objective, material terms. Such examples of difference, overlooked or ignored, openly convey the celebration of local sustainability as a prime strategy for sustainable development. They were realized within the local, regional and countrywide conditions of a specific place, i.e. in their peculiar context. Consequently, all the cases point to the capability for the realization of sustainability in the architecture of Turkey, too.

The achievement of sustainable building in Turkey can only be realized by building up a design attitude that facilitates the integration of the theories and strategies of the discourse of sustainability into the discipline of architecture. This approach should not only encompass the design and construction features of a building but also deal with its design process. This dissertation asserts that the question of sustainable architecture in Turkey amounts to a formulation problem: a design process which will evaluate the usual economic, social, and ecological conditions of any case aiming at sustainability. In other words, the study points out the problem that in Turkey there is no systematic viewpoint when it comes to designing a sustainable project. It is claimed that we need a scheme integrating the sustainable point of view into the discipline of architectural design.

Again, the proposition above on the ability to achieve sustainable building in Turkey may also be realized by the correct definition of the design problem. Indeed, an ideal sustainable architectural project includes a context-specific design problem concerned with ecological, social, spiritual, aesthetic, and economic conditions of the case area. Any sustainable project in Turkey, therefore, should consider the reality of designing in a southern country from these points of view.

Similarly, this dissertation claims that the question of sustainable architecture in Turkey is in fact the question of the definition of a design problem which assesses the usual economic, social, and ecological conditions of any case as a whole. In other words, the study addresses the problem of producing sterile projects in Turkey where the design project is isolated from the existing state and completely protected from the unwanted activities and diverse activities seen in Turkey. It stresses the need for developing an approach to design which would define sustainability as not only an ecological problem but also as one that must deal with the social, spiritual, aesthetic, and economic problems of a society.

1.2. Aim and Scope of the Study

This dissertation acknowledges that the very idea of realizing sustainable building in Turkey is a major problem, and aims to put forward an approach critical of a single definition for sustainable architecture. The frame of the critique is to undermine the hegemony of the definition of sustainable architecture which has prevailed by the leadership of northern countries including those of Europe and the United States and Canada, and to move the scope along to a more circumstantial platform centering not on global but local definitions of sustainability. To this end, the concept of sustainability and the indicators of sustainable design approaches in the world at large and the projects in Turkey will be scrutinized.

The problem of designing sustainable built environments requires an integrated design study that initially entails the full pre-recognition of design stages. New targets introduced by the concept of sustainability bring forth an accompanying body of data that should be evaluated in architectural discourse; thus the field of architectural concern has become more complex and wider. In short, sustainability as the major design problem in architecture necessitates a scheme organizing the data of changeable disciplines and integrating them as an input to design study.

The sustainable architectural practices of the last ten years indicate that the introduction of thinking on sustainability into the architectural milieu has inevitably directed the formation of a new design process peculiar to the sustainable way of design. Actually, each design practice, and logically its process, is context-specific; in other words, unique for the case area. However, the sustainable design problem forces designers to follow the particular stages in which every product, process and procedure must be questioned and reviewed from a new perspective, i.e. the sustainable point of view, that includes the ecological and human health impact of decisions.

In Turkey, it is hard to evaluate in each case how the way leading to sustainable architecture is expressed through the design for sustainability, because there is a lack of knowledge about the design processes of examples in Turkey, and most of them have no deliberate design process predefined. Yet it is clear that the required design stages are similar, even though the issues influencing the integrated design process of a sustainable project in Turkey differ from those in other countries. The designation of this distinction and awareness of the issues are vital for the success of further sustainable implementations in Turkey.

The objective of this dissertation is thus to develop a proposal of design process which offers the implementation and integration of main sustainable development goals in both architectural design process and end product. This proposal will help with designing new sustainable building projects in Turkey.

This dissertation is in search of the definition of a process sequence. For this reason, it seeks to determine the issues lacking in sustainable architectural practice in Turkey, and takes them into consideration by developing a design process proposal. In addition, it is assumed that making sense of sustainable architectural innovation for a specific location today is inseparable from the world-wide, comprehensive history of sustainable architecture including intersecting architectural approaches, political trends, economic priorities, scientific developments, and environmental movements. Therefore, this dissertation examines other design processes developed internationally, and then calibrates them in keeping with the conditions of Turkey in order to introduce a new process.

The design process proposal can be realized as a way to understand how the delivery process of sustainable design can be thought of in terms of phases requiring one another. The phases are derived from the existing examples examined in Chapters 3, 4, 5 and Appendix D, but assembled originally for any design project for sustainability at the building scale in Turkey. In the preparation of this proposal, the projects are studied in terms of both their design processes and the end products. They provide the theoretical and methodological framework of the study, yet the resulting proposal presents a unique and newborn design process.

Within the scope of sources on sustainable architecture in Turkey which can be obtained so far, it can be asserted that no design process has been determined, prepared and/or implemented in a sustainable architectural project in Turkey before this. Hence, the design process proposed by this dissertation is a pioneering one.

When examining sustainable practices in Turkey, it can be concluded that the problem of sustainable design is considered mostly in the scope of a building scale alone, yet the definition of the design problem without a holistic point of view that respects the impact and relationship of a building with the ecological values, social constitution, spiritual beliefs, aesthetic taste, and economic structure of the case indicates a vital deficiency. Furthermore, to identify sustainable buildings simply with respect to their use of ecological materials or whether they are energy-efficient also constitutes a big mistake.

The principal supplementary aim of the dissertation here is the creation of a process that will eliminate misunderstandings about the definition of a sustainable design problem and will incorporate the approach of sustainability into architectural practices by learning from failures and mistakes seen in sustainable architectural practices in Turkey.

The other crucial contribution of this dissertation is to fill a vital gap bearing on a range of sustainable architectural practices in Turkey. The critical analysis of sustainable practices in Turkey indicates that no similar architectural project has been realized to date, respecting future development of an existing settlement toward sustainable development goals. Thus, the introduction of a new scope for sustainability into the architectural practices of this country is the other contribution of this dissertation.

Such a design process can introduce, promote and guide comprehensive and integrated design proposals. Thus it can be implemented in similar design projects in Turkey. This is a process-oriented approach: the project taken up by this dissertation in essence, thus, should be recognized as an example where this process will be implemented. The solutions that will be developed at the end of the dissertation are one indication of the ability to achieve a sustainable project within the context peculiar to Turkey.

In this sense, the study seeks to recognize ways of designing a sustainable housing development in the architectural scale, by taking the conditions and characteristics of Seyrek, a village in the province of Izmir*,* Turkey, as a case in point. The main design problem of the project is to develop sustainable solutions, i.e. design tools, for a new housing area located in the existent settlement of Seyrek. The crucial point here is first to locate a way to define sustainability for Seyrek, and then to identify the design attitude that will affect the on-going transformation of Seyrek into a sustainable course of development. The reason for choosing Seyrek as a case area is because the region constitutes a vital example of a currently unsustainable development process.

The present situation of the village indicates that Seyrek is going to lose its semi-rural character of agriculturally based livelihood, with a growing trend for joining the urban pattern of Izmir. The town's inhabitants, social relations, ecological values and their economic life are changing, and thus inevitably changing is the architectural character of the town. After a long period of closed social structure, its settlement pattern altered when Seyrek became a municipality devised in 1992. The municipality consumes its resources, e.g. the natural and agricultural land, potable and ground water, for the sake of short-term affluence without assuming responsibility for the future. The latest development plan of the town devised in 1999, for instance, does not incorporate any sustainable strategies, e.g. sustainable land strategy, transportation strategy, sewage strategy, and so on.[6] Accordingly, becoming a municipal center has introduced urban services which improve quality of life and bring economic vitality to the town, yet at the same time cause irreversible damage to the health of the region's ecosystem, cultural degeneration, and corrosion in the social structure.

Seyrek is situated in a region at the north development axis of Izmir and is subjected to the faster urban and industrial transformations. This is a broader dilemma that can be seen in almost all southern countries which are experiencing the growth challenge. The wide agricultural land of the Gediz Plain, the means of sustenance for local inhabitants, has been endangered by the extension of the city. Besides, as one of the important bird areas of Turkey, Gediz Delta has deteriorated as the result of the stress of human activities originating in Izmir (Onmuş et al. 2002). All these situations mean that the ecological problems of this region conflict with the economic problems of the city.

Indeed, the Gediz Plain, seen as a potential expansion area for the city of Izmir, requires the development of a site strategy in a regional scale, by which the sustainable future of the city should be considered in its economic, social, and ecological aspects. It should be noted that the profits from the destruction of the land will cause irreparable long-term damage. As a result, even today, this region

[6] For instance, according to the records of the Seyrek Health Center for June 2002, the population of Seyrek municipal center was 949. The latest development plan introduces a new residential zone surrounding this traditional town. The residential density is steeply increased, when compared with the current one. Hence, the population of these development areas will multiply the population of the old town around 24 times as of 2002. The physical and social problems caused by this sharp increase in the population have not been considered or compensated by the latest development plan, yet.

needs the development and implementation of a rehabilitation policy toward sustainability.

At this point, the task of the architect who will design new buildings in Seyrek should be discussed carefully. The architect should foresee the current development trends of the region, fulfil the contemporary requirements and work for the continuity of prevailing architectural tradition. Such should lead the architects / builders to understand the sustainable qualities and transformation processes of the settlements, as in the case of Seyrek. To initiate a housing development project in a sustainable manner is, therefore, essential for maintaining the sustainable growth of the village as well as the region. In addition, the problem of integrating the new into the existent structure is the concern of the case study related to maintaining the continuity of the prevailing architectural tradition.

The study area is all the Gediz Plain, but the starting point is all dwellings of Seyrek, including the traditional adobe residences and relatively new buildings. The study investigates the social, ecological and economic characteristics of the town as well as the basic characteristics and patterns of the dwellings, starting from the neighborhood scale, and turning to the spatial organizations and sustainable architectural features of dwelling units. The dwellings are evaluated by considering the daily life and living habits, cultural and economic background and resource consumption pattern of their inhabitants.

1.3. Limitations and Assumptions

This dissertation proposes the design tools for a sustainable housing development project in Seyrek, Izmir, Turkey. The study ends with the phase of design tools. However, the proposal of design tools does not mean that any study for a sustainable architectural project finalizes at this stage. On the contrary, it needs to be improved.

A sustainable project in this wider scope requires an integrated design process, and thus multidisciplinary teamwork. During the design process, a group combining many separate fields of expertise, such as architect, city planner, as well as civil, environmental, and mechanical engineers, sociologist, ecologist, meteorologist, geologist, and economist should come together or consult so as to prepare the required analysis and designate the sustainable strategies. Only studies for a sustainable housing development that would be realized by an architect in this team will be fulfiled within the scope of this dissertation.

The case study is realized on a building block in the residential development zone of Seyrek. The latest development plan constitutes a study pad for gathering the related data about the case of the dissertation. Within this scope, the transportation pattern and the organization of building blocks are accepted as proposed in the plan. However, the decisions as to ownership pattern, and building regulations and thus the population density proposed, need to be assessed, since these applications, by themselves, harm the sustainable continuity of the settlement pattern and social life.[7] Building regulations are outside the scope of this dissertation except the ownership pattern proposed by the 1997 development plan.

The predetermined decisions and regulations that are subject to professional fields other than the architectural field of study, were approved in their current state. Even if they were criticized, this dissertation does not attempt to produce proposals for any field of expertise except architecture. For example, the current and continuing fact is that the Gediz Plain has a big share in the economic activities of Izmir. Hence, the continued negative effects of these economic activities on the ecological cycle of the region are reluctantly accepted. To make any inference or transformation suggestion for Gediz Delta would require expertise in city planning. Furthermore, it is assumed that the current shift in the northern development axis of Izmir will continue and will even expand fast.

1.4. Method

This study assesses the current stance of sustainable architecture in Turkey by means of proposing a specific project, as one of the criticism methods in architecture. It realizes this by presenting the design tools for a project that will be proposed for Seyrek, Izmir, Turkey. Seyrek is a typical case with a high potential for misdevelopment: it faces the development problems caused by rapid urbanization and industrialization. The study deals with sustainability as a design

[7] The applications are based on the regulation about the organization of building lots and estates according to Article 18 of By-law No. 3194: see *İmar kanununun 18inci Maddesi Uyarınca Yapılacak Arazi ve Arsa Düzenlemesi ile İlgili Esaslar Hakkında Yönetmelik-RG [Official Gazette], 02.11.1985 - 18916* (1985). The building density of the residential development zone is quite high, with four-storeyed new dwellings in a total area ratio of 1.2—*KAKS: 1.2*.

problem in the profession of architecture in Turkey, discusses the problems that will be faced in the case, and offers possible solutions.

The reason for preferring this critical method is to prove the applicability of ideas of sustainability in this country with a project in a case area by pointing out mistaken and missing features, as well as the encouraging solutions derived from sustainable architectural practices in Turkey and in the world.

The concept of criticism, highlighted in this study, should be perceived as pertaining to operative criticism (Tafuri 1980). The verbal examination of data, which is the inexorable method of scientific research, no doubt occurs in this dissertation. Yet the study avoids making a concession from the subjectivity which is in the very nature of a design action and which is in danger of being sacrificed for the sake of absolute scientism. It is possible that the tendency for the analytic search of case studies made in scientific research of the architectural profession is caused by fear of incompatibility of the subjective and intuitional features of the design practice with a scientific method. Thus, the method of operative criticism is used here in an attempt to reflect circumstantiality while maintaining the subjective side in each design action. Operative criticism includes the development of a metalanguage that uses the language of the field in question—in this case, the architectural language of the profession of architecture—and hence the language of the method coalesces with the object being criticized. The rationale of operative criticism has been most famously elucidated by Manfredo Tafuri:

> What is normally meant by *operative criticism* is an analysis of architecture (or of the arts in general) that, instead of an abstract survey, has as its objective the planning of a precise poetical tendency, anticipated in its structures and derived from historical analyses programmatically distorted and finalized.
>
> By this definition operative criticism represents the meeting point of history and planning. We could say, in fact, that operative criticism *plans* past history by projecting it towards the future. Its verifiability does not require abstractions of principle, it measures itself, each time, against the results obtained, while its theoretical horizon is the pragmatist and instrumentalist tradition. (1980, p.141)

In this study, the clichéd definition and methods of sustainable architecture, therefore, are criticized by way of both verbal criticism and operative criticism, most immediately evident in the conjoining of the history of sustainable architecture, the critique of present and past practices in sustainable architecture, and a specific case study that derives from the findings of that history and that critique.

Consequently, the case study proposed here goes beyond the customary options open to scientific method. In a way that parallels the main approach of this dissertation on the definition of sustainable architecture, the case study implies the impossibility of finding a single right solution in sustainable architecture by the analysis of data.

Hence what underlies the design process proposal, suggested in the dissertation and put forward as being repeatable, is the existence of changeable, subjective and circumstantial basics that are as important as this process. This is the ontological critique of design process methodologies often encountered in the profession of architecture since the 1950s.

Within the scope of this study, the main questions requiring realization of a new sustainable project in Turkey are simply, what should be done and how should it be done? For this project to succeed, the present condition of sustainable architecture both in other countries and Turkey should be studied within the limits of this dissertation. Therefore, the methodology of study given in the outline consists of four steps. In other words, the structure of the study may be summarized as a four leveled zoom-in process:

The first step presents brief information about the concept of sustainability along with the criticism of different dimensions of sustainable development. It also includes the historical evolution of sustainable approaches. The subsequent step evaluates respectively the sustainable architectural practice of the 1990s in terms of first a categorical viewpoint based on the global and local definitions of sustainable architecture, and only then different modes of sustainable practices in the North and South. Here, this disregarded and discarded sustainable examples are included in the discussion. Architectural criticism of sustainable examples in Turkey is the third step. Lastly, the fourth step comprises the presentation phase of the case study. In this part, a design process proposal for realizing new projects whose sustainable design problems are correctly defined is introduced, and the new design process is implemented for a housing development project in Seyrek. The dissertation concludes with discussion of a number of key concepts for the development of sustainable values in the architecture of Turkey.

Chapter 2 about the discourse of sustainability consists of a critique of the notion of sustainability and the confrontation of its conception between the southern and northern countries, so as to stress the divergency between the understanding of sustainability theorem and its innumerable interpretations and implementations. The year 1992 is assumed to have been a threshold for the evolutionary course and spread of the idea of sustainability.

Within this conceptual framework, this chapter is divided into two parts. The first offers a theoretical framework on the transnational character and ideal development proposition of sustainability by presenting the definitions and historical evolution of the sustainable approach during the last decade. The second part questions the arguments on sustainability stated above, by explicating the events, policies, tendencies and global or local problems from both the viewpoints of the North and the South.

Afterward, the stance of the sustainable point of view in the development trends of the last decade, its proposed strategies and applications, are subjected to critical analysis. Here, the initial emphasis is first to indicate the inseparability of social, economic, and ecological issues for attaining sustainable development, and second to solve the problems on a small scale—local or regional levels— with local resources such as local inhabitants, wisdom, governance, natural environment and building materials.

Since the concept of sustainability originated initially from economic concerns, the issue of economic sustainability is dealt with from two opposite approaches, sustainable globalization and sustainability as an anti-globalist action. In the other prime concern of sustainability's effect on social development, the rising awareness of the importance of ecological sustainability is compared with the need of countries for economic prosperity.

Chapters 3, 4 and 5 are structured with a zoom-in method that presents an overview of sustainable architecture in three sections. The first two relate to the sustainable architecture of the world, while the last one introduces the state of sustainable architectural discourse in Turkey. They proceed from a retrospective view on the development of sustainable architecture and the evaluation of existing cases in the North–South distinction to the more specific themes of the evaluation of sustainable cases in Turkey.

Chapters 3 and 4 discuss the sustainable approaches in architectural discourse of the last decade without limiting the scope to either northern or southern countries. In essence, they examine the diverse design strategies and competing conceptions of sustainable place-making. They highlight the conceptual challenges involved in defining what is meant by calling a building sustainable and outline the development of sustainable architecture. In addition, this part puts forward the existence of disregarded or mostly discarded architectural samples, and thus signifies a critical stance in the wide ranging scope of sustainable architecture. In this respect, the structure of the first two parts is organized in dual segments such as:

1. Global and local practices and theoretical approaches of the 1990s
2. Confronting modes of southern countries with northern ones

The analysis of these parts is based upon the studies of completed buildings and thus it requires an extensive literature review covering issues related to complex and conflicting values of sustainable architecture. It is clear that architectural practices about sustainability have become a widely and frequently treated concept in architectural publications, yet comprising an arguable title with all the complexities, implications and one-sided viewpoints of the sustainable approach to design. Here, it should be stressed that this favorite concept requires deeper recognition.

Since almost all architectural publications originate in the North, the sustainable building examples generally are restricted to the 'developed' North, and give less, if any, information from the 'developing' South. Therefore, the analysis part of this dissertation begins with a selective survey of books concerning sustainable architecture and architectural periodicals, particularly the *Architectural Review* from February 1983 to December 2002, *Architectural Design* from July 1972 to December 2002, *Architecture and Urbanism* from February 1997 to December 2002, *Detail* from February 1997 to December 2002, and *Techniques & Architecture* from February 1997 to December 2002, which gives a brief account of the steadily broadening scope of sustainability in architectural theory and practice of the northern countries. The critical texts on sustainability are evaluated by conceptual and geographical criteria. Next, and more importantly, the study collects data about the South, by investigating books published related to what are conceived of as the 'developing countries', such as publications of the Aga Khan Awards for Architecture, and searching internet sites of international organizations that attempt to expound means of the affordable housing, such as Habitat for Humanity International, Best Practices and Local Leadership Programme (BLP) of the UNCHS (Habitat), sustainable development projects funded by the World Bank, and so on.

Chapter 5 focuses on the current panorama of sustainable architecture in Turkey. Since there is almost no comprehensive previous study assessing the examples of the country as a whole, personal investigations are utilized to obtain data through site surveys and interviews. Hence, this part includes many individual visits to existing projects and a literature review of the limited number of books, articles, and reports covering examples which are characterized as sustainable building in Turkey. The building visits took place in July of 1997, 1998 and 1999, May, June, and October of 2001, and September 2002. The data about the buildings were mostly gathered by interviews with the users of those buildings, their architects and contractors, or by personal observations on the site.

The first part of this chapter focuses on the evaluation of cases in Turkey. Based on the examination of stakeholders' role in the projects, it presents a comparative categorization explaining:

1. Private enterprise: by individuals and communities, e.g. NGOs, CBOs (Community Based Organizations)
2. Government: local or central governmental organizations and formal bodies, e.g. ministries and universities

The concluding remarks of this part also provide a framework for challenging the meaning and validity of the design process that will be developed in the subsequent chapter.

In terms of the methodology of the case study, Chapters 6, 7, and 8 are organized around a common objective, that is, to design a sustainable housing development in Seyrek, Izmir, Turkey. Hence, this part includes the following four stages:

1. Definition of the problem of designing a sustainable building in Turkey
2. Explanation of the proposed design process for a new sustainable project for Turkey
3. Understanding the extant condition of the case area, Seyrek and Gediz Delta, along with their potentials and problems

4. Presentation of distinctive design tools along with the process proposed by this dissertation.

Firstly, the part devoted to the definition of the problem is briefly introduced to underline the main problem of this dissertation, i.e. realizing sustainable building in Turkey. This problem is based on two main requisites: the correct definition of the design problem, and a particular design scheme which ultimately describes the way through the design and construction stages.

The second stage presents the proposal of a design process required to make sustainable architectural projects in Turkey. It describes a set of sequences that should be implemented by means of the following of particular phases. The design process proposed by this dissertation is unique, yet it is developed through the examination of specific projects and the calibration of their design and construction processes according to the conditions of Turkey. In this regard, the site survey, interviews and observations in Seyrek provided significant experience for understanding the role of the actors in a project, determining the sequence of phases, and in brief, producing decisions for a new design process.

There is a very limited number of examples which inform us about the design processes, as well as the end product. Thus the selected samples are drawn from all over the world. In this case, the design process proposal is primarily grounded in the co-housing, i.e. community housing, projects in northern Europe and in sustainable design guide books providing a clear road map for the integrated multidisciplinary design process.

In the third and fourth phases, there is a simulation of the proposed design process, thus the particular stages are followed in order. First and most importantly, it should be noticed that designing sustainable buildings needs a special strategy for obtaining data and analysis processes. In the beginning, a wider scope of knowledge should be managed and the already available data should be filtered through the point of view of sustainability.

Ideally, the wide-scoping data on the case area should be collected by collaborative and continuous team work. Instead, there is one researcher to this dissertation. Two methods were followed to cope with this problem:

1. There are recent and reliable studies about the Gediz Delta concerning its flora, mammals, birds, pollution, groundwater, and so on, since the study area

with its ecological value and ecosystem health has been attracting researchers from environmental sciences for a long time.

2. The author interviewed experts who offered professional information and advice. A dialogue was set up with the consulting professions, e.g. mechanical, environmental and energy engineering, and city planning.

It should be noted here that not all the facets of the design process are examined; some of the phases, particularly the sub-processes, are tested, whereas others are either omitted or developed from the quantitative and qualitative data obtained from the site investigations. The proposed project does not consider an active design process, engaging public participation. User participation is ideally a component of sustainable architecture. The participation of the inhabitants, the agents of central and local government, private sector, investors and academicians are fundamental to many sustainable projects of the world. Nevertheless, the present Seyrek project does not follow an active participatory design strategy. For one, this was not possible within the scope of this dissertation for practical reasons: given the fact that the present project aims at designing for an entire building block comprising 14 plots, actualization of the design project could not be included within the time of composition of a dissertation. Furthermore, the participation of the user in determining building size, material and construction technique, as well as site organization, may give way to design solutions adverse to basic project objectives and debar achievement of sustainable design principles in Seyrek. For these reasons, the goals and priorities are specified on the basis of the data by field surveys, including physical and social ones for Seyrek and the Gediz Plain, and personal observations during interviews.

The conditions of the case area are introduced in Chapter 7 by the limitations stage of the design process proposal. This part initially aims at describing all kinds of factors influencing the performance of project targets, which are the continuation, rehabilitation, integration and betterment of the physical environment toward social, ecological and economic sustainability of Seyrek. In this respect, the study is centered on comprehensive field surveys.

The part concerning 'strengths and weaknesses of the case area' is organized in three main sections, each clarifying its focus of concern. The wide-scoping information, then, is included in the bipolar list explaining the factors as either an opportunity for or threat to the creation of a sustainable housing development project in Seyrek. At the end, a possible scheme for the next ten years in Seyrek and the Gediz Plain is presented.

The implementation of the design process proposal is limited to the presentation of design tools in Chapter 8. All comprehensive data presented in the preceding chapter, here, is converted into a distilled case-specific design strategies in order to ensure the applicability and feasibility of the proposed design. The first part clearly puts forward two main priorities for the sustainable housing project in Seyrek. It enumerates the strategies belonging to each priority by posing a basis specific for the related priority. Here, the possible dwelling types designed for the sustainable housing development project in Seyrek are represented in the visual-technical language of architecture. The second part expresses the proposed sustainable design tools by sketches, scaled drawings, tables, and, of course, simple narrative guidelines.

The analysis of the case area in Chapter 7 is based on a survey with two different scales questioning the potentials and problems of the study area through sustainable development. The first step includes the large-scaled survey of a region covering the north development axis of Izmir and the Gediz Delta. This regional analysis first incorporates the ecological values of Gediz Delta to indicate the vulnerability of the region in terms of ecological sustainability. It investigates the factors such as regulations, land use and development plans, and polluters discouraging the ecosystem health of the region. The semi-rural character of the region depending on agricultural economy and improving industrial activities are examined so as to develop strategies for economic sustainability of the inhabitants of Seyrek. Moreover, basic infrastructure and transportation lines, fault zones producing earthquakes and locally available building materials are analyzed in order to create solutions about energy and waste sectors and construction techniques. In summary, the first step concerns the regional characteristics and development trends that mean a threat or an opportunity for the project in that case area in Seyrek.

To gather data in the regional scope, interviews were conducted with the authorities of local and governmental institutions in Izmir such as the General Directorate of Rural Services, General Directorate of Highways, General Directorate of State Hydraulic Works, Turkish Electricity Distribution Corporation, Ministry of Environment, Ministry of Transport, and so on. Relevant information was also taken from the reports of these institutions. The detailed report of the Turkish Ministry of Environment on the Gediz Delta has provided an extensive source of information about the ecological values of the wetland.[8] Furthermore, field trips were taken to housing developments in the region. They helped in understanding the consequences of the increase in existing building activities and to verify its negative effects on the Gediz Delta.

The second step of field surveys was located in the boundaries of the Seyrek Municipality where the physical and social surveys were completed in both settlement and building scales. There are very limited written sources about the physical qualities of the Seyrek Municipality. The several sources are the 1995 and 1997 development plans of Seyrek and an Environmental Impact Assessment Report prepared for a secondary school on the periphery of the municipal center.[9] In the case of social survey, the most current data concerning the population and family size of Seyrek were taken from the Seyrek Health Center. However, no previous social survey was done in the boundaries of the Seyrek Municipality. As a result, the study focused more on the social survey sheet, and then on personal interviews, observations and documentation at the site. In summary, within the scope of this second step, the case study concentrated on two main subjects, viz. physical survey by documentation at the site and social survey by social survey sheet and personal interviews.

It should be noted that Seyrek has not been an object of research before. The development plan prepared for the Seyrek Municipality and submitted in July 1997 by the Doğan Cartography Corporation, provides the latest and most detailed survey of Seyrek. Therefore, both surveys have evaluated the latest condition of the town.

The physical surveys were made in the municipal center of Seyrek between August and October 2002 by exterior and interior observations of buildings. This is the period of time when the inhabitants of Seyrek spend both cushy and busy days in terms of agricultural activities. Since the agricultural production is mainly based on cotton cultivation and the harvest begins in the

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[8] *Sulak Alanların Yönetimi Projesi: Gediz Deltası Sulak Alan Yönetim Planı Alt Projesi* Izmir: final report of 1999, printed by The Republic of Turkey Ministry of Environment and Ege University, Faculty of Hydroproducts, Publication V. i-ii.

[9] For the latter, see *Eğitim Kompleksi Çevre Etki Değerlendirme (ÇED) Araştırma Raporu*, by Çevre Sistem Mühendislik İnşaat Turizm San. ve Tic. Ltd. Şti. (Izmir, 1998).

middle of September, the time is specially chosen when the population is the largest and the inhabitants can be employed both in the preparation phases and the harvesting itself.

Within the scope of the physical surveys, the current dwelling stock was surveyed one by one by working at the settlement. The residential buildings were classified according to their current utilization, namely as in use, abandoned, demolished, or under construction. In order to define their architectural character, the dwellings were subdivided into types by inner-spatial organizations and their locations on the building plot. In this scope, some of the dwellings representing particular plan typologies were measured and registered. In addition, simple sketches indicating mass–open space relation were drawn at the site.

The physical survey of the architectural stock of the settlement classified buildings according to the number of storeys, construction materials, and functions. The data was treated on a base map that has been upgraded over the original map of the Doğan Cartography Corporation.

Within the scope of methodology of social survey in the municipal center of Seyrek, the research scopes out the concerns related to the social structure of inhabitants, the relationship with the environment, the consumption habits, and the traditional use of space. Here, the major issues may be grouped as follows:

1. The way of living and the degree of change both socially and architecturally
2. Response to the nature and environmental items of near surroundings
3. Use of technology in daily life
4. Use of natural resources

The prime tools for gathering data are the social survey sheet and the longer conversations held with the householders. The social survey sheet may be seen as a sample set of questions involving the items that need to be learned when designing a sustainable architectural project in Turkey. The purpose of the social survey sheet is to collect data about the residential buildings and their householders living in the municipal center of Seyrek. The social survey sheet provided the recognition of user profile and helped define the physical and social qualities that should be changed, maintained, preserved or rehabilitated for the sustainability of the Seyrek settlement and, more particularly, the project area.

The principal approach through the social survey of Seyrek is to accept each dwelling unit as both the social unit, i.e. the family, and the architectural unit, i.e. the dwelling. Asatekin (1994) asserts that to understand and define the reciprocal relationship between these units will encourage the continuity and sustainability of characteristics of the social group which prefers to use existing spatial systems in Seyrek.

Within this scope, the questions were prepared to analyze, and then to reveal the relationship between the householders and the residential units. The aim was to convey the character of interior and exterior spatial use, the recent building comfort conditions and the new building types that are mostly desired. Thus, the closer interaction between the spaces and the inhabitants' daily life, and increase in need and requirement for new spaces were investigated. Furthermore, the sustainable notions from their daily life were targeted to be defined in terms of clarifying the consumption habits, daily or seasonal production patterns, and transportation preferences. Finally, the existing and the desired building materials and construction techniques were considered in order to discover the locally available materials and changing tendencies.

The parts and rationale of the social survey sheet were the following: for amplification of the rationale, the reader may turn to Appendix B, for the social survey sheet itself, to Appendix C: the sheet has six main parts, each having its own headings. The heading provides a brief summary of the questions under the same heading. This enables one to understand the subject that is being talked about. The main six parts, their headings and the number of questions are given in Table 1.1.

Table 1.1 Parts, number of questions and headings of the social survey sheet

PARTS	**NUMBER OF QUESTIONS**	**HEADINGS**
Part 1	12	Use of space in the dwelling, current comfort conditions, requirements and preferences
Part 2	17	Determination of environmental consciousness and consumption habits
Part 3	7	State of ownership
Part 4	4	Relationship with the environment
Part 5	6	Information about householders
Part 6	5	Questions completed by the questioner

The survey area was all the dwelling units in the municipal center of Seyrek. There were 952 people living in 305 units, or *hane*, established in the three districts of the Cumhuriyet, the Atatürk, and the İnönü Mahallesi—*mahalle*, meaning 'district'.[10] The social survey sheet was practiced with 101 residents, 68.3% of whom were female. The sampling rate is 10.6%, expressing the ratio between the number of surveyed persons and the whole of the 952 people living in Seyrek. Moreover, the information about 101 families and 332 persons represented about 35% of the population living in Seyrek center. In terms of dwelling units, 101 units were surveyed, or 33% of all units in Seyrek. The distribution of the social survey sheet according to the location of residential units in districts is 31% in Cumhuriyet Mahallesi, 33% in Atatürk Mahallesi, and 36% in İnönü Mahallesi. In short, one person in ten persons or one dwelling unit out of three units was surveyed.

Through the selection of the sampling band, it was noticed that the selection probability of each dwelling should be the same, thus the selection procedure was systematized by the 'systematic sampling method'. As maintained by this method, every one of five units on the same side of the street was identified and surveyed.

The studies of social survey on the selected units were completed with a general evaluation phase indicating that nearly half of the chosen units could not be surveyed. The reasons were as follows:

1. Most of the householders rejected holding the conversation.
2. Most of the dwelling units were either abandoned or intermittently used, because the householders do not live there continuously.

In such conditions, it was decided to communicate with dwellers who agreed to participate in the social survey. Hence, the sampling method of the social survey was converted to 'convenience sampling'. Along with this method, the other dwelling units located on the same building plot were kept out of the social survey sheet. The reason was that some of the answers were inevitably the same, and to reach different householders provides wider data. Nevertheless, this decision inevitably resulted in doing interviews with adjoining dwellings.

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[10] The population information is based on the annually renewed records of the Seyrek Health Centre for June 2001.

The pre-test of the social survey sheet was made with fifteen users, and then some questions were developed, omitted, or added. The social survey sheet was implemented directly with the dweller, interviewing one by one. Each social survey sheet took at least twenty minutes. As observed during use of the sheet, interviewers got more relaxed after the first two parts of the survey.

The application of the social survey sheet was held over 17 days in August and September 2001, when the villagers rarely are engaged in agricultural activity. The most beneficial hours for the interviews were between 9.00 and 12.00 and between 15.00 and 19.00 because the period of time around noon and in early afternoon was mostly utilized for napping purposes because of high summer temperatures. The social survey sheet was administered by a total of eight persons; six of them completed 30% of the 101 social survey sheets on the same day. On the whole, it was applied by the author of this dissertation either alone or with one other person.

In the analysis phase, the answers for open-ended questions were classified first. Then, the coding of both questions and answers was organized using the SPSS statistical program that helped analyze the relationship between parameters of the social survey sheet. The results of social survey studies are referred to in the limitation phase of the design process proposal. Only the related results are included in the text below, to prevent interference with the flow of the main text. For the tabulation of the survey results, the reader may turn to Appendix D.

CHAPTER 2
THE DISCOURSE OF SUSTAINABILITY

Ideally, when the discourse of sustainability is taken up without present notions of 'development' that are increasingly identified with consumption, the pursuit of sustainability will turn into a promising approach that is capable of compensating global and local problems, inevitably threatening the healthy existence of the ecosystem and human being, caused by the profit-based productive systems and development models. Far from vain idealism, this turn for the better for life on Earth *can* be hoped for because, indeed, the rigorous concept of sustainability proposes a kind of development that defends the right to life of not only humans but of all beings living and non-living. It suggests this as a new apprehension of future development. However, in the epoch of post-development and cyberculture, everyone has inevitably a different goal of sustainable progression and a different notion of the sustainable life.

We have been familiar with the idea of sustainable development since the late 1980s. The concept emerged as a result of such problems as pollution, energy scarcity, climate change, biodiversity loss and depletion of resources caused by a model of economic growth that has been at work from the 1950s up to the present. This approach is presented, particularly in southern countries like Turkey, as the peerless path to development and progress which will enable capture of the high economic standards of the 'developed' countries. The unwavering target is given as the progress level identified by the 'developed' world; the primary criterion of 'being developed' is, in turn, always the economic, while the social and ecological dimensions of development are relegated to the second place (Özesmi 2002a). Arturo Escobar assesses the role of sustainable development in affirming and contributing to the reconciliation of growth and environment, yet he undertakes this in relation to the fact that it is the "growth, and not the environment, that has to be sustained" (1995, p. 195). Escobar stresses the beholder role of the 'developed' world in ruling and restructuring the society and nature of the 'developing' world and for loading more weight on the latter's back by the discourse of sustainable development. Reading Escobar at length will be worthwhile:

> […] the emergence of the concept of sustainable development is part of a broader process of the problematization of global survival that has resulted in a reworking of the relationship between nature and society. This problematization has appeared as a response to the destructive character of post-World War II development, on the one hand, and the rise of environmental movements in both the North and South, on the other, resulting in a complex internationalization of the environment. What is problematized, however, is not the sustainability of local cultures and realities but rather that of the global ecosystem. But again, the global is defined according to a perception of the world shared by those who rule it. Liberal ecosystems professionals see ecological problems as the result of complex processes that transcend the cultural and local context. Even the slogan Think globally, act locally assumes not only that problems can be defined at a global level but that they are equally compelling for all communities. Ecoliberals believe that because all people are passengers of space-ship Earth, all are equally responsible for environmental degradation. They rarely see that there are […] great differences and inequities in resource problems between countries, regions, communities, and classes; and they usually fail to recognize that the responsibility is far from equally shared (Escobar 1995, pp. 194-95).

In the last analysis, Escobar trenchantly places the responsibility upon the so-called 'progressives' of the North or West, the industrialized or developed: "Becoming a new client of the development apparatus, in other words, brings with it more than is bargained for: it [sustainable development discourse] affirms and contributes to the spread of the dominant economic worldview" (1995, p. 196). Reciprocally, the South, the Third World, becomes in this context nothing but "resource"—once again for the 'sustainability' of the North: "[…] even the most remote communities in the Third World are torn apart from their local context and redefined as 'resources' " (Escobar 1995, p. 194).

In fact, the World Bank's most recent classification of economies by country, countries are grouped as low income, middle income (subdivided into lower middle and upper middle), and high income, based on 2002 gross national income (GNI) per capita. This graduation in income groups underscores the criterion for being 'developed' as it is measured by the World Bank. According to 2002 GNI per capita of national economies, the country classification is determined as $9076 or more in so-called developed countries ("The World Bank Group" 2003). The World Bank criterion of GNI indeed seems like a solid scientific criterion. However, as we shall see again and again in the following pages, it is too abstract a criterion, as well as too simplistic a one to comprise the multi-faceted problems saving 'developed' and 'developing' today. For example, how can one claim that the people of a ‘developing’ country are less developed because they consume less energy and natural resources? In point of fact, those consuming more resources have been supported by equating the economic prosperity, power and the growth with the ‘developed’, and thus the values of current consumer society have been supported.

The report, *Our Common Future*, prepared by the World Commission on Environment and Development, launched the strategy of sustainable development as the great alternative for former development practices. Yet some counter arguments, questioning ‘sustainable development’ as a developmental framework, have arisen in spite of continued exertions on behalf of sustainable development.[1]

Once this two-fold classification, or binarism, deriving from the concept of ‘development’ is accepted, the concept of sustainability emerges as a dilemma for both groups of countries. Taken in terms of the developmental binarism, the so-called developed countries will have already attained the desired level of economic progress by means of exploiting and consuming the resources of the so-called developing countries—albeit in unsustainable fashion. Indeed, once they have attained the high living standards and economic prosperity that inform the World Bank’s criteria for determining ‘development’, they uphold the idea that the same developmental model need, or rather must, not be pursued by the countries still ‘underdeveloped’. On the other hand, they do not refrain from exporting the ‘dirty’ technologies that they themselves have declared obsolete. Still on the other hand, the viewpoint of the so-called developing countries propels the latter to develop, as it were, as fast as possible, at whatever cost, which, in their perspective, is identified with affording conspicuous consumption by as large a portion of the population as possible. These countries have thus entered a path similar to that originally pursued by the ‘developed’ countries: they have taken the growth experiences of the ‘developed’ countries as a model. Yet most small communities in the ‘developing’ countries are not aware of sustainable values that are already inherent in their way of life. They are swiftly losing the opportunity for sustainability that is still, to some extent, available to them.

[1] On the meaning of the conception of ‘developed’ and the status of sustainable development in the last decade, see the following postmodernist critiques of development: Escobar (1995), Fagan (1999), Lehmann (1997), Pieterse (1998), Pieterse (2000), Rahnema and Bawtree (1997), and Sachs (1992).

This dissertation therefore adheres not to the binarism of the developed and underdeveloped, but to a nomenclature deriving from the dialectical opposition between the North and the South. However, in the larger context of this dissertation, this opposition too is subject to critique since sustainable development is, in the last analysis, a regional matter to describe which 'North' and 'South' are too large, for which, at times, even the scale of a country is too large. Yet at the same time, as we are going to see, even the categories of 'North' and 'South' are too small. The terms 'industrialized' and 'non-industrialized', on the other hand, are privileged in the present study to underscore a differentiating notion intended to replace dichotomic thinking in terms of the use of technology. The 'industrialized' countries, in the current state almost invariably identifiable with the 'North', are those that create scientific knowledge and succeed in converting this knowledge into technology. The 'non-industrialized' countries import technology, and only to a lesser extent the scientific knowledge whence technology derives, instead of creating them. They mostly fail to adapt the technology to their own circumstances. In this dissertation, the critical standpoint targets the notion that the industrialized North and its use of high technology production systems is identifiable with sustainability. A low-income/low-wealth community may wield locally based technological applications, yet be classified as non-industrialized. The other, older, and to a large extent obsolete binarism too will be utilized in this dissertation, viz. developed-developing, as well as that remnant of nineteenth-century orientalism, East-West. At times, the pair 'developed-developing' will occur, as here, in single quotation marks to remind the reader of the critical distance to be preserved vis-à-vis the categories. At times, the opposition between 'industrialized' and 'non-industrialized' too will be used, occasionally within single quotation marks in order to criticize the categories of a binarism that continues to be fostered by certain current conceptions of sustainable development which the following chapters will demonstrate to be erroneous. In order to serve as a backdrop to grasping the significance of such dichotomies, but also to overcome the glaring lack of a comprehensive formulation of both definition and history of the concept of sustainability, this chapter will now focus on extant definitions and the history of the theory of sustainability.

2.1. Definitions of Sustainability

Sustainability is, in fact, related to the systems approach of the biological sciences (Checkland 1994; Tivy and O'Hare 1991): John Button defines 'sustainability' as, "the capacity of a system to maintain a continuous flow of whatever each part of that system needs for a healthy existence" (1988, p. 34). When this conception is applied to ecosystems containing human beings, it comes to refer to the limitations imposed by the resilience of the biosphere. This in turn emphasizes the need to organize human activities in order to maintain balance and permanence in the world ecosystem. When sustainability is a goal, the human being as only one member of this natural ecosystem does not obstruct the sustainability of other living organisms merely for its own comfort, convenience, and wealth.

The human being, however, today dominates the biosphere. Human 'achievements', whether economic, technological, or cultural, direct the health and diversity of the ecosystem. Since current culture and value systems only consider promoting the development of civilization, the resilience of the Earth is continuously under attack (Svirezhev and Svirejeva-Hopkins 1998; Train 1994). From the anthropo-centric viewpoint, i.e. the utilitarian view, this means the exhaustion of the capacity of all the systems that sustain us, and from the ecocentric viewpoint, i.e. in the ethical view, the health and future existence of the planet are threatened.[2]

In this context, the term 'sustainability' has become the overall symbol of the latest environmental movement. The environmental problems which we face within the current development process reveal the need for producing macro-scale policies and global solutions both economically and socially, as well as environmentally. Therefore, the approach of sustainability potentially offers holistic, comprehensive and variable responses to the environmental crisis; and

[2] The ecocentric stance for environmental concerns bears the idea that the protection of the integrity of natural ecosystems is a "biotic right": "Nature […], contains its own 'purpose' which should be respected as a matter of ethical principle" (O'Riordian 1976, p. 4), not for the need and happiness of humanity. This view is supported by the ecocentric mode of environmentalist approach that, "preach the virtues of reverence, humility, responsibility, and care" (O'Riordian 1976, p. 1). Yet the current value system identified with the idea of more consumption for more growth contradicts the moral respect implied in the ecocentric view and supports a profit-based value system that centralizes the human ability "to understand and control physical, biological, and social processes," and upholds a view of 'nature for the sake of humanity'. Timoty O'Riordian (1976) wisely defines this anthropo-centric stance as the technocentric mode of the modern environmentalism.

that is why sustainability is not considered a single path or approach, but "the notion of sustainability often appears as a 'black box' " (Faucheux et al. 1996, p. 2). Its meaning is as varied as the international boards, governments, non-governmental organizations, social and interest groups that wield it. Thus it is best to trace the basic concerns of sustainability starting from the first emergence of the movement to its contemporary state.

The word 'sustainability' slowly entered into common usage with the heightened interest in the imperative outcomes of a struggle for rapid industrialization and growth. Fear of the depletion of raw materials and natural resources, and the idea that the world might become no longer hospitable to human life because of environmental pollution, caused, in a first step, a self-critique: the northern countries criticized their own growth process, especially their self-destructive, polluting, dirty production technologies. The rising environmental alertness at the political and institutional plane and the international conferences on environment and development have resulted in the promotion of sustainable development as a universal goal by the North (Escobar 1995; Sachs 1992).

The Brundtland Report of the World Commission on Environment and Development convened by the United Nations in 1987 was the first endeavor to attract global attention to the concept of sustainability and sustainable development. The Report, called *Our Common Future,* represents an overview of the current state of the world, and then offers certain general characteristics and a common consensus on the scope of sustainable development. The most quoted definition of sustainability is from the Report: "sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (Brundtland 1987, p. 43). The fundamental stress in this definition is on the necessity of a broader, longer-term vision for achieving sustainable development.

According to the report, sustainability is defined as a process that reconciles present and future requirements for technical improvement, institutional coordination, investment and the use of natural resources (Kaplan 1997). This statement of sustainable development does not only emphasize the need to achieve harmony between economic and environmental factors toward sustainable growth, but also encourages more complex and multidimensional proposals including political and institutional procedures.[3] The well-established definition of sustainability in the Brundtland Report sets an ideal premise. However, it does not clarify specific human and environmental parameters for realizing or measuring sustainable development. This goal-oriented definition needs to be interpreted more specifically. Thus Manzini (1997, p. 46) defines the term as follows: "what is meant by the expression 'sustainability' is a form of organization of human activities whereby, on a planetary and on a regional level, the ecosystem need not be disturbed beyond the threshold of its 'resilience'." This emphasis on form implies "the condition or state which would allow the continued existence of homo sapiens [*sic*], and provide a safe, healthy and productive life for all generations in harmony with nature and local cultural and spiritual values" (du Plessis 2002a, n.p.). These two definitions both point out that the term 'sustainability' defines the ideal stance of the human being as only one of the entities on the living Earth.

We further read that in order to achieve the goal of sustainability, humanity should attain the "characteristic of a process or state that can be maintained indefinitely" (*Caring for the Earth* 1991, p. 211). This vague definition may be clarified with the definition of sustainable *use* as the "use of an organism, ecosystem or other renewable resource at a rate within its capacity for renewal" (*Caring for the Earth* 1991, p. 211). Jones (1998a, p. 249) characterizes the meaning of 'sustainable use' more precisely as "the concept of managing the use of natural resources so that the amount of the resource is not irretrievably depleted." It can be readily seen, however, that the term 'sustainability' defines the type, condition, and way of using any entity by implying that human beings have a legitimate right to its use.

In this respect, sustainable development denotes, "improving the quality of human life while living within the carrying capacity of supporting ecosystems"

[3] Actually the term 'sustainable growth' has a critical meaning. Daly (1993, p. 268) points out that, "the term 'sustainable development' is used as a synonym for the oxymoronic 'sustainable growth' " by asserting that, "sustainable growth is impossible." According to him, "*to grow* means, 'to increase naturally in size by the addition of material through assimilation or accretion'. *To develop* means 'to expand or realize the potentials of; to bring gradually to a fuller, greater, or better state'. When something grows it gets bigger. When something develops it gets different. The earth ecosystem develops (evolves), but does not grow. Its subsystem, the economy, must eventually stop growing, but can continue to develop. The term 'sustainable development' therefore makes sense for the economy, but only if it is understood as 'development without growth'—i.e., qualitative improvement of a physical economic base that is maintained in a steady state by a throughput of matter-energy that is within the regenerative and assimilative capacities of the ecosystem." (p. 268)

(*Caring for the Earth* 1991, p. 211). When this homocentric definition is left aside, it means the kind of development enabling "a continuous process of maintaining a dynamic balance between the needs and demands of people for equity, prosperity and quality of life, and what is ecologically possible" (du Plessis 2002a, p. 2). In the light of these various definitions, it can be seen that there are two key concepts framing the scope of sustainability: "the idea of limitations" and "the concept of needs" (Brundtland 1987, p. 43).

The context imposed by limitations in the report refers to the necessity of restrictions for human beings exploiting and consuming beyond the carrying capacity of the world while supporting the progress of civilization and humanity. Therefore, the current developmental objective should be to avoid creating ways of living, patterns of built environment and models of development that might ultimately harm people and natural ecosystems. The vague perspective by the limitations implies "find[ing] most efficient forms of using resources without threatening the survival of nature and people" (Escobar 1995, p. 196), or in more implicit phrase, "producing more with less" (Brundtland 1987, p. 15). This assertion has also been treated by the World Watch Institute's annual reports *State of the World* since the first Worldwatch Paper was published in 1975 ("State of the World" 2003). Yet, as claimed by Escobar (1995), in spite of these exertions of limitations, the discourse of sustainable development is more interrelated with the 'growth of limits' rather than the 'limits to growth'.

Sustainable development, moreover, requires the designation of human needs and aspirations once again. The essential needs of most people around the world for food, clothing, shelter, and jobs, are not being met. The Brundtland Report states that,

> [s]ustainable development clearly requires economic growth in places where such needs are not being met. But growth by itself is not enough. High levels of productive activity and widespread poverty can coexist, and can endanger the environment. Hence sustainable development requires that societies meet human needs both by increasing productive potential and by ensuring equitable opportunities for all (Brundtland 1987, p. 44).

As is understood, the report stipulates the economic growth for meeting the basic needs by proposing increase in the productive potential in communities, supporting more production and economic activity and actually by driving consumption. It also maintains setting up an economic system that guarantees the equity in meeting needs and that implies an 'equal' distribution of 'wealth', i.e. a 'redistribution of wealth', in an economic manner.[4]

Within the general context based on these two key factors—the limitation and the need—and on behalf of the Brundtland Report, the concept of sustainable development embodies these essential principles (Brundtland 1987; Selman 1996):

Holism: The transformations toward sustainable development are devoted to the growth and development of the whole of humanity and the protection of the planet for future life.

Long-Term View: Sustainability requires thinking long-term and assuming responsibility for the future.

Green Growth: The report also proposes that economic growth or development is still possible as long as it is green growth.

Polluter Pays: "The costs of environmental damage should be borne by those who cause them" (Carew-Reid et al. cited in Selman 1996, p. 15).

We may continue the list of principles as follows:

New Forms of Development: Sustainability implies new forms of development that no longer harm the Earth but are in harmony with its natural processes.

Betterment of Living Quality: To improve the quality of living conditions of every people is one of the primary goals of sustainability.

Betterment of Ecological Quality: Sustainability supports the policies that give priority to bettering ecological quality as a basis for improving other aspects of life.

Ethical and Social Responsibility: The term sustainable development reintroduces the ideas of ethical and social responsibility through the adoption of lifestyles within the planet's ecological means.

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[4] Actually, many sustainable development models, as stated by Faucheux et al. (1996), explore how, and to what extent, the socio-economic objectives of a society or nation may be reconciled with the concern for inter-temporal equity and increase of a potential for economic welfare. Duborg and Pearce (1996) analyze the issues arising from the application of standard models of optimal growth to sustainability, if an ethical norm is adopted into the economic system. Consistent with the Brundtland Report which put it bluntly, they assert that a model cannot serve both optimal growth and sustainability, and the criterion of equity and the acceptable welfare distribution between the communities fails because the efficient use of resources from the ethical standpoint can bring about an unacceptable reduction in the standard of living for many 'developed' countries under certain defined conditions of technology, capital, resource use and the determinants of economic prosperity.

Inter- and Intra-Generational Equity: All people, currently alive or not yet born, have an equal right to benefit from the use of resources, both within and among countries.

Social Solidarity and Justice: The report encourages people to work together to create healthy communities; all citizens should have the opportunity to improve the quality of their lives.

Civic Engagement: Sustainable communities necessitate the creation of full opportunity for citizens, business and communities to participate in and influence the decisions that affect them; effective citizen involvement in decision-making is proposed.

Resources and Energy: The report proposes to conserve non-renewable resources as far as possible, to minimize the production of waste and to encourage efficient use of renewable energy sources.

Consumerism: Sustainable consumption is related to sustainable production concerning the more responsible consumption of more sustainable products. Sustainable communities must not only consume in more socially and environmentally responsible ways, but also must consume less.

While the Brundtland Report enumerated the criteria for achieving sustainable development as given above in 1987, a decade later, Ayşegül Kaplan, in *Küresel Çevre Sorunları ve Politikaları* [Global Environmental Problems and Policies], was going to criticize the same in the context of national boundaries. Thus the objectives proposed for achieving sustainability in the national scale were enumerated by Kaplan as follows:

> Excessive population growth should be halted immediately.
>
> Food requirements should be continuously guaranteed.
>
> The disturbance of ecosystem health and the process of destruction of biodiversity should be stopped.
>
> The intensive use of non-renewable energy sources should be avoided in energy consumption while preferring the use of renewable sources.
>
> The technologies that do not harm natural resources and the environment should be developed.
>
> The uncontrolled overgrowth of cities should be halted (1997, p. 162; my translation).

In sum, the 1987 Brundland Report formulated the principal goals within the constituent dimensions of sustainability, viz. ecological, economic, and social sustainability for all southern and northern countries. All three dimensions must be integrated in order to attain sustainable creation.

Ecological sustainability involves protection of resources and protection of ecosystem health. The understanding of the ecological properties of systems depends on understanding their interrelations. Hence, the idea of ecological sustainability symbolizes a concern with pattern, interrelatedness, system, as well as a holistic approach (Orr 1992).

Economic sustainability is concerned with the growth trend of society as well as the principles of production and the limits of consumption. The economic dimension of sustainability can be divided into two parts. An investment should be considered in terms of both long-term resource productivity and low running costs. Instead of minimizing the investment cost through highly customized low-cost solutions, it is preferable for a given investment to find the solution which has the highest durability and re-usability. Solutions that can be repaired and used in several ways have the highest long-term potential. Besides, solutions with low energy consumption, which are easy to operate and maintain generally have low running costs and low environmental impact at the same time. In that sense, the sustainable investment approach supports the life cycle assessment tool for comparing the environmental credentials of similar products and services and thus, for marketing green goods ("Life Cycle Assessment" 2003).

Social sustainability means that these ecological and economic aspects of sustainability cannot be evaluated as a choice for individuals, groups and societies, unless the habitants of that place assert their specificity—ethnic, religious or cultural—in the face of the current globalization and homogenization process. The social aspect of sustainability, thus, emphasizes the importance of the sense of community, the maintenance of cultural values and mending community ties.

The societal system should aim at reproducing itself through continuous improvement of the quality of life and sense of community while decreasing the impact of the societal system on the environment. The notion of sustainability requires that society adopt a value system that is based on more than money, which would also mobilize public opinion toward more balanced use of resources for economic well-being. All these dimensions depend for their success on the understanding of complex systematic relationships in societies with different behavioral, philosophical, social, cultural, and educational systems.

With reference to the conceptual evolution since the late 1980s, it may be noted that the sustainable point of view promotes studies in two different scales and scope: firstly, sustainability promotes ‘thinking and acting globally’ to create global solutions, stating aims in coordination, working together and producing common projects for the common future. The transition to sustainable development can only be possible through co-operation, in other words through creating global partnerships. Strong (cited in *Projects Around the World* 2000, p. 32) supports this idea with the following words:

> It requires a major shift in priorities for governments and people, involving the full integration of the environmental dimension into economic policies and decision-making in every sphere of activity and a major redeployment of human and financial resources at national and international levels. This global partnership is essential to set the world community onto a new course for a more sustainable, secure and equitable future as we prepare ourselves for the 21st century.

The stress on worldwide thinking, acting and reacting has resulted in sustainability becoming a buzzword of international boards, strategic framework studies and intergovernmental policies. Sustainable development has emerged as a most defensible and elegant term. It has been presented as a global discourse, yet only on the theoretical plane.

Secondly, sustainability celebrates being local and indigenous (Selman 1996). It promotes ‘thinking and acting locally’ to develop local solutions, stating aims in coordination with local governments, enabling user participation and producing projects unique to the case for the common future. Thus while it has some specific implications at the local level; the interpretations vary, even if the realization of goals is planned to be country-based. In many case studies such as the one in the town of Davidson, North Carolina, USA, incorporating the sustainable development into local-level planning activities (Thomas and Furuseth 1997), the local sustainable development strategies have provided the consultation and involvement of the general public, the formulation of local partnerships for local problems and the development of self-monitoring, measuring and reporting systems on progress toward sustainability. And what is more important, the small-scaled local studies for sustainability seem to have been more successful than the ones on the global plane. The review of the International Council for Local

Environmental Initiatives amplifies this assertion with a key message: "local action moves the world" (*Dialogue Paper by Local Authorities* 2002, p. 3).[5]

Indeed, the role of locality has been pivotal in moving toward a sustainable future. The sustainable course of action suggests a development trend toward local sustainability aimed at constituting a social act as an anti-study against the homogenization and globalization trend of the last century. The importance given to local sustainability has also brought the valuation of local knowledge, and the encouragement of the local resistance, ethnicity and cultural autonomy (Escobar 1995). The role of local sustainable development policies in transition toward the sustainable course of action yet needs to be carefully assessed.

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[5] In the Second Summit Preparatory Committee (PREPCOM 2) Meeting, 28 January - 8 February 2002, New York, the Economic and Social Council presented a worldwide review of local government progress in implementing Agenda 21 over the past ten years. Addressing local sustainability, the worldwide survey pointed out the inconsistency and inadequacy of overall global response to Local Agenda 21. Yet the existent studies themselves were evaluated as the essential benefit of the last decade since the Rio conference, because they were the sign of commitment at the local level. Pointing out that, "[s]ince 1992, more than 6,200 local governments in over 100 countries have established local Agenda 21 planning processes," the report evaluates the course of local actions while itemizing the following concerns:

- "Local Agenda 21 processes have been instrumental in enabling local governments to enhance local good governance. They have facilitated the involvement of major groups, including women, youth, indigenous peoples, NGOs, workers and trade unions, the private sector and other local stakeholders in local decision-making structures…, local governments have established formal partnerships with major groups, ethnic minorities, community-based groups, the education sector, research and scientific institutions, the media, professional associations, international agencies, national Governments and other local governments to accelerate sustainability.
- Local governments dealing with complex political and economic transformations have also begun to embrace local Agenda 21 processes. Nearly 100 local governments in Estonia, Latvia, Lithuania, Poland and the Russian Federation have adopted local Agenda 21 plans. The trend towards the decentralization of decision-making authority from national to local levels in the Asia-Pacific region has led to expansion of local Agenda 21 processes in China, Thailand, Indonesia, the Philippines, Malaysia, Viet Nam and the Republic of Korea… In Latin America, local Agenda 21 has been a vehicle to promote equality and democracy in local government. Brazilian local Agenda 21 processes have resulted in local governments introducing participatory budgeting while Peruvian local governments are advocating links between local Agenda 21 processes and ongoing decentralization in their country.
- Local government planning processes aimed at sustainability in developed nations often embody many Local Agenda 21 public participation principles, even if they are not deemed as such. In Japan, 109 local governments have local Agenda 21 strategies and many others address environmental issues with similar participatory approaches. In Western Europe, new multi-stakeholder mechanisms are being implemented. Some 1,300 European local authorities, representing over 100 million citizens, have joined the European Sustainable Cities and Towns Campaign, committing themselves to engaging in local Agenda 21 processes. All Swedish municipalities and over 90 per cent of local governments in the United Kingdom of Great Britain and Northern Ireland have adopted these strategies" (*Dialogue Paper by Local Authorities* 2002, pp. 4-5).

2.1.1. Historical Background: Conceptual Evolution of Sustainability Guidelines

Early efforts toward sustainable development date back to the beginning of the 1970s when the United Nations first organized a worldwide Conference on the Human Environment, which met at Stockholm, Sweden, on 5 - 16 June 1972. The conference was a sign of consideration of "the need for a common outlook and for common principles to inspire and guide the peoples of the world in the preservation and enhancement of the human environment" (*Declaration of the UN Conference* 1972). The Stockholm Declaration was a significant milestone that set a new agenda for sustainable development; the member countries, especially the 'developed' ones, agreed on the urgent need to respond to the problem of environmental deterioration (Özesmi 2002a).

By the early 1980s, again by the collaboration of international organizations such as The World Conservation Union (IUCN), The United Nations Environment Programme (UNEP) and World Wide Fund for Nature (WWF), a detailed set of policies, namely the *World Conservation Strategy*, was declared to attract attention to the need for the conservation of nature and natural resources stressing the interdependence of conservation and development.[6] However, neither the UN Conference on the Human Environment, which was the earliest international meeting on the environment, nor the World Conservation Strategy, one of the pioneering guidelines on development, could give binding force to its proposals for constituting a global partnership. Instead, they stimulated the dissemination of information that the existent development trend toward permanent growth had failed.

The concept of sustainability gathered increasing political attention and acceptance around the world, notably after the activities of the Brundtland Commission between 1983 and 1987, and the United Nations Conference on Environment and Development (UNCED), known as the Earth Summit, held in Rio de Janeiro, Brazil, in 1992 ("UN Conference" 1997). In addition, the second study of IUCN, UNEP and WWF in 1991, *Caring for the Earth: A Strategy for Sustainable Living,* continued to support a broad and explicit world strategy for

[6] The proposed strategy conveyed that sustainable development depended on caring for the Earth. Thus it emphasized three objectives: 1. Essential ecological processes and life-support systems must be maintained; 2. Genetic diversity must be preserved; 3. Any use of species or ecosystems must be sustainable (*Caring for the Earth* 1991, p. 1).

the changes needed to build a sustainable society (*Caring for the Earth* 1991). These formal studies promoted local action, thus Local Agenda 21 (LA 21) studies were started in order to encourage local sustainability and subsequent preparation of national sustainable development strategies.

The Earth Summit in 1992 was the first international conference in which sustainable development was agreed to by all the members of the United Nations. It mobilized governments to move the sustainability issue to the center of development planning, economic and sectoral policy and decision-making. It was clearly understood that the protection of the environment and social and economic development are fundamental to sustainable development, based on the Rio Principles.

The creation of a Commission on Sustainable Development (CSD), recommended by this conference, has monitored progress on Agenda 21 (*Agenda 21* 2003). The LA 21 studies are the initial attempts to implement the sustainable principles at local level, and to instill an acceptance of sustainability based on the inseparability of social, economic, and environmental issues. They are the working groups outlining the action plans of cities for the twenty-first century. Locality as an arena for effective citizenship action comprises LA 21 studies' apparent concern for the decentralization of decision-making downwards while facilitating development of international co-operation upwards.

Agenda 21 action plans pre-suppose the availability of an effective planning framework. In this stance, as was stated already in *Agenda 21—Report of the United Nations Conference on Environment and Development* in 1992, Agenda 21 expects an integrated approach to the disciplines of planning and architecture, because, it claims, some kind of system regulating land use must and needs to be installed as a means of improving urban conditions and in order for norms determining building capacity to respond to environmental pressures (Selman 1996, "Promoting Sustainable Human Settlement" 2003). This criterion actually arises from the predetermined conference goal of the integration of environment and development considerations in the broader decision-making process. Therefore, the action plan stresses the need for integrated planning and management of land resources related to the design disciplines. The broader strategies drawing the framework for human settlements are as follows:

providing adequate shelter for all;

improving human settlement management;
promoting sustainable land-use planning and management;
promoting the integrated provision of environmental infrastructure;
promoting sustainable energy and transport systems in human settlements;
promoting human settlement planning and management in disaster-prone areas; and
promoting sustainable construction industry activities
(Selman 1996, p. 109-110).

Following the main agenda and the Rio Declaration on Environment and Development, the conference initiated three global statements on key environmental issues, namely:

the Framework Convention on Climate Change
the Convention on Biological Diversity
the Statement on Principles of Forest Management
(Selman 1996, p. 23).

Earth Summit of 1992 offers some basic principles for the determination of these action plans. It is expected that all nations, without discrimination between so-called developing and developed countries, should have primary duties and liabilities to prevent further damage to the environment, and to provide for the use of resources by economic means which consider the coming generations.

After the Earth Summit, the global dimension, i.e. the transboundary character of development, was addressed by a series of conferences, treaties, conventions and protocols to affect general and specific responses from national governments. In any case, all these international strategies are associated with specific legal and funding measures.

The major 1996 Habitat II, The United Nations Conference on Human Settlements in Istanbul, Turkey (*HABITAT II* 1996), was billed as the City Summit and focused largely on the concepts of global village, mega city and human settlements aiming to nurture a healthy and sustainable habitat and human settlement. It was also to become a critical conference on account of the debates on the prepared national sustainable development strategies of countries.[7]

[7] The UN Center for Human Settlements (UNCHS), i.e. Habitat ("UN-Habitat" 2003), played a valuable role in advising and supporting governments within this conference. It took attractions to the enormous pressure for shelter and services in both rural and urban areas placing in both the South and North. As a result, the Habitat II Conference has accelerated the projects especially for urban challenge in the South to strengthen the local governments and to attain self-reliance and citizen involvement. Furthermore, it clarified by Çelik (1997 p.6) that, "only with the partnership between different actors such as governments, non-governmental organizations

Five years after the United Nations Framework Convention on Climate Change, governments committed themselves to cut local CO^2 emissions by the Kyoto Protocol, agreed on in December 1997.[8] The protocol marked an important threshold in efforts promoting the decrease in use of carbon-based fossil fuels worldwide. Yet it may also be deemed an evident indicator of a corporate block against the international commitment to the sustainable development by the pioneers of the North such as the USA, Canada, and Australia. These countries do not want to ratify the protocol "without the 'meaningful participation' of developing countries" (Thomas 2002).

After more than a decade, corporate exertion both internationally and locally has achieved relative success putting sustainability issues on the global political agenda. While global policy makers and environmental experts formulate the global strategies in conferences, NGOs, community-based organizations (CBOs), environmental and social groups and the local people committed to changing their own communities give life to the projects. Even though overall global partnership is inadequate, there is an accelerating adoption by local governments to support the principles of sustainability.

At this stage, the Johannesburg Summit 2002, in other words The World Summit on Sustainable Development (WSSD) ("The Johannesburg Summit" 2002), which took place in Johannesburg, South Africa, from 26 August to 4 September 2002, may be characterized as a worldwide Local Agenda 21 survey of local authorities and their associations evaluating the extent of the implementation of Local Agenda 21 plans globally.[9]

(NGOs), the private sector, academia, and local authorities can the development of sustainable human settlements be achieved, the problems of rapid urbanization solved, the dynamics of urbanization of poverty understood, and living conditions in cities improved."

[8] The Climate Change mitigation focuses on how countries should prepare and adapt for climate change. It is expected from the national governments to make commitment on reducing their greenhouse gas emissions and to mitigate the threat posed by global climate change.

[9] Within the scope of lessons taken over the past ten years, the Summit highlighted the strengthening of locality, the local governments and redesign of government as a strategy for the sustainable development, because the local government was symbolized as an effective agent for the promotion of equity poverty reduction, social justice and security, to sum up sustainability at local level, and for implementation of conventions on climate change, biodiversity and desertification, and other local strategies. The 30th item of Johannesburg Declaration on Sustainable Development underlined the accelerating understanding on the issue by expressing that, "we undertake to strengthen and improve governance at all levels for the effective implementation of Agenda 21, the Millennium development goals and the Plan of Implementation of the Summit" (*From our Origins to the Future* 2002). For more information about the outcomes of the Conference, see also the *Report of the World Summit on Sustainable Development* (2002).

Strategies for sustainability at the local level are now becoming dominated by Local Agenda 21 exercises. Approaches to LA 21 have been largely experimental in the wake of the Rio Conference. These are still insufficient in number and have done little to mobilize their national and local bodies (Gutman 2003), but there are good practices by NGOs now reflecting more mature comprehension of strategies. Yet the discussions on the accomplishment of WSSD indicate that most environmental and social NGOs see the meeting as a failure in terms of both North and South, or as a lost opportunity to increase the dialogue and long-term co-operation among the NGOs as well as the nations (DiSano cited in "UN Taking First Steps" 2002; Karen 2002). The critiques focus on the question of 'what is new'; the impressions have been that the agreed-upon plan made little progress. Pablo Gutman, for instance, briefly explains that, "the final four-page Johannesburg Declaration on Sustainable Development avoids polemic issues (such as environmental targets, trade reforms, democratization, market reforms, or international aid) and repeats—without innovation—the wish list from international meetings over the last 10 years" (Gutman 2003, p. 27). More importantly, all these indicators about the conference clearly brought to light the fact that few governments and businesses seem willing to commit to social and environmental goals. The economic slowdown, the United States administration, terrorism concerns, World Trade Organization and other trade negotiations were shown as the reason dominating the international development agenda, not the WSSD (Karen 2002; Gutman 2003; Speth 2003; "UN Taking First Steps" 2002).

2.2. Critical Overview of the Last Decade

After a decade, the concept of sustainability needs review with the considerable change in its focus from *why to sustain* to *how to sustain*. Sustainable development is a well-known concept today, even if it is not yet a widely accepted and well thought-out goal for countries, societies or persons. There is an enormous difference between ideal propositions and wide-ranging practice. The success and failure of the last decade's discourse on sustainability may be conveyed in discussion of the variety of responses to the two queries of *why to sustain*, including questions and analyses of corporate globalization and the anti-globalization movement, and *how to sustain*, including propositions aimed at sustainability. While the concept of sustainable development arose as global discourse in the 1990s, the development trend of nations toward globalization has also become widespread and popular. The 1990s may be characterized as those years when the development efforts of nations spread worldwide, while this was on a national or regional plane in the 1970s and the 1980s. National economic policies especially have been directed by the concept of globalization. Hence, sustainability must deal with globalization first.[10] The worldwide globalization trend affects the discourse of sustainability in two directions: on the one hand, globalization and sustainability have become partners in a new concept of sustainable globalization. On the other hand, thinking about sustainability has resisted and rejected globalization.

In the former way, the financial industry has been presented as a sector which can play central role in funding and developing effective responses to sustainability challenges. For example, in the International Roundtable Meeting on Finance and the Environment organized by UNEP in November 2000, the financial sector was indicated as an inevitable part of the world's sustainable development because, without it, there would be little hope of creating a sustainable world for 8 to 10 billion people. At the end of the meeting, it was suggested that, "the financial sector can play a pivotal role in creating, nurturing, and driving new markets which respect the environmental, social and economic dimensions of sustainability" (Van Dijk 2001, p. 384). This view shows that UNEP as an international constitution encourages the global market and business toward sustainable globalization.

Debates, therefore, draw attention to the re-regulation of the financial sector. The emerging environmental challenges, especially climate change, are creating new, potentially massive liabilities for the world of finance: the sanction of the Kyoto Protocol for the decrease in CO^2 emissions is a case in point. This has logically led to the need for creating a new market demanded by sustainability (Doucet 2000). The business case for sustainable and responsible investment has

[10] Globalization is the development tendency empowered by the intensification of global linkages across a wide sphere, trans-national corporate business structures, international finance, mobility of some particular group of people, e.g. laborers, emigrants, tourists, and others, and technology and electronic communications (Hall and Tarrow 1998; Szántó 2001). The costs of globalization, especially in the South, are crucial; the environmental, social and psychological results of development toward globalization in Ladakh, India, are a case in point. "Ladakh's local economy is being steadily dismantled, and with it the local community that was once tied together by bonds of interdependence" (Norberg-Hodge 1998, p. 67).

to be communicated and explored globally, and a corporate structure for sustainability must be created. Otherwise the widespread adoption of sustainable investment practices would be unlikely. Even if the essential need for forming a new market has been argued for a long time, the projects and investments are still inadequate to constitute successful implementations. The real problem is that there is no applicable and overall answer to how globalization and sustainable development will structure the financial institutions which can contribute to and benefit from penetrating new markets in a globalizing world headed toward sustainability.

Today, it is generally accepted that a vision based on creating economic well-being by sustainability is captivating, but difficult to put into practice. Hence, the latest studies for sustainable development, especially in Europe, concentrate on the failures in sustainable enterprises so far, and thus on learning by describing and analyzing the reasons for failure. The Second International Zurich Sustainability Symposium in September 2001, organized by the Sustainability Forum Zurich, for instance, was the meeting at which the lack of corporate sustainability was identified as one of the chief causes ("Financial Services and Sustainability" 2001). In Zurich, Strong, in the vanguard of sustainability and a driving force behind the UN Earth Summit in 1992, clearly confirmed that the prevalent development processes indeed worked against sustainability. He pointed out that while some changes were routinely promised at international meetings, they were then pushed aside by daily business or blocked by pressure groups. Thus he suggested that, "it might perhaps be time for pioneers in financial services to start acting as a lobby themselves and press for framework changes that would speed up sustainable development" (Strong cited in "Financial Services and Sustainability" 2001, p. 2). In this meeting, the requirement for a dialogue among all stakeholders was cited as the core issue for a sustainable financial industry. This is essential because, "corporate and financial decision-making needs to consider a wider range of criteria" ("Financial Services and Sustainability" 2001, p. 1), and the dialogue will be a key challenge for the financial sector to learn how to use a wider set of data.

This recent consequence may be evaluated as the struggle for the real implementation of sustainable principles in economic development beyond verbal efforts. It suggests a new kind of corporation, in other words restructuring the "corporate sustainability" (Dyllick and Hockerts 2002), perhaps as was done by global corporate powers in the globalization process. There is, however, a certain paradoxical situation in that sustainability describes itself with an opposite stance to the globalization trend. First and foremost is the fact that the guideline of sustainability with its propositions for the development process has conflicted with the course of globalization. In point of fact, the term 'sustainability' expresses a global attitude for economic welfare that considers a progressive transformation through growth without stemming development, while at the same time guaranteeing social justice, equity and ecological well-being for so-called developing countries as well as for the 'developed' ones. Globalization, however, conveys a general sense that economic growth is driven more and more by international forces interested only in the profit motive (Roberts and Hite 2000).

Contrary to sustainability, globalization "crystallizes both the hopes of some people that we will finally achieve a global society, earn more money, obtain power, and the fears of many others that their lives and jobs are threatened by forces beyond their control" (Hall and Tarrow 1998, p. B4). Globalization favors some groups, i.e. multinational power groups, and ignores the others, while sustainability considers that humans should share equally in all advances. Within this dilemma, the ideologies of globalization and sustainability clashed, and some basic conflicts arose in terms of the way to attain economic prosperity.

The restructuring period of the development process toward sustainability actually increased the criticism of globalization. The philosophy of capitalism, besides, has been under attack during the last decade. Lastly, a global action called 'anti-globalization' has been formed against globalization, and the necessity for a new economic base has been clearly realized.

The anti-globalist movement presents a noncontrolled ground, growing up freely against the economic development trend toward globalization. This action does not constitute any alternative economic system. Its position can be summarized as only the refusal of globalization. Moreover, this is not an action promoting any economic system. The anarchist character of the movement opposes any global agreements on economic growth—in other words any constitution manifesting corporate power globally.[11] This is why the anti-globalist

[11] The report of Canadian Security Intelligence Service explains the phenomenon of anti-globalization as, "the growing trend toward anti-globalization activism is directed, first, against

movement does not support the sustainability idea, even if the concept of sustainability offers a new set of economic values, which contribute to the anti-globalist idea.

The increasing interest in the sustainable way of life and negative judgments on globalization have given rise to new implementations to change the rules and practices of conventional international trade. Fair Trade, for example, is an alternative approach to conventional international trade. Fair Trade "is a trading partnership which aims for sustainable development of excluded and disadvantaged producers. It seeks to do this by providing better trading conditions, by awareness raising and by campaigning" (Krier 2001, p. 5).

This latter approach sets an example of partnership in trade through dialogue, transparency, and respect. It aims at alleviating poverty in the southern countries by providing disadvantaged producers in Africa, Asia, and Latin America with fair opportunities to access markets of the North ("Fair Trade Labelling" n.d.). It builds sustainable direct relationships between these producers in the poor and the consumers in the rich parts of the world, and emphasizes that, "Fair Trade is not just about trade, but also about development both at the producer and the consumer end of international trade" (Krier 2001, p. 6). While many trade organizations promote the marketing of handcrafts and food products in a rather direct manner, they help minimize dependency on the North in controlling their living and natural environments, and present a path to keep their already sustainable living habits by creating culturally grounded, locally-produced, small-scale ventures that do not require big investments, yet build systems for livelihood of citizens. This actually causes a self-healing process in the built environment such as that experienced in the affordable housing projects in Colombia and El Salvador ("Fair-Trade Coffee" 2002).[12]

'big business'—multinational corporate power—and, second, against 'big money'—global agreements on economic growth. […] Protest objectives extend beyond the claimed corporate impropriety, however. Multinational economic institutions, such as the World Trade Organization (WTO), the World Bank (WB), and the International Monetary Fund (IMF), are seen as establishing, monitoring, and rendering judgements on global trade practices, and are viewed as the spearheads of economic globalization. These institutions, considered to be the servants of corporate interests, exercising more power than elected governments and interested only in the profit motive, have increasingly become principal demonstration targets" ("Anti-globalization" 2000).

[12] The role of local fair trade organizations may be traced in the local community housing project for the people of the Colombian indigenous co-op Ingrumá and for the reconstruction of damaged or destroyed houses by the earthquake in El Salvador in 2001.

Next, the scope of sustainability has been enlarged as not only being related to economic prosperity but also to social development. The studies on sustainable development indicate that the process should require a major shift toward the formulation of the sustainable approach as a social project. It is realized that the goal of economic development for sustainability is inadequate without any change in social structure.[13]

When considering the scope of sustainability as a 'social project', the international stance of sustainability faces us with the bipolar stance of countries because of their current economic conditions. The countries have been channeled about the development of an attitude toward the sustainable development process according to their 'poorness' and 'richness'. The label of this dichotomy is the re-structuration of society by means of handling sustainability as a social project in a so-called developing country or a so-called developed country.[14]

Logically, all countries depend on one biosphere for sustaining their lives. Yet, even now, each strives for survival and prosperity with little regard for the impact on others. The effort to attain more prosperity and improve quality of life, negatively affects the social development target of sustainability. 'Poverty', still cited as one of the root causes of the unsustainable development of the South (*World Summit on Sustainable Development* 2002), is a self-destructive dynamic for the social sustainability of so-called developing countries. It is true that poverty reduces people's capacity to use resources just as poverty and hunger lead to environmental degradation according to *The World Bank Annual Report* in 2001: "environmental degradation poses great harm to developing countries, which suffer annual losses of productivity and natural capital as high as 4 to 8 percent of GDP" (2001, p. 49). Indeed, the migration to the cities because of hunger and unemployment leads to explosive levels of urban growth and

[13] This is because of a recognition common for both southern and northern countries that the prevailing operating system of our society is not capable of being maintained at its current pace or in its current form. Isbister (2001) states that the promises of food, health, work and consumer comfort for all by the industrialization process since the nineteenth century have proved tragically false. The promise of social enlightenment and freedom for any person due to abundance of material wealth and the growth of knowledge has proved equally elusive.

[14] A special group, namely the Social Development Group established in the World Bank ("The Social Development Group" 2003), is an indicator of this dichotomy in order to ensure that the social dimensions of sustainable development for the 'developing' countries are taken into account on the project and programmatic level of the Bank. It clearly defines that the goal of social development is to support the empowerment of 'poor' people by increasing their social assets and capacities and to promote inclusive institutions, thereby increasing 'poor' people's opportunities for more secure livelihoods.

slumming. A growing number lack access to clean water and sanitation. In conclusion, unsolved poverty causes an unsustainable social life without satisfying any aspiration for a better life. Yet what is the root cause that makes the poor people of the South live in unsatisfactory living conditions, to have unsustainable social life? Is it only the "poverty as the effect of destroyed environment" (Escobar 1995, p. 202) as represented by the discourse of sustainable development?

Keeping in mind these questions behind the problematization of poverty, the sustainable initiatives aim at proposing a social system in which people will have the ability to attain their basic needs while ensuring the continuity of basic lifecycles and ethnicity for future generations. Indeed up to now, sustainable development has implied an international stimulus to the South for the elimination of 'poverty' problems. The task to prepare economic development planning was given mostly to international boards. The idea behind this is that, "global poverty cannot be reduced by the governments of poor countries acting alone. At the same time, more aid and other forms of finance, while necessary, are not sufficient. Projects and programs must be designed for sustainable development" (Brundtland 1987, p. 76).

Sustainable poverty-focused programs, therefore, were developed by international collaborations such as the World Bank (WB), International Monetary Fund (IMF), Organization for Economic Co-operation and Development (OECD), the UN Development Program (UNDP), The UN Environment Program (UNEP), the Trust Fund for Environmentally and Socially Sustainable Development (TFESSD), to enhance the flow of resources to so-called developing countries.[15] They offer the financial resources, technical assistance, information and consultation, and the experience to construct self-sustainable societies. The main target is to assist people to help themselves and their environment by providing

[15] The WB, the UNDP and the UNEP are the three implementing agencies of the Global Environment Facility Program (GEF). In this context, the World Bank has come to the fore with investment projects for economic sustainability of countries. The World Bank's primary role is in ensuring the development and management of investment projects. The United Nations Development Program's primary role is in ensuring the development and management of capacity building programs and technical assistance projects. The United Nations Environment Program's primary role is in catalyzing the development of scientific and technical analysis and advancing environmental management in GEF-financed activities. Depending on their fields of interest, these international aid programs focus to ensure the implication of sustainable strategies on such themes as the population, education, governance, climate change, energy, water sources, health, poverty, nutrition, transport, and so on.

capital and/or assistance, and by forging partnerships in the public and private sectors.

At this point, the anti-globalist movement has opposed and criticized the role of international co-operation with the 'developing' countries, or rather, the extant mode of interaction between the North and the South. The protests of anti-globalist groups have increased with international intervention in the economic growth strategies and social objectives. They are concerned that those external agencies supporting and facilitating private investment, particularly export credit and investment insurance organizations, give priority to economic growth rather than to sustainable growth. Austerity programs laid down by the IMF, for example, have provided credits, yet the increased cost of foreign borrowing has helped to plunge many southern countries into debt crises. Other international organizations such as the WB, the UN, and OECD have incorporated the sustainable development criteria into their policies and practices. Yet they have a dominant role in the structuring of self-sustainable economic growth because of the economic tightening they impose with their loans. The objections of the anti-globalist movement state here that, in the end, growth is cut back; and simultaneously, recession, austerity and falling living standards occur. In addition to the economic difficulties, many social objectives have fallen by the wayside, including those having to do with employment, health, education, sanitation, and culture.

At the same time, anti-globalists have criticized the key role of multinational corporations in the southern world. The stimulating effect of the global economy has hampered the constitution of self-sustainable urban and rural societies: the solar photovoltaic panel (PV) market is a case in point.[16] This high-tech product, used for producing electricity from solar energy, has been implemented in many rural parts of southern countries by way of low-interest loans or donations. Yet the background idea is more to force these countries and their society to be dependent on this technology, and thus to ensure the progression of the market (*Energy Sector* 2000; Hankins 2001; Miller and Martinot 2002).

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[16] One of the latest activities is a workshop hosted by UNDP/GEF for African Solar PV initiatives in Pretoria, May 27-29, 2003. The workshop attracted participants from 13 countries across southern Africa, from donor agencies such as World Bank, GEF and UNDP, and from PV dealers and consulting companies ("Initiative" 2003).

On the positive side, the labor of international partnerships has played a crucial role in the rehabilitation of the environment toward ecological sustainability. A large portion of assistance has gone to projects conserving biodiversity, restoring the vulnerable ecosystem and improving the productivity of resources. This intends to create an ecological culture and awareness that will replace polluting uses; preserve biological diversity and generate additional income for the inhabitants to make them readier to accept restrictions on exploitation to conserve nature. Such labors include reforestation and fuel-wood development, renewable energy sources, watershed protection, soil conservation and agroforestry.[17]

Furthermore, all these efforts have brought about social development outcomes. Firstly, the international stimulus has increased the importance of active participation of all members of society for ecological sustainability. This is the active conservation approach concerning the role of citizens in every aspect of studies for sustainability. It indicated the substance of the civic engagement in ecologically and socially sustainable development. Secondly, foreign assistance provided an awareness and reactionary voice between all members of society on the habitat destruction threatening the insurance of continuity of a system for future generations.

Even the biodiversity of the land seems under guaranty. The intention behind assistance given by 'developed' countries for preserving nature is indicated as the effort of "modernity's and capital's restructuring nature and society" (Escobar 1995, p. 206) in the South. In his book *Encountering Development*, Arturo Escobar underlines that the slogan of 'saving nature' by the biodiversity programs of international boards implies a new type of dependency toward postdevelopment—in Escobar's terms, "the postmodern form of ecological capitalization" (1995, p. 203) engaging in "liberal sustainable

[17] The projects selected by the EXPO 2000 Projects Around the World Programme (*Projects Around the World* 2000) offer a possibility to observe many attempts for ecological sustainability, including the ones supported by the UN and WB. Some of them are listed in line with the name of the project, the location and the supporter(s), as follows: Pilot Programme to Conserve the Brazilian Tropical Rain Forest, Brazil, by the WB and the European Union (EU); Protecting Biodiversity and Establishing Sustainable Development in the Sabana Camagüey Ecosystem, Cuba, by the UNDP and the WB; National Tree Seed Project, Ethiopia, by the UN; The Protection of the Lake Ohrid and Lake Prespa Landscape, Macedonia, by the WB and the German Federal Government; Peace Parks, South Africa, by the WB and the South African Worl Wide Fund for Nature (WWF); Sustainable Development of Wetlands in Eastern Uruguay, Uruguay, by the WB and the European Union (EU).

development discourse based on economistic, not ecological, rationality" (1994, p. 205). International bodies such as GEF's WB and UNEP force society to develop culture-specific, autonomous, democratic productive strategies for the management of environmental resources, under the name of biodiversity programs in mega-diversity countries.[18] Here, the "environment must be seen as an articulation of economic, cultural, technological, ecological processes that must be woven together to generate a balanced and sustained productive system" (Escobar 1995, p. 205). In order to ensure the success of the programs, Escobar asserts, the initial strategy is the encouragement of ethnicity, cultural autonomy and local being. The cultural dimension of sustainable development, in fact, is used as a tool for the conservation of nature, actually as reservoirs of value for research and knowledge. The encouragement of local communities in the South guarantees healthy existence of reserves and locates the people as "the stewards of the social and natural 'capitals' " (O'Connor cited in Escobar 1995, p. 203). The valuation of the local provides easy systemization of the traditional knowledge of sustaining nature, in order to be used, later, for scientific usefulness economically or medically. The backyard of rising interest in cultural concerns thus is the restructuration of society for accessing the natural resources of the South, regulating the land ownership and ensuring conservation by strengthening the cultural resistance.

Similar to the 'poverty problem' of southern countries, sustainable development efforts have to cope with the problem of overexploitation particularly toward 'sustainable consumption'. The development of sustainable strategies, patterns and preferences for consumption and production in the so-called developed part of the world is as important as the studies for 'elimination of poverty' in the so-called developing world. Yet as noticed by the Sustainable Development Commission of the United Kingdom, "this concept currently has almost no serious traction in public policy terms; if it means anything all, it means 'the slightly more responsible consumption of slightly more sustainable products' " (*Redefining Prosperity* 2003).

[18] Mittermeier et al. (1997) state that 'mega-diversity' countries refer to the 17 countries having the greatest biological diversity in the world, including Brazil, Colombia, Mexico, Indonesia, Malaysia, the Philippines, Madagascar, Congo, India, China, and Australia.

Even the sustainable consumption carries dilemmatic notions because the concepts of consumption and the consumer society encouraged by economists and business executives are seen as the key to continued economic expansion of both the North and South.[19] Consumerism simply means continuing to buy things of mass production after people's natural desires for food, clothing and shelter have been satisfied (Hearn and Roseneil 1999), and this simply refers to an ever-increasing standard of living. The amount of consumption is measured with respect to countries' average annual incomes and their lifestyles. Alan Durning states that there are consumption classes: "the consumers, the middle income, and the poor" (1992, p. 26). Indeed, this classification also reflects the World Bank's classification into high, middle, and low-income countries. What is more suppresively mentioned is 'inequity in the consumption', "comparing industrial countries, home to most of the consumers, with developing countries, home to most of the middle income and poor, gives a sense of the orders of magnitude. Industrial countries, with one fourth of the globe's people, consume 40-86 percent of the earth's various natural resources" (Durning 1992, p. 50). To conclude, the real intention in dwelling upon the concept of sustainable consumption and inequalities in consumption patterns seems to be to continue measuring growth by increase in the consumption patterns. This idea encourages the 'consumer society of the developed world' by quantitative, and also more qualitative, consumption toward sustainability and urges the 'consumer society of the developing world' to consume more.

It is obvious that ecology and economics bind the 'poor' and the 'rich' in ever-tightening networks, yet with a negative effect on the poor, since the cost of consumption patterns of the northern countries is mostly paid for by the southern countries (Amin 1990; Beladi et al. 2000; Crush 1995; Escobar 1995; Hall et al. 1996; Isbister 2001; Mohan and Stokke 2000; Muscatelli and Vines 1991; Rahnema and Bawtree 1997; Sachs 1992; Shiva and Moser 1995). The growing demand for scarce resources, for example, causes environmental stress. "The rich earn more, consume more natural resources, and disturb ecological systems more

[19] Durning roots the formation of consumer society to the United States of America in the twenties, "when brand names became household words, when packaged, processed foods made their widespread debut, and when the automobile assumed its place at the center of American culture" (1992, p. 29). In fact, consumer society may be related to the rise in the living conditions, in other words standards of consumption. This can be simplified with Durning's words as "the definition of a 'decent' standard of living—the necessities of life for a member in good standing in the consumer society-endlessly shifts upward" (1992, p. 41).

than average consumers do" (Durning 1992, p. 29). Besides, the ecological impacts of the North reach into the local life and environments of the South; the economic burden of the latter directs economic activities toward trade and export of natural resources, which in turn causes the dissolution of social ties and ecological degradation.[20] However, what is perhaps more important for our topic is that the consumption patterns, and even the sustainable consumption, facilitates the control and manipulation of the South economically. Escobar (1995) asserts that, "institutions, again, will continue to reproduce the world as seen by those who rule it" (p. 203). This is because,

> sustainable development is the last attempt to articulate modernity and capitalism before the advent of cycberculture. The resignification of nature as environment; the reinscription of the Earth into capital via the gaze of science; the reinterpretation of poverty as effect of destroyed environments; and the new lease on management and planning as arbiters between people and nature, all of these are effects of the discursive construction of sustainable development (p. 202).

In such broad-based hegemony, the last decade's concern for sustainable solutions has evolved into one overall provision, that is, local sustainability. Actions are formulated according to a criterion that the basic condition for change toward sustainable development is to solve the problems at small scale—local or regional—levels with local resources such as local inhabitants, culture, wisdom, governance, and natural resources.

The celebration of the local and indigenous set a strategy for sustainable development to underpin attempts toward mobilizing citizens and their constituencies of interest together with networks and partnerships. In other words, as stated by Selman (1996), the locality is important in setting a framework of measuring, monitoring and managing the resources within the local administrative units. Actions for sustainability harness the local arena in contrast to the orientation of solving environmental, social and economic problems in national or global agenda. Recognizing this dynamic and in order to achieve locally-generated solutions in the transition to sustainability, Chrisna du Plessis (2002b) has asserted that, "sustainable development requires three sets of enablers. Firstly,

[20] Durning (1992) posits a good illustration, namely the social and ecological problems in Brazil. He points out that hydroelectric dams in Brazil have been constructed to generate electricity for production of aluminum and steel. The export of aluminum and steel to the North causes flooded rain forests and displacement of native peoples from their ancestral domain. At the same time, the slash and burn clearing of forests has condemned countless species to extinction in response to the unilateral appetite of the North for wood and minerals.

the technologies that will ensure an acceptable quality of life within the biophysical constraints of the planet" (p. 32). This means that the improvement of technological capabilities in the South is the way to the betterment of life toward sustainability. Secondly, the society needs "the institutional enablers that will make sure that these technologies are encouraged, allowed and accepted" (du Plessis 2002b, p. 32). They can be local and central governmental representatives, members of nongovernmental organizations, academics or laypeople enabling the knowledge transfer. The institutional enablers are also growing in prominence through LA 21 studies and other regional studies. Up to now, much emphasis has been placed on improving new technologically intense enablers, especially in the northern countries. The direction of technological developments may solve some immediate problems for improving the productive potential of industry in the southern countries, yet it can lead to even greater ones. Thirdly, these two enablers "will be of little use without a value system that actively demands a more sustainable approach to living. Adopting new technologies and institutional processes requires that we make specific decisions to do so" (du Plessis 2002b, p. 32). These decisions are based on the society's value system, which determines its voluntary adoption of more sustainable courses of action. Transferring to a new value system depends on awareness by people that are already sustainable in their cultural heritage, religious or spiritual belief systems. Here, Escobar's (1995) view on the question for alternatives in the manner of sustainable development emphasizes more the "defense of the cultural difference" by itemizing:

> The defense of the local as a prerequisite to engaging with the global; the critique of the group's own situation, values, and practices as a way of clarifying and strengthening identity; the opposition to modernizing development; and the formulation of visions and concrete proposals in the context of existing constraints, these seem to be the principal elements for the collective construction of alternatives that these groups seem to be pursuing (p. 226).

Yet the South may be considered, in some respects, fortunate in sustainable social development because it already has, we may surmise, a social structure and cultural values oriented toward a more sustainable way of life. The problem is that wide segments of the population of the South are generally not aware of sustainable things or of the concept of sustainability. A point of debate, of course, would be that what lends the South the upper hand in achieving a more sustainable life and architecture is precisely its underdevelopment; and, it is maintained, that underdevelopment will even prevent conceptual recognition, and thus the material pursuit of sustainability. Thus some equate sustainability with the North, and put their efforts into attaining the modern way of life and living standard, which gives rise to the dialectic of ‘loss of natural resource’ and ‘consumerism’. As a result, most societies have been losing much of their identity with sustainable features and a whole way of life by adopting the industrialization process.

In the case of the North, over-consumption exists as a threat to ecologically and socially sustainable development. The consumption habit now permeates the social values of the ‘developed’ North, since consumption has been put forward as a goal for economic growth. The hierarchy of social values in ‘developed’ countries still measures personal success by quantity and variety they consume.

The solution is toward changing life styles by consuming ecologically less damaging products and awareness that the consumer class uses a disproportionately large share of resources. If society is to become more sustainable, we will need to generate major alterations in the nature of our governance, personal behavior and ethical bases for action and our ability to cope with the pressures for rapid change. Familiar examples would be changing technologies and methods in agriculture, transportation, urban planning, and energy that can reduce environmental damage. It is clear that technological change and population stabilization cannot suffice to save the planet without their complement in the reduction of material wants and the amount of things we consume. This first involves the profound transformation of many of our civilization’s basic values and practices. Sustainability ultimately depends on the decisions people make regarding their own behavior. Reinventing the relationship between people and their environment and those values that define behavior is, therefore, crucial to the ultimate sustainability of humankind. Indeed, the concept of sustainability has lost its leading position in the global political arena when compared with its popularity in the early 1990s. The credibility of sustainability as a guide to action has diminished as doubts arise as to the extent and success of its implementations.

The critiques vary, yet their essence is based on the idea that the economic aspects of sustainable projects are far from the coherent ideology of sustainability introduced by the Brundtland Report. When economic development theories according to sustainable guidelines are not clearly understood, misinterpretations are likely to arise—with dire consequences. For example, concern with sustainability can be equated with an approach leaning toward the mere revision of the current economic system within a green label. This attitude also supports economic growth as still possible as long as it is green growth. This has been interpreted by many to endorse a ‘business as usual’ approach in the direction of environmental protection. On the contrary, this approach actually ignores the real meaning of sustainable development.

In the face of all diverging levels of critique, today is the time to undertake practices toward sustainability. After the latest UN Conference of Sustainable Development in 2002, disappointment was expressed that there is something wrong with the number of practices which governments had promised to carry out. “No more summits are planned by the United Nations on environment and development until the governments put into practice what they decided to do” (Lean 2002). What is needed now, rather than debates at the theoretical level, is to start and guarantee a real period of intensive implementation. Individual local government successes abound; the present decade will require local commitment and pioneering action.

CHAPTER 3
SUSTAINABLE ARCHITECTURE IN THE 1990s

Though it is one of the fundamental assumptions of this dissertation that the comprehensive history—taken in the widest sense of chronologically tracing the entire past of intersecting architectural approaches, political trends, economic priorities, scientific developments, and environmental movements—of sustainable architecture is inseparable from the investigation of an architectural practice for sustainability for a specific location today, this chapter will focus only on that part of this history that starts on the threshold of 1992, the Earth Summit, held in Rio de Janeiro, Brazil. The significance of the Summit, as elaborated in the preceding chapter, was that it underscored sustainability as a global precept and pointed at the necessity of its implementation in specific countries' policies. An elaborate history of sustainable architecture, however, going back beyond 1992, has been included in Appendix E. Several extant histories of 'environmental', 'green' or 'ecological' architecture notwithstanding (Banham 1969; Behling and Behling 1996; Farmer 1996; Hawkes 1996; Jones 1998), surprisingly we lack a comprehensive history of *sustainable* architecture. The extended Appendix E is intended for partially overcoming that lack. It treats of that history starting with the 1970s and brings the reader to the threshold of the last decade. 'Sustainability' has become the buzzword of the 1990s, in the same way that 'green' was in the 1980s and 'environmental design' was in the 1970s' architectural milieu. These terms are, in fact, quite transposable, whereas such substitution is one indication of shifting attitudes in sustainable design. They are simply the keywords to investigate different facets of the last thirty years.

The terminological shift from 'environmental' to 'green' and 'ecological', and lastly to 'sustainable' signifies a continuously widening scope in theory and practice. According to Madge (1997), the concept of sustainability had already been treated in design disciplines starting in the early 1980s, and it became globally known by the early 1990s, a turning point for sustainable architectural discourse.[1] Many factors contributed to this shift, but the initial one was that

[1] Madge (1997, p. 44) similarly utilizes the three terms, viz. "green, eco- and sustainable," by presenting a critical overview of the development of ecological ideas in the profession of industrial design starting with the mid-1980s, and by interrelating such substitution with earlier environmental ideas.

sustainable development was made a popular and transboundary concept by the Brundtland Report of 1987. The latter "moved the focus from 'energy savings' towards 'sustainability' and a more complex view about buildings' interaction with the environment" (Jensen 2002, p. 22). By giving binding force in the international arena, the UN Earth Summit at Rio de Janeiro in 1992 became the benchmark of sustainable discourse. The theories of sustainable development, in turn, have also influenced architectural practices all over the world by the motivation of Habitat II Conference at Istanbul, Turkey in 1996. Thus the term 'sustainable design' began to be used in reference to a broader vision of ecological, green or environmental design (Madge 1997, "Sustainable Building" 2002).

The semantic distinction between the other terms and 'sustainable design' clarifies the discrete visions expressing the former as project-based, single issue, and relatively short-term design approaches and the latter as system-based, long-term, ethical design. Sustainable design implies more complex and competing conceptions, while at the same time moving toward embracing societal conditions, economic development, ecosystem management, spirituality, and ethics. Thus architectural design does fit into a global trend toward sustainability, albeit with competing conceptions, diverse design strategies and contrasting implications in both theory and practice (Farmer 1996; Farmer and Guy 2002; Guy and Farmer 2001).

The means of making sustainable buildings have broadened. A building can be a sustainable one if it employs technology to achieve low consumption of energy, water or material resources. The use of green technologies and renewable energy sources, ecological cycles, climatic conditions, healthy and recycled materials, passive design principles altogether mark a building that is sustainable.[2] Making sustainable sense of innovations can also be linked to the projects and ideas of architectural interest within such contexts as recognizing and preserving the local social, cultural, spiritual and economic values, encouraging local empowerment, enabling affordability in design and construction, activating residential participation and civic engagement, and creating environmental awareness. The designation as 'sustainable' may be due to the aesthetics of the

[2] Here, the term 'green technology' means the type of technology which causes minimum environmental damage on the natural and built environment. In this respect, the concept of green technology covers the low, modest type of technologies as well as the high, sophisticated ones.

building, e.g. visualization and dramatization of nature, natural cycles or organisms, while at the same time prioritizing fully automatic artificial environments contingent on advanced technology for low energy consumption. More than anything else, many different stakeholders, including central and local governmental representatives, academicians, NGOs, CBOs, investors and citizens have taken up sustainable architecture in different contexts. All these have made it more difficult to answer the question: what is sustainable architecture?

3.1. The Monophonic Perception: The Global and Local Practices

The 1990s embraced extremely wide-ranging sustainable architectural practices encompassing many viewpoints and a bewildering array of contrasting building types. To refine this sampling universe is problematic; to define what we mean by calling a building 'sustainable' is challenging. The multiplicity of designs is one significant barrier to identifying meanings, strategies, and conceptions.

While it is commonly recognized that sustainability in architecture is a "contestable" (Guy and Farmer 2001, p. 140) concept, much of the contemporary admiration for sustainable architecture tends to lean toward the hegemony of the northern countries including those of Europe and the United States, and Canada. If it needs clarification, there is already a consensus on the definition of sustainable architecture originating in the North, and it dominates the outlook of the architectural intelligentsia of today over a more global platform. This definition tends to frame the definition of sustainable architecture specifically depending on some sustainable practices while preferring to omit the others: e.g. Guy and Farmer (2001, p. 140) indeed observe that, "the contemporary debate on sustainable architecture tends to sidestep the issue" by viewing sustainable buildings that, "merely represent differently configured technical structure" while ignoring "the essentially social questions implicated in the practice of sustainable architecture" is the case, but they fail to realize that even this critical perspective is limited within the borders of Northern supremacy. Slessor (2002b) undertakes a self-critique by admitting that the prominent architectural mainstream tends not to have a great deal of latitude for drawing lessons from some instructive practices of rural communities in Latin America, Africa and Asia, "as they [architects] are swept along in the 'time is money' dominated processes of building procurement and production" (2002b, p. 33). Even if she gives credit to these unseen, forgotten architectural cultures of the South, her argument too falls short of recognizing the right-scope of sustainable practices of the South. She points out merely the traditional, medieval, domestic ones within a utilitarian view while eliminating a great ensemble of practices dealing with the problems of the South.

However, it is possible to propose another definition for the same period which emphasizes the local. This definition represents a group of sustainable architectural practices readily available, yet less known, and covers alternative concepts of what may constitute a sustainable place. In this regard, the conception of sustainable architecture indicates an architectural practice which is more circumstantial, changeable, adaptable and contextual at a local platform.

The existence of disregarded or mostly discarded architectural samples indicates that the perception of sustainable architecture in the last decade should be questioned. The panorama suggested by some of the architectural intelligentsia of the North is rather the symptom of a sustainability theme which leads us to monophony and reduces the role of the locality in architecture. Thus the sustainable architectural discourse of the 1990s needs to be viewed in two ways:

1. The global practices and theoretical approaches of the 1990s
2. The local practices and theoretical approaches of the 1990s

The former embraces the architectural implications and the theory that fit into the economic and social system of the 'developed' northern countries. In other words, this theme includes variously worked out—but all insistently imposed—sustainable architectural definitions associated with northern supremacy.

With the advance of the sustainable discourse of the early 1990s, the concept of sustainability has also become a widely and frequently treated concern of the architectural periodicals, publications and international architectural associations. The two questions, what sustainable architecture is and what conceptions it outlines, have always been at the center of interest, often seen as the title of an article, book or conference. The prominent architectural publications, mainly the periodicals and books, analyze this favorite concept by covering the issues related to sustainable, environmental, ecological or green buildings.[3] The building examples of this prominent mainstream demonstrate the northern perspective on defining what is meant by calling a building 'sustainable'. Hence architectural publications, in a way, are the essential bodies that impose and legitimize this definition.

In the scope of this dissertation, sustainable architectural practices can be evaluated in a chronological way; in other words, by simply introducing an analytical critique. Much research, including theses, articles, reports, and books, have already used this methodology. However, in such research, it is not possible to critique or even list all examples of sustainable design, because the panorama of sustainable architectural examples presented to us consists of the ones selected/defined by the Others. What is meant here by 'the Others' is the architectural intelligentsia originating in the North and, unsurprisingly, its architectural publications.

The discourse imposed by the prominent mainstream of periodical publications and publishing houses wields an approach which ignores the local sustainable development practices of the so-called developing and developed countries. Thus it inevitably directs the architectural perception of sustainability. The panorama with which we are most familiar is one-sided. This panorama incorporates a group of 'sustainable projects', that is, sterile projects, which are elaborate, mature, precise, well-designed and constructed, and mostly consist of single buildings located in areas that are sterile environments, where the buildings can only be realized in the economic, social and environmental conditions of countries with high income levels, or in areas far from any human settlement, and at the same time any human-centered problems, such as in a virgin, pure, unmodified, uncultivated piece of land.

The latter category (local practices and theoretical approaches), on the other hand, challenges what we currently mean when we call a building

[3] Among the periodicals, some of the issues in the 1990s were devoted to topics such as 'Energy Matters' (May 1995), 'Sustainable Architecture' (September 1996), 'The Future' (November 1996), 'Architecture and Ecology' (April 1998), 'Greening Architecture' (February 1999), 'Ecological Propriety' (January 2002), 'Greening the European City' (May 2003) in *Architectural Review*; 'Sustainable Architecture' (May 1997) in *Architecture and Urbanism*; 'Organic Architecture' (January and February 1993), 'The Architecture of Ecology' (January and February 1997), 'Green Architecture' (July 2001) in *Architectural Design*; 'Living Architecture' (April and May 1993), 'Designing-in Environmental Control' (October and November 1997), 'Environmental Engineering' (June and July 1999) in *Techniques & Architecture*; 'Solar Architecture' (March 1997), (March 1999) and (June 2002), 'Simple Forms of Building' (March 2001) and (June 2003) in *Detail*.

'sustainable'. In general, it implies the presence of conventional ways of making a place sustainable. In particular, it is based on a local, citizen-oriented discourse which represents a design attitude toward formulation of local solutions by developing local sustainable strategies.

It is clear that the locality has always been at the core when setting up applicable strategies for sustainable development. Similarly, this definition underpins the acknowledgment of specific local conditions and competing forms of local knowledge as a main design strategy, as well (Selman 1996). Therefore, the projects in the latter category embody simple, unique, uncomplicated, immature, autochthonous and context-specific solutions that correspond mostly to the economic and social systems of the 'developing' southern countries or those either rejecting the existing economic and social systems of the northern countries and searching for alternative life styles and living environments. They handle the concept of sustainability as a goal which can only be framed in the scope of the conditions of a particular place. Here the question of sustainability is intertwined with that of the available technology, local material and construction techniques, local building habits, local labor and knowledge.

These disregarded examples are also differentiated with reference to their conceptual framework. The key concept of a project may be the constitution of a self-sustainable social structure, or the ensuring of the continuance of existing economic activities and increasing it to a sustainable level (Mumtaz and Hooper 1982). With this approach, a sustainable building not only fulfils sustainable design criteria in the building but also engages with local problems: for example, the empowerment of existing agricultural activities, the provision of shelter, the revitalization of social and cultural values.

3.2. Global Practices and Theoretical Approaches

The debates about the sustainable architecture of the 1990s stem from a quest to find a "true," "incontestable" and "consensual definition" (Guy and Farmer 2001, p. 140) which would plainly explain the locally changing nature of sustainable building. The available arguments focus selectively on particular applications with definite functions, quality and comprehension of sustainability; they view sustainable design practice within the domination of the northern countries.

The search for a consensual definition was essentially underpinned by the positivistic scientific assumption of the period which viewed sustainable design practice as the implementation of a plan for action. Thus the struggle to define sustainable architecture seems to be a ready-made prescription for making sense of sustainable innovation in architecture.

At the beginning of the 1990s, the terminological uncertainty about sustainable place making activity arose in the mainstream of the architectural profession, even if there has been a gradual increase in the use of the term 'sustainability' as well as 'ecology'. The discussions conjoined two basic topics: which projects and buildings can be called sustainable and whether or not they are really addressing ideas of sustainability. The underlying crucial question was, which qualities qualify a building as sustainable.

As a formal body in the international arena, 1996 Habitat II, The UN Conference on Human Settlements in Istanbul, Turkey, was organized to discuss the creation process of sustainable settlements, focusing on principles and methods as well as protection of the earth through architecture. The conference set up a forum for the concept of sustainable settlements and design. This was one example that many governmental and non-governmental bodies were involved and one sign that sustainable architecture was beginning to be incorporated into national policies with Agenda 21 studies. Thus it helped clarify and specify the definition of sustainable architecture, and made available broad-based data transfer about the existing sustainable building and settlement examples from all over the world.

The perception of sustainable architecture at the conference was different than that expressed in the unilateral mainstream of the architectural publications. The conference focused interest on less known, but vital architectural problems of the world such as lack of housing, poor sanitary conditions, affordability problems, difficulties in obtaining building materials and lack of qualified labor (Çelik 1997). However, the conference was not reflected in a change in sustainable architectural definitions, as far as could be observed in architectural periodicals.

Even at the end of the 1990s, despite broad consensus on the need to promote sustainable innovation in building design, the factors labeling or constituting a sustainable building were still unclear. Curiosity on the subject was limited to discussion of whether the published examples were directly relevant to the themes of sustainability. The letters from readers after the "Architecture and Ecology" issue in the *Architectural Review*, for instance, mostly assessed the magazine's point of view of the sustainable, and criticized the selection of examples for their lack of relevance to sustainability.[4]

Another issue of the *Architectural Review*, "Greening Architecture," was criticized because it reflected the diverse themes in sustainable architecture without exploring "why these projects are so different or any recognition of the contested nature of the environmental debate" (Farmer and Guy 2002, p. 11).[5] In fact, these were signs of complexity in the perception of sustainable architecture, or, even of uncertain definition and context. They indicate that there was as yet no consensus about the sustainable basics, or where this term should be cited as a paradigm for design.

Within this indefinite manner of sustainable place making, there were already attempts at consensual definitions to express the core idea and aim of sustainable design: sustainable architecture intends to reconcile and integrate human activities and behavior patterns with pre-existing environmental conditions and natural phenomena. The role of the sustainable building is to attain human comfort and survival within an ecologically correct attitude toward ecosystem health. O'Cofaigh and Lewis (1999) in their book *A Green Vitruvius* advise a more restricted definition related to more evident concepts such as energy and water inputs, materials, indoor air quality and wastes.

These general definitions, nevertheless, do not express the contested nature of debates around sustainable architectural practices. The myriad articles, reports and books on the subject of sustainable architecture point out that sustainable building employs a great variety of different technologies and design approaches, each justified by multiple opinions and perspectives on what a sustainable place might represent. Recognizing this fact, Cook and Gulton (cited in Guy and Farmer 2001, p. 140) claim that sustainable architecture is an "essentially contestable concept." In other words, sustainability is far from a single coherent ideology.

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[4] Architecture and Ecology, *Architectural Review*, 1214/4 (1998).

[5] Greening Architecture, *Architectural Review*, 1214/2 (1999).

Therefore, rather than searching for a singular optimal definition, it is important to accept the existence of contradictory certainties, as quite different pathways toward a range of sustainable futures. Sustainable design practice embraces conflicting interpretations through which a complex set of actors participate in a continuous process of defining and re-defining the sustainability problem. And, then, the debates around the completed examples of sustainable architecture are shaped by varying social interests based on different interpretations of the problem. Indeed, this complexity in debate arises not out of uncertainty in the concept of sustainable architecture, but because of the different philosophies of what constitutes sustainable place making.

The search for consensus should be translated into the search for an enlarged context in which a more heterogeneous categorization of practices can be developed. Instead of viewing sustainable design practice as the implementation of a prescription for action, it should be viewed as an ever-changing design attitude or continuing transformation process in which different interests participate.

Guy and Farmer (2001) advocate this approach by adopting an interpretative framework for the definitions of sustainable architecture. They group the various positions into six separate logics: "eco-technic, eco-centric, eco-aesthetic, eco-cultural, eco-medical and eco-social." These alternative visions of sustainable architecture have their roots in competing conceptions of environmentalism, influenced by the ideas of high-tech or low-tech, romantic or rational, new age or old guard, right or left, and several shades in between. Guy and Farmer (2001, p. 141) examine the ideologies behind sustainability and conclude that as,

> [e]ach logic is underpinned by a disparate concept of the space through which environmental benefits and detriments flow and are represented; differing sources of environmental knowledge though which we come to experience and understand the environment; and distinct images of buildings in relation to the environments they inhabit.

These contrasting environmental discourses, therefore, prefigure themselves by different, yet specific, forms of environmental place making within a broad sustainable design strategy.[6] Guy and Farmer's reinterpretation of

[6] Guy and Farmer (2001) essentially express the one point that these logics are separate but not autonomous. This means that in an analysis of a sustainable building, logics may merge or

sustainable architecture seems one of the most sensible categorizations of the northern mainstream, as compared to the homogenous ones with no reference to distinctiveness of sustainable buildings. However, by analyzing their selected samples it can be asserted that the sustainable building debate still depends on sources of the 'developed' world.

While considering the logics of Guy and Farmer, it is possible to frame the debates on sustainable place making over the global platform within three other logics, that is, eco-technic, eco-centric, and eco-social, which are different in scope. This analysis of global practices and theoretical approaches of the 1990s is based on three categories that help us understand how the multiplicity of design approaches of the architectural intelligentsia in the North are created, legitimated, and contested.[7] These logics are a specific ensemble of ideas, design approaches, images of spaces, building images and technologies in sustainable architecture. Each has its origins in the multiple opinions, perspectives and discourses of environmentalism, philosophy, international or national policy and trends of the 1990s. The crucial point here is that each of the three logics tends to be dominated by a specific issue that is the source of diverse strategies in building design:

1. Eco-technic logic addresses the emblematic issue of 'technology'.
2. Eco-centric logic addresses the emblematic issue of 'nature'.
3. Eco-social logic addresses the emblematic issue of the 'nature of the human being'.

The starting point of critical perspective for the development of sustainable architecture in the 1990s derives from a convergence of views inherent in techno-centric, eco-centric, and humanist modes of thought. The resulted sustainable buildings are ramified, each with a history of evolution, yet they can be basically assembled in three sets of interpretations.

According to eco-technic logic, each building is an act to improve on nature. The buildings have positive impact on the environment through the technological improvements used in them. According to eco-centric logic, conversely, each building is an act against nature which causes it to deteriorate.

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simply be absent. On that point, they explain their aim merely as taking out the general "metalogics" framing the idea of sustainable architecture.

[7] These logics are not meant to be frozen in time or space; they interrelate, affect or transform each other. Thus they illustrate distinct images of buildings as separate, but not autonomous.

Buildings have negative impact on the fragile environment by interrupting the regular cycles of nature in the form of pure consumption. According to eco-social logic, each building is an act to help reach culturally, socially and medically sustainable humanity. Buildings help human beings constitute a sustainable way of life.

3.2.1. Eco-Technic Logic

Eco-technic logic is founded on a scientific discourse which prioritizes the management of environment by an objective analysis and a rational scientific method. Here, the emblematic issue is 'technology', within a belief that science and high technology can rectify global environmental problems. While borrowing much of its symbolic terminology from the science of ecology, eco-technic logic wants to overcome the environmental crisis, and thus promotes incremental change in economic and social development issues; but by going further into industrialization and emphasizing technological improvement. This idea, described by Guy and Farmer in "Eco-technic Logic" (2001, p. 142), holds that, "what is required is an integrative approach in which science, technology and management take account of the environmental impacts of development."

The prioritization of technology, in fact, dates back to an old belief of the 1960s and 1970s that science and technology can provide solutions to environmental problems. The belief is rooted in the technocentric view of environmental philosophy, and then spreads by means of the ecological modernization theory of environmental policy in the 1980s.[8] The ecological modernization theory approves the 1980s' green consumerism thinking, by advocating the possibility of overcoming the environmental crisis without leaving the path of modernization.[9] The key feature is in its theory which takes environmental protection as a potential opportunity for economic growth. Thus

[8] Technocentrism, i.e. technological environmentalism, is a mode of thought stated first by Timothy O'Riordian in 1977. The idea recognizes environmental problems but holds that humanity will always solve them and achieve unlimited growth by careful economic and environmental management. It also coincides with the 1970s' environmental thought of shallow ecology. See Pepper (1984), especially the part on "the Roots of Technological Environmentalism," for analysis of this approach.

[9] The ecological modernization theory originated in the 1980s through the work of the German sociologist Joseph Huber. Blowers (1997, p. 852) points out the key assertion of the ecological modernist view that environmental needs are not in conflict with economic demands. In other words, the ecological modernization theory regards the environmental challenge not as a crisis but as an opportunity. The emphasis is on its integrative approach in which "ecological criteria are introduced into the consumption and production processes" (Blowers 1997, p. 853).

"global environmental change can be managed through the adaptation of modern economy and related institutions" (Blowers 1997, p. 852) and applied by a particular political program of technological innovation. As with ecological modernization, eco-technic logic supports the beneficial connection between the economics and science of ecology.

In the field of architectural practice, these environmental theories are characterized by a common view about the application of technological innovations in buildings. The technology labeled as clean and the products identified as ecological or recycled have been developed for the protection of resources and the reduction of polluting processes. The focus, therefore, is converted into technological adaptation, pollution control technology and energy generation while maximizing technological expertise.

The eco-technic logic encourages the objectives of sustainable development, at least, because they both try to overcome global environmental problems. The eco-technic logic situates the sustainable approaches within a global context, maintaining that what is required is just international political consensus and a top-down view of technological change. The idea is also compatible with the sustainable concern for inter- and intra-generational equity and a long-term view of ethical responsibility toward future generations. The common feature of these two concerns originates from the Eurocentric doctrine that basically positions the human being as the master of the universe.

Correspondingly, in the case of building design, the role and context of sustainable buildings become prioritized in terms of global action and local reaction. In a macro physical context, the design strategy of sustainable building is proposed in a locally adaptive, but globally beneficial and future-oriented manner including ethical responsibility not only for humanity but also for the world ecosystem.

Here, this admiration for technology, whether because of inclination or necessity, is indicated in the design field by an emphasis on efficiency, especially on energy efficiency. The approach of energy-efficient building design, sometimes called the 'energy-conscious' or 'low energy' building design, places its optimistic faith in an integrative approach in which technology and architecture take account of the environmental impacts of development by energy saving precepts.

In fact, the concern for an environmentally sustainable form of development has led to interaction between architecture, science, technology and energy management fields toward minimizing negative environmental impacts of buildings on the world ecosystem, as well as reducing maintenance and life cycle costs. The trend is even recognized by the architectural intelligentsia: Webler and Geissler's statement in their article, "An Approach to Ecological Building Design," epitomizes the shifting trend by asserting that, "we stand on the threshold of a new time when we are aware of the necessity of using renewable energy sources and have the technology to do so" (1997, p. 75).

In architectural practice, the trend, not surprisingly, is toward maximizing the intense utilization of technology as a tool for energy efficiency. Since environmental problems stem from past building practices not taking sufficient account of environmental concerns, attention turns to the development and transmission of the new technologies that are more complex or intelligent than the older ones and that benefit from the place where the building is erected. The challenge for sustainable design, therefore, is to offer a technologically dominated attitude for energy efficiency without suspending ecosystem health. The resulting design scheme is "adaptive but based on recognizably modern, usually high-technology buildings that attempt to maximize efficiency of building in spatial, construction, and energy terms" (Guy ad Farmer 2001, p. 142).

The belief is perhaps the best prioritized in architecture by practices advocating the exploitation of a whole range of technologically sophisticated innovations in building fabric and servicing systems. Particularly, intelligent buildings exemplify the approach by achieving energy efficiency through the establishment of a relationship between building form and mechanical and electrical service systems. The built environment, thus, is predominantly artificial, wholly automatic and centralized, and the comfort conditions in the entire building depend on the continuous consumption of energy. High-rise buildings in particular necessitate these kinds of active environmental control systems.

In the case of building practice, technological intensity for energy efficiency has been most fully exploited by the British architects Norman Foster (Herzog 1998; Jones 1998; Melet 1999; Pawley 1999), Richard Rogers (Toy 1997; Herzog 1998; Melet 1999; Powell 2001), Nicholas Grimshaw (Toy 1997; Herzog 1998; Pearman 2000), and Michael Hopkins (Davies 2001; Dunster

1997); the Italian architect Renzo Piano (Buchanan 1997; Melet 1999); the German architects Thomas Herzog (Jones 1998; Herzog 1998), and Webler + Geissler ("Götz Administration Building" 1997; Lodel 1999; Miles 1996); the French architects Jourda and Perraudin ("Academy at Herne-Sodingen" 1999; "Academy of Further Education" 1999; Kugel 1999; Melet 1999), and the designer of bioclimatic skyscrapers, Ken Yeang, in Malaysia (Powell 1999; Richards 2001; Toy 1997) (Figures 3.1; 3.2; 3.3). In their projects the said architects and designers have sought to combine the eco-technic image of the built environment with both the high-tech approach and the concept of sustainability while attempting to find an optimum relationship between the building and energy consumption in accordance with recent scientific studies. These intelligent building practices toward sustainability advanced rapidly in the course of the development of high-tech buildings. However, by the mid-1990s, a significant alert arose to the effect that controlled inner environments were placing a significant burden on human health in both physiological and psychological terms. The question of how to create a high standard of environment which would be both healthy and energy-efficient, as well as humanistic and environmentally responsible, led to a focus on the re-evaluation of user comfort conditions.

This re-examination accompanied a whole range of criticism directed at high-technology buildings. In comparison with the so-called modern and high-tech buildings which typically accommodate artificial inner atmosphere, highly artificial lighting and artificially filtered, cooled and humidified air, and in which the user is isolated from nature and its surroundings, intelligent buildings address the occupant's distinctive requirements with more than mere application of the most up-to-date technology. Firstly, the review of high-tech buildings implies a new definition of human comfort conditions to which a healthy energy-efficient building should conform. A new set of comfort standards, for instance, was studied and promoted by the European Commission and by individual countries regulating the use and management of technology transfer programs for energy

Title of the Project: Eden Project
Location: Bodelva, Cornwall, United Kingdom
Completed: 2001
Architect: Nicholas Grimshaw & Partners
Structural Engineers: Anthony Hunt Associates Ltd.
Consulting Engineers: Over Arup & Partners

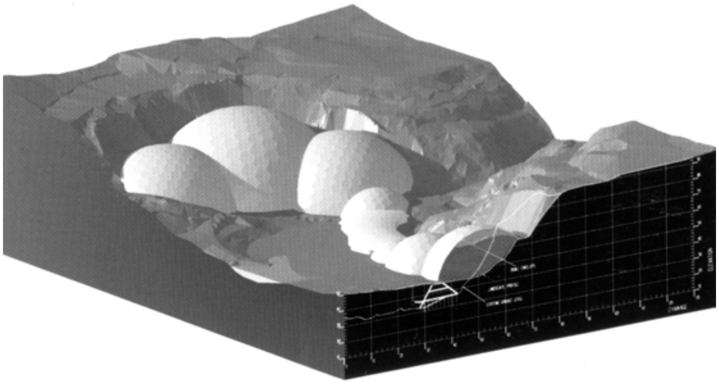


Figure 3.1 Computer modeling of geodesic domes of Eden Project in Cornwall, United Kingdom, by Nicholas Grimshaw & Partners. **Figure** Nicholas Grimshaw & Partners.

Title of the Project: Götz Headquarters Building
Location: Würzburg, Germany
Completed: 1995
Client: Götz GmbH, Metall-u. Angalenbau, Würzburg
Architect: Webler + Geissler Architekten, Stuttgart Martin Webler, Garnet Geissler
Structural Engineer: Ingenieurbüro Rudi Wolff, Stuttgart

Figure 3.2 Fully glazed double façade as a fundamental component of energy strategy of Götz Headquarters Building, Würzburg, Germany by Webler + Geissler Architekten. **Photography** Roland Halbe.

Title of the Project: Mont-Cenis Training Centre
Location: Herne-Sodingen, Germany
Completed: 1999
Client: Mont-Cenis Property Development**,** Herne-Sodingen
Architect: Jourda & Perraudin Architectes, Paris
Structural Engineer: Arup GmbH, Düsseldorf

Figure 3.3 Wooden structure carrying glass panels with photovoltaic cells in Mont-Cenis Training Centre, Herne-Sodingen, Germany, by Jourda & Perraudin Architectes. **Photography** F. Ali M. Demirel/MKM Archive.

efficiency.[10]

Secondly, studies on the negative impact of artificial environments on human health have resulted in a preference for mixed systems, combining active, i.e. artificial, service systems with passive ones, i.e. natural conditioning.[11] Here, the subject has stimulated a different quest, that is, an environmentally responsive approach to high-technology building design in which the intelligent building is defined not in general terms but in particular ones—locally and specifically. The climatic data of a given region, the inner and outer landscape qualities and topographic inputs all regulate the comfort conditions in order to optimize natural light and ventilation, comfort and a feeling of well-being, while at the same time utilizing high technology to reduce both environmental pollution and running costs. This approach has inspired many buildings, among them Helmut Richter's Triple Sports Hall for the Secondary School in Kinkplatz, Austria (Herzog 1998; Knopf 1995; Steiner 1996), Richard Rogers's Daimler Chrysler Offices and Housing in Potsdamer Platz, Berlin, Germany (Herzog 1998; Spring 1999; Toy 1997), and Michael Hopkins's New Parliamentary Building, Westminster, England (Dunster 1997; Herzog 1998) (Figures 3.4; 3.5; 3.6).

High-rise sustainable buildings especially were implicated in this health crisis in the last decade. The new approach has best been realized by Norman Foster with his Commerzbank Headquarters Building in Frankfurt, Germany (Buchanan 1998; Herzog 1998; Jones 1998), Thomas Herzog with the Trade Fair Administration Building in Hanover, Germany (Dawson 2001; "Trade Fair Pavilion" 1997), and by Ken Yeang and T. R. Hamzah with their bioclimatic skyscrapers in Malaysia ("Menara Mesiniaga" 1997; "Office Towers" 1996; Powell 1999; Toy 1997) (Figures 3.7; 3.8; 3.9). Despite the limitations imposed

[10] The JOULE-THERMIE is, for example, the European Commission's Program for the research, development, demonstration and promotion of non-nuclear energy technologies. It brings together for the first time the JOULE component on research and development, managed by the Research Directorate-General of European Commission, and the THERMIE component for the demonstration and promotion of energy technologies, managed again by the Energy Directorate-General. The program ran for four years (1995-1998). For more information about the objectives of the programme, see European Commission, Non-Nuclear Energy (Joule-Thermie) JOULE Component (2000), European Commission, Non-Nuclear Energy (Joule-Thermie) THERMIE Component (2003). Particularly see Edwards (1999) for the overview of European Directives on the topic.

[11] Natural conditioning proposes the passive way of heating, cooling, lighting and ventilation in buildings without relying on mechanical systems and imported energy. Haggard et al. mention that, "it is achieved through holistic architectural systems that respond to chaotic conditions on-site. These conditions include climate, human use, and the microclimatic effects of winds, topography and the building itself" (2000, p.37).

Title of the Project: Triple Sports Hall for the Secondary School; **Location:** Kinkplatz, Austria **Completed:** 1994; **Architect:** Helmut Richter, Vienna; **Structural Engineer:** Vasko-Heinrich

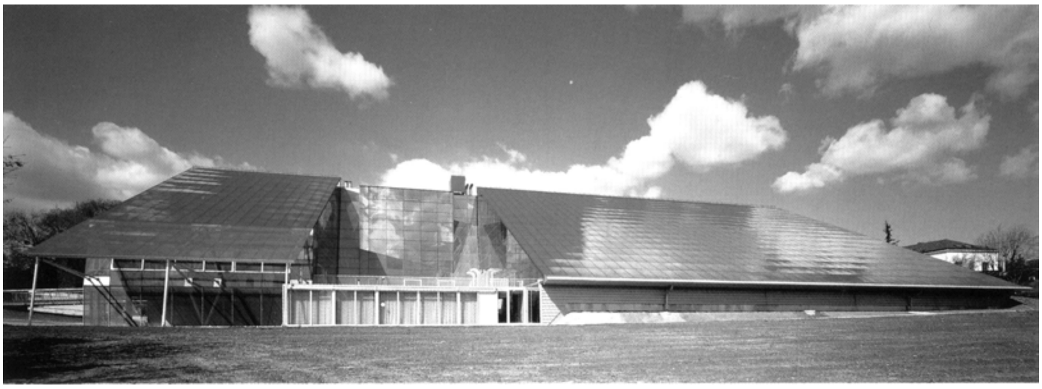


Figure 3.4 Triple Sports Hall for the Secondary School, Kinkplatz, Austria. **Photography** Helmut Richter.

Title of the Project: Daimler Chrysler Offices and Housing
Location: Potsdamer Platz, Berlin, Germany
Completed: 1999
Architect: Richard Rogers Partnership, London
Structural Engineers: Weiske & Partner GmbH / Ove Arup & Partners

Figure 3.5 Daimler Chrysler Offices adopting a passive environmental approach responding to climatic conditions and the renovated urban context of Potsdamer Platz in Berlin, Germany. **Photography** Serkan Bilgiç, 2003.

Title of the Project: Portcullis House: New Parliamentary Building
Location: Westminster, United Kingdom
Completed:1995
Architect: Michael Hopkins & Partners, London
Engineer: Ove Arup & Partners

Figure 3.6 Offices of New Parliamentary Building in Westminster, United Kingdom, is serviced by a mechanically ventilated system integrated in the rooftop and partly the passive solar system based on solar gain. **Photography** unnotified.

Title of the Project:
Commerzbank Headquarters Building
Location: Frankfurt, Germany
Completed: 1997
Client: Commerzbank Headquarters
Architects: Sir Norman Foster and Partners, London
Structural Engineer: Ove Arup & Partner, London, Krebs und Kiefer, Darmstadt

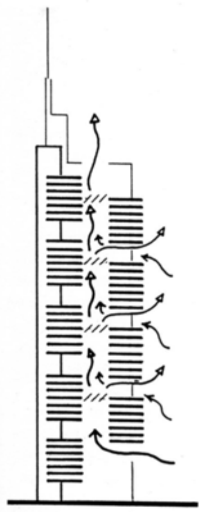


Figure 3.7 Commerzbank Headquarters Building, Frankfurt, Germany. **Photography** Richard Davis. **Figure** Sir Norman Foster and Partners.

Title of the Project: Trade Fair Administration Building
Location: Hanover, Germany
Completed: 1999
Client: Deutsche Messe AG.
Architect: Herzog + Partner BDA, Munich (Thomas Herzog, Hanns Jörg Schrade)

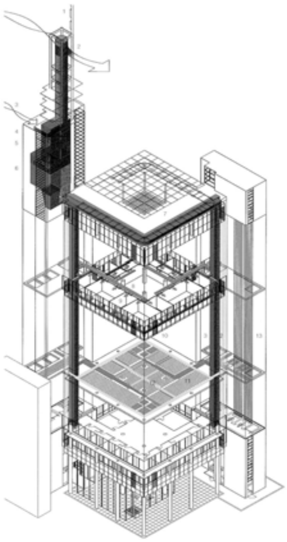
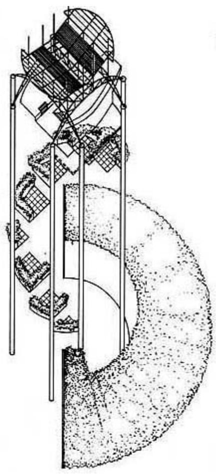


Figure 3.8 Trade Fair Administration Building, Hanover, Germany. **Photography** Demuss. **Figure** Herzog + Partner.

Title of the Project: Menara Mesiniaga
Location: Selangor, Malaysia
Completed: 1992
Client: Mesiniaga Sdn. Bhd.
Architect: T. R. Hamzah & Ken Yeang



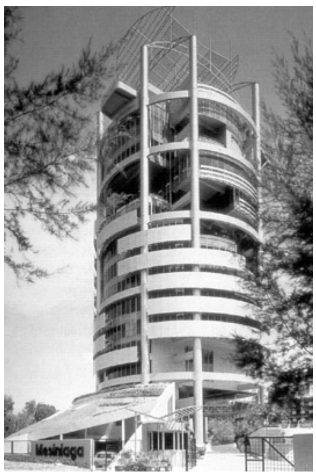


Figure 3.9 Bioclimatic approach to high-rise building by Menara Mesiniaga, Selangor, Malaysia. **Photography** K. L. Ng. **Figure** T. R. Hamzah & Ken Yeang.

by the security rationale, the buildings provide more comfort by allowing carefully controlled natural ventilation from openings on the façade, dynamic shade variation and glare control, and even by integrating individual control systems both enabling manual use by occupants and reducing energy demands.

An important characteristic of such environmentally responsive approach to intelligent architecture is the ability to control and manage the internal requirements and external conditions. The building should react to external influences and itself contribute to the process of change necessary to achieve users' predefined comfort level. Therefore, primary attention is given to optimization and management of comfort conditions which make possible the use of analogies with the human body, comparing the task to the function of the brain and the nerves in the human body. Intelligent buildings utilize technology through fuzzy logic and information-processing networks.[12]

The eco-technic approach has also inspired 'zero-energy' buildings, in which the generation of energy from solar radiation is the most important technical design challenge. Here, the role of the building goes beyond a dwelling or working place; the building itself is to become a private power station (Jones 1998, Schmitz-Günther 1998), or in Melet's words, "energy generators" (1999, p. 130). The outer surfaces or roofs are optimally aligned to the angle of inclination and course of the sun, and take account of all conditions of solar radiation. The solar-generated electricity is then fed into the local power-grid. Thus a communal network would serve as a reserve source in the event of private energy failures. With such a system, the "post-fossil society" would finally seem to be transforming society from a service-consuming one to a logistical society (Althaus 2002, p. 722).[13]

The scope of sustainability made possible the integration of global environmental concerns into conventional buildings by posing new design strategies that would handle the potentials and possibilities of technological

[12] The function of the neural network is to learn and determine the energy status of the building. Based on constantly updated knowledge of the building, the neural network is able to predict how the building will react to external influences and to the measures taken to deal with those influences, and thus to find the optimum combination of solutions to apply in response to changing atmospheric conditions. Fuzzy logic enables the definition of the parameters of such a complex system in different cases in order that the management system of the building can achieve its tasks more efficiently.

[13] Althaus searches for an architecture for the post-fossil society and proposes the combination of solar energy, technology and art as a solution for the current architectural milieu.

development as a panacea for the environmental crisis. Technology is manipulated as a tool for energy efficiency in sustainable building design and, at the same time, for encouraging economic development. Creating high-technology building, hence, is perceived as objectively preferable to the other sustainability tools to solve such environmental problems as global warming, climate change, rise of GHG (greenhouse gas) emissions. Simultaneously, this point of view has revitalized the rational vision of the 1960s and 1970s that the operation of particular scientific methods and technological programs can offer a sufficient base for environmental design, or in more current terminology, for sustainable design. Indeed, this perspective conveys a performance-based explanation in which a sustainable building is considered the self-evident proof of this rational, scientific vision to grapple with global environmental problems, because a building provides quantitative data relating to the numerical reduction of building energy consumption, energy needs, waste, water, and so on.

At this point, another subject of debate concerns to what extent and how successfully a building may achieve sustainability. Building assessment programs (LCA), employed mostly by northern countries, have evolved in the 1990s (Crawley and Aho 1999).[14] "Existing building environmental assessment methods attempt to measure improvements in the environmental performance of buildings relative to current typical practice or requirements" (Cole 1999, p. 232). The intention here is to attain international standards needed for labeling buildings as sustainable.

Life cycle assessment studies for sustainable building bring about a process of standardization, with particular ways of technological innovation and the assessment of scientific measures necessary to solve environmental problems. From one aspect, this approach inevitably implies the acceptance of the notion of buildings as simply technical structures related to the accepted environmental standards. Declining CO^2 emissions, for example, are made possible by using scientific knowledge in architecture, e.g. installation of photovoltaic cells for

[14] LCA – Life Cycle Analysis, applied in a completed building or in the early design stage, is an effort for labeling buildings as green (Crawley and Aho 1999; Peshos and Hall 2001). There are several internationally well-tried methods, and they all aim to assess the environmental impacts of a product or building over the entire life cycle, e.g. cradle-to-grave impacts, including all inputs such as raw materials, energy and water, and outputs such as emissions to air, water, land and waste. In that sense, a complete environmental assessment takes into account not only the operational resource consumption but also material manufacture, construction, maintenance, demolition, and final disposal.

energy production and solar hot water systems for heating. This admiration for technology results in the examination of how much new technology can help switching from the present pattern of development to a different one, and therefore more standardization is generated through the materials and components in the building construction industry and by stricter building codes.[15]

Currently, critiques of technological intensity in sustainable building design focus on a conviction that the architectural profession is inseparable from the technological challenge posed by global ecological problems. Another belief in architecture follows from this, namely, that the energy demand can be supplied and environmental problems can disappear *if* the building possesses the appropriate technical structures. A building is seen as a ‘high-technology machine’, reducing energy consumption, producing in response to its own needs, and accordingly minimizing environmental problems.

Moreover, the critiques concentrate on the indirect influence of the technologically dominant attitude toward the social structure of a community (Grindheim and Kennedy 1998, Pearson 1989). It is asserted that the encouragement of high-technology causes a rupture in the crucial interrelation between a building and the social body. Utilization of high-technology in building tends to ignore the social questions such as the encouragement of local cultures, traditional values and solutions and development of a sense of community and togetherness. One reason for the critical stance may be that technological innovation is a means of abandoning place-bound conditions with no reinforcement by the myth of cultural origin (Guy and Farmer 2001). If these claims are correct, it may be concluded that there is a clear conflict of technological superiority with the specifications of sustainable development.

The common point for these divergent critiques, in fact, may be the presentation and perception of technology as a prescription for sustainability. The core assumption behind this prioritization is the belief that the world might become a better place to live if sustainable principles were integrated into design by means of exploitation of the latest technology. Yet one vital concern is always forgotten, namely that the integration of technology into architecture should not

[15] Especially the building codes aim at improving energy performance and indoor living conditions. They propose employing the three technologies, viz. conservation, and passive and active system technologies. This means that energy efficiency and low energy technology can contribute to the reduction of energy demand and use in buildings.

simply be a means of accepting all innovations and improvements without interrogating their impact on human health.

In the case of work environment, critiques mostly tend to identify the negative influence of high technological intensity in sustainable buildings—intelligent, zero energy, and energy energy-efficient buildings—to the degree that the individuals who work in such an environment are separated from nature and lack control over their immediate surroundings. Indeed, many people spend their lives in anonymous environments which are artificially lit and mechanically ventilated spaces, and are effectively cut off from the outside world. Furthermore, the revelation of one more fact, namely that the application of technology is not considered to be a risk-free operation, generates concern that the building design should also wield with precaution any technologies for any kind of pollution risk. This, in turn, means more technology, equipment, and data. Fortunately, both the isolation from nature and the risk involved are being increasingly challenged by high-tech building inhabitants, who now desire more control over their work and living environments.

3.2.2. Eco-Centric Logic

In contrast to eco-technic logic with its emphasis on advanced technology and scientism, eco-centric logic emphasizes a fundamental re-orientation of values through ethical ecological thinking. This logic is in favor of low-impact technology as is eco-technic logic, but it opposes the idea of technology as a panacea. The idea summarized by Guy and Farmer's statement in "Eco-centric Logic" (2001, p. 142) holds that, "what is required is not only the development of more efficient technologies but a wider questioning of what constitutes sufficient technology; it is the latter which must define the boundaries of the former."

The emblematic issue of eco-centric logic is 'nature', within a holistic viewpoint generated through the combination of the science of ecology with an ethical framework that extends moral considerations to take in non-living objects and ecological systems. According to the eco-centric idea, the human being is subject to ecological and systems laws. Ecologically-based morality constrains human action by imposing limits to growth. At the same time, sustainable development is concerned with the negative environmental impacts of rampant economic growth and of large-scale industrial development. In fact, it matches eco-centric logic: both emphasize the idea of limits and advocate compulsory restraints on human consumption of natural resources. Both discourse of sustainability and eco-centric logic encompass a radical approach, advocating immediate precautionary measures and developing a responsive style to interacting with nature. For architecture, this means rethinking building design and construction without unrestrained admiration for technological improvements; in other words, in opposition to the eco-technic logic.

In the eco-centric image of the built environment, the main concern is to achieve a well-balanced relationship between nature and building. For this reason, it is important to identify the characteristics of the desired relationship with nature. First and foremost, this logic suggests the creation of buildings that embody and express an environmentally friendly attitude, which simply means the adding in of environmental criteria to the design process. Environmental policies and competing environmental strategies are introduced into the architectural agenda within a strategy of creating "a built environment that mimics and complements rather than conflicts with nature" (Slessor 2002b, p. 32).[16]

Sustainable architecture has continuously borrowed views and terminology from the science of ecology and the environmentalist movements (Madge 1997; Farmer 1996). The ecological approach to design is typically discussed under such headings as "environmental architecture" (Hagan 2001, p. xv), 'environmentally friendly architecture', 'environmentally-sensitive design', 'environmentally-oriented design', "environmentally sound" (Farmer 1996, p. 179) design or, the most commonly accepted phrase, 'ecological architecture'.

Contemporary architectural approaches using eco-centric logic range from direct analogies with ecological systems in an aesthetic manner to self-sufficient buildings prioritizing the efficient use of resources. As a framework of analysis, the approaches to ecological architecture can be grouped under the following three headings:[17] self-sufficient building design; buildings giving environmental messages; climatically responsive building design.

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[16] Especially today's global environmental problems are written up by Catherine Slessor (2002b), one of the critics on the staff of *Architectural Review*. In the introductory paragraph of the theme of the issue, 'Ecological Propriety', she deals with the environmental issues such as climate change, global warming, forest fires, changes in Arctic ice sheet, droughts, floods and storms by interrelating with the other subjects of sustainability such as over-population, pollution and waste.

[17] One noticeable point here is that while criticizing why a building is designed according to a particular environmentally friendly idea, the strategic priorities and conceptions of the

Self-sufficient building design: Among noticeable manifestations of eco-centric logic in architecture are the 'self-sufficient buildings', also termed 'autonomous buildings' (Vale and Vale 2000), which represent strategic action for the minimization of the 'ecological footprints' of humankind. In other words, the buildings are "capable of sustaining themselves to some degree within their own region, in terms of […] energy supply and waste disposal" (Hagan 2001, p. 185).

In the field of environmental philosophy, a self-sufficient building was characterized by the 'ecocentric' attitude of the 1970s, based on bio-ethics and a deep reverence for nature.[18] These attitudes also came to be described in terms of 'deep ecology', like ecocentrism, emphasizing harmony with nature and the intrinsic worth of all forms of life, as well as simplifying material needs so as to reduce human impact on the world.[19] The human being is conceived of as a steward responsible for the health of the ecosystem; guided by "a kind of management ethic dictated by the biophysical constraints and limits that come not from human needs but from within nature itself" (Guy and Farmer 2001, p. 143). This envisages the metaphysical belief that humans are not the owners but an integral part of the Earth. Aldo Leopold's land ethic viewpoint indeed is the origin of this idea that the land is not merely the soil; it cannot be seen as a commodity to be bought or sold, but rather must be viewed as a community of human and non-human beings (Leopold 1949/1998). Eco-centric logic defines a familiar approach, similar to James Lovelock's hypothesis named after 'Gaia', the archaic Earth goddess (Pearson 1989).[20]

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environmentalism of those involved in its design and construction must first be understood. Consequently, the building examples in the following part are presented together with the environmental ideas that influenced them.

[18] Ecocentrism is a mode of thought stated first by Timothy O'Riordian in 1977. The idea views humanity as a part of the global ecosystem, and emphasizes the idea of limits advocating compulsory restraints on human breeding, levels of resource consumption and access to nature. Here, there is a strong tendency to equate human and natural bodies, deriving morality and life-styles for human beings from ecological principles such as carrying capacity, strength through diversity and hierarchical organizations. See Pepper (1984) for ecocentric philosophy.

[19] Deep Ecology is an environmental movement first developed by the Norwegian philosopher Arne Naess in 1972. In contrast to shallow ecology, it advocates that both human and non-human life on Earth have the same value, and this value cannot be based merely on usefulness for human purposes. There are eight points in particular explaining the basis of deep ecology. On these points see Naess (1986/1998).

[20] Gaia is the name given by scientist James Lovelock to his hypothesis in 1979, proposing that the Earth and all its life systems as an entity are self–sustaining, self-regulating, and have the characteristics of a living organism. Gaia has become a potent symbol because it provides a planetary perspective on the current ecological crisis. According to this hypothesis, all living

These environmental visions all claim that nature is fragile and easily disrupted. They stress the negative environmental impact of the current built environments. In their view, these buildings constitute an unnatural form of consumption interrupting the cycles of nature. In this sense, each building poses an act against nature, and is, in ecological terms, a "parasite" (Curwell and Cooper, cited in Guy and Farmer 2001, p. 143).

These ethical concerns affect the vision of the potential building as an integral part of the Earth; in other words, the creation of "a micro-system interacting with the wider ecosystem of Gaia" (Pearson 1989, p. 21). The essential mission of sustainable architecture, therefore, becomes the radical reduction of the ecological footprint of buildings and the guarantee of the efficient use of resources.

The resulting design strategy is to draw analogies with ecological systems by designing efficient, dynamic, living and cyclical processes and buildings. It treats the earth as a living entity, thus building strategy looks to the earth to find "what constitutes a healthy built environment, how to build with the least impact on the earth, and ways in which the built environment can nurture vibrant community" (Elizabeth 2000, p. 3-4).[21]

Approaches to design tend to revolve around small-scale buildings utilizing low and intermediate technologies. There is an emphasis on reducing or breaking dependency on centralized infrastructure services of water, energy and waste, such as the houses by Thomas Spiegelhalter in Germany (Frei 1996; Kugel 1998; Schmitz-Günther 1998) and Bill Dunster in the United Kingdom (Herzog 1998) (Figures 3.10; 3.11). In terms of building materials, the preference is for renewable and natural materials such as earth, timber, stone, and straw as seen in Peter Hübner's timber-based buildings (Blundell Jones 1996a; Herzog 1998; Blundell Jones 2001b), Rick Joy's rammed earth buildings in the USA ("Casa Jax, Tucson" 2002; "High and Dry" 2003; Joy 2002; Slessor 2002a) (Figure 3.12), H2O Architects' Textile Faculty Building in Australia (Hughes 2001) (Figure 3.13), Bertrand Bonnier's CESNAC Airport Building in France ("Integrated

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organisms form a balanced control system to provide optimum conditions for life in the world, evolving with the non-living environment.

[21] Elisabeth (2000, p. 3) maintains these questions as the main concerns of the act of natural building. She also points out that, "natural building is about far more than materials and wall assemblies. […] It encompasses a broad set of ethics, underpinned by a worldview that treats as not only sacred, but alive."

Title of the Project: Solar Cultural Center
Location: Breisach, Freiburg, Germany
Completed: 1998
Architect: Thomas Spiegelhalter

Figure 3.10 The house in Freiburg, Germany, using ambient energy and rainwater, is made completely from re-used and recycled materials. **Photography** Friedrich Busam.

Title of the Project: Terrace House Prototype (Hope House)
Location: East Molesey, United Kingdom
Completed: 1995
Architect: Bill Dunster
Structural Engineer: Mark Lovell

Figure 3.11 Self-irrigating, self-draining and self-venting sunspace for energy supply, food production and extra living space in Hope House, East Molesey, United Kingdom. **Photography** Dennis Gilbert.

Title of the Project: Palmer House
Location: Tucson, Arizona, USA
Completed: 1998
Architect: Rick Joy Architects (Rick Joy, Andy Tinucci)

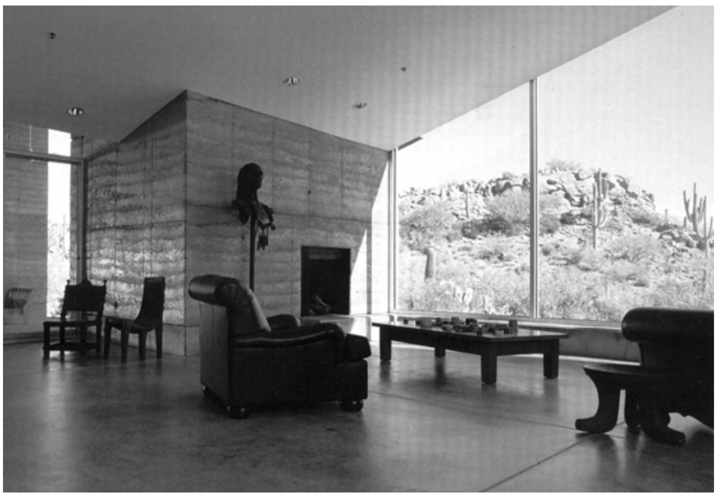

Figure 3.12 Massive rammed earth walls of Palmer House in Tucson providing insulation in the arid climate of Arizona, USA. **Photography** Bill Timmerman.

Energy" 1997) (Figure 3.14), and Ian Ritchie's Greenhouse in France ("Ian Ritchie" 1997; Uide 1998). The reduction of the use of building materials demanding high energy in the production process, as seen in Edward Cullinan's Westminster Lodge Building in England (Jones 1998; Toy 1997), made of rough-timber and Herzog and De Meuron's Winery in the USA (Betsky 1998; Lecuyer 1998) (Figure 3.15) with walls made of galvanized steel gabions filled with crushed stone, or the diminution of material-based errors in the construction, like Hübner's School Extension Building in Germany (Blundell Jones 1996a), demonstrate very different ways of expressing an intense awareness of the importance of ecological and human concerns. Moreover, the architects employing re-used and recycled materials such as Shigeru Ban with his Paper Tube Architecture (Jones 1998; "Paper Tube Architecture" 1997) signify that sustainable architecture is not just a matter of the expensive use of space and materials, and the advanced technology, but also encompasses a broad set of ecological ethics.

Buildings giving environmental messages by aesthetics and building art: The eco-centric image of the built environment, secondly, has its roots in the metaphoric expression of ecological awareness by setting forth a new architectural language in the building arts. This metalanguage of architecture is the result of a desire to form a new universal culture which would emphasize a transformation or shift into new consciousness. In this respect, the eco-centric logic harmonizes with a new world view known as "New Ageism" (Storm cited in Guy and Farmer 2001, p. 143), or the New Age Movement, which envisages social change beginning with self-awareness, individual reflection, and ecological consciousness. The New Age Movement, "as a theory of social change" (Guy and Farmer 2001, p. 143), is a postmodern idea promoting the belief that the solution to the environmental crisis requires a shift from utilitarian values to an attitude in which aesthetic and sensuous values play a prominent role. A more sensuous community, argue the New Ageists, gives rise to more ethical responsibility in social and environmental concerns, which in turn leads to the development of an ecologically aware society, while at the same time rejecting the rationalism, modernism, and materialism of the North. Hence, both New Ageism and eco-centric logic meet in a mutual wish that the ecological worldview become the Zeitgeist.

Title of the Project: Textile Faculty Building, **Location:** Australia
Completed: 2000
Client: Royal Melbourne Institute of Technology (RMIT)
Architect: H2O Architects + Bates Smart Architects
Structural Engineer: Ove Arup & Partners

Figure 3.13 Within the changing inclination of the sun throughout the day, cedar timber as a surface material and its texture produce changes in the color of skin of the Textile Faculty Building, Australia. **Photography** Trevor Main.

Title of the Project: CESNAC Airport Building
Location: Aerport de Bordeaux-Mérignac, France
Completed: 1996
Architect: Bertrand Bonnier

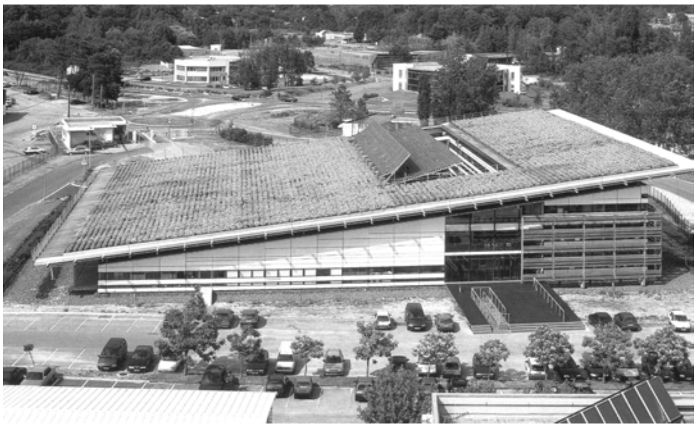

Figure 3.14 Oriented south-east, the planted roof of the CESNAC Airport Building in France protects from aircraft noise and wind. **Photography** Hervé Abbadie.

Title of the Project: Vinery for Dominus Wines
Location: Yountville, California, USA
Completed: 1998
Client: Christian Moueix, Cherise Chen- Moueix
Architect: Herzog and de Meuron, Basel, Switzerland (Jacques Herzog, Pierre de Meuron)

Figure 3.15 Walls of the prismatic winery in California, USA, are composed of steel gabions filled with stones. **Photography** Richard Barnes.

In the case of building design, the emblematic issue is creating icons, especially with reference to aesthetic iconography, prioritized as having transformative value in changing the current consciousness and responsiveness to nature and environmental problems. Here, the essential mission of sustainable architecture becomes the conveying of "visibility" by the use of green icons in building (Hagan 2001, p. 128). The architectural preference is to break the formalist interpretations of architecture and create buildings that celebrate the environmental message.

The iconic expression of ecological values may be best traced in the works of an American design team, SITE (Hagan 2001; Wines 1997), the buildings of Andrew Wright Associates (Jones 1998; Herzog 1998; Wright 2000) and the projects of the Argentinean designer Emilio Ambasz (Toy 1997; Hagan 2001) (Figure 3.16). Here, the role of sustainable architecture is metaphorical; the buildings are termed sustainable as they are assumed to signify the ecological paradigm in architecture and landscape designs by emphasizing 'appearance' over performance. This approach to building develops an iconographic language of representation which emphasizes the reflective individual with a romantic view of nature, and this can be evaluated as one way of rendering visible a new relation between building and nature. For instance, Ambasz attempts a symbiotic relationship in the project of the Nichii Obihiro Department Store of Ibihiro, Japan (Toy 1997), by "burying it [built culture] under mounds of the earth wherever possible" (Hagan 2001, p. 161), whereas SITE's response in the Saudi Arabian National Museum in Riyadh (Toy 1997) has a different aesthetic approach, based on folding planes (Figures 3.17; 3.18). In the former, the building tries to create an inner nature-park, a picturesque landscape, complete with waterfall and lake, and ever growing trees between the two layers of external façade. This is, however, achieved by advanced environmental control and glazing systems in such a cold climate. In the latter, the building is physically integrated with the surrounding land where the topography is built by literal folding planes. In terms of environmental pragmatism, however, it has a primarily reflexive agenda rather than a sustainable agenda, demonstrating a "commitment through highly visible aesthetic choices" (Wines 1997, p. 33).

Moreover, many urban landscape and park renovation projects originating especially in Europe use green icons as a tool to create ecological consciousness

Title of the Project:
Samye Ling Buddhist
Retreat Centre Project
Location: Holy Island,
Scotland
Planning: 1994
Architect: Andrew Wright
and Consultants, London

Figure 3.16 Samye Ling Buddhist Retreat Centre Project in Holy Island, Scotland, designed as a self-sufficient complex in terms of water, waste, food, and energy. Photography Eamonn O'Mahony. **Photography** Eamonn O'Mahony.

Title of the Project: Nichii Obihiro Department Store; **Location:** Obihiro, Japan
Architect: Emilio Ambasz and Associates

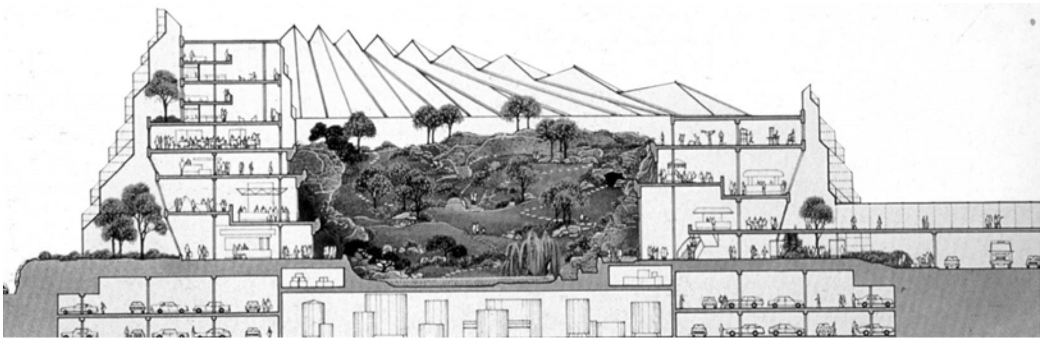

Figure 3.17 Nichii Obihiro Department Store, Obihiro, Japan. **Figure** Emilio Ambasz and Associates.

Title of the Project: Saudi
Arabian National Museum
Location: Riyadh, Saudi
Arabia
Architect: SITE

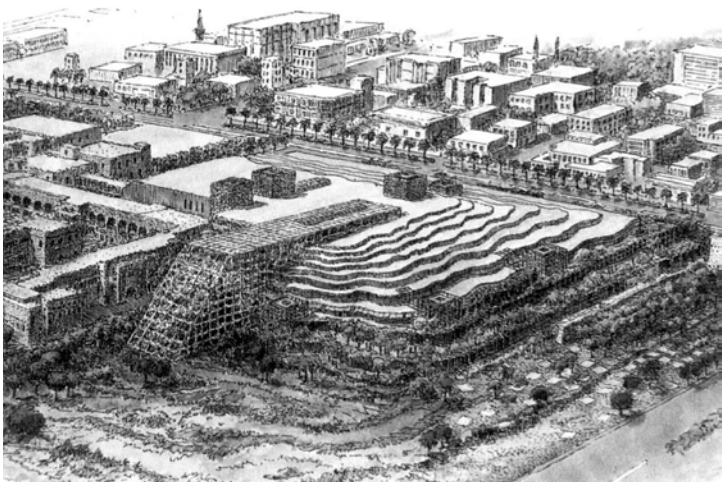

Figure 3.18 Saudi Arabian National Museum, Riyadh, Saudi Arabia. **Figure** SITE.

as well as to mend the fractured urban realm. Alain Cousseran's Thames Barrier Park with Patel Taylor in London, United Kingdom (Slessor 1996b); Patrick Berger's public park and viaduct refurbishment in France ("Alchemical Landscape" 1996; Jones 1998; Meade 1996) and Tottori Flower Park in Japan (Vitta 1999), grounded in the concept of *Feng Shui*, are illuminating because the emphasis is upon an aesthetic language aimed at representing an idealist vision of global ecological awareness (Figure 3.19).

Title of the Project: Viaduct Refurbishment
Location: Paris, France
Completed: 1995
Client: SEMAEST
Architect: Patrick Berger
Landscape Architect: Philippe Mathieux

Figure 3.19 Elevated linear promenade of Viaduct Refurbishment Project, Paris, France. **Photography** Achipress / Franck Eustache.

Correspondingly, the quest for giving environmental messages has inspired buildings seeking for appropriate forms prior to and above physical performance. The expression of architecture here is chaotic and non-linear, achieved by referring or using direct analogies to systems in nature. This arises from a new approach borrowed from the chaos and complexity theory in physics. As with the ecocentric attitude and the Gaia hypothesis, the complexity paradigm of the 1970s revolutionized the image of nature as a whole of unpredictable, dynamic, evolving, self-adapting and self-organizing systems. Jencks (1995) explains that the complexity paradigm places the emphasis in sustainable architecture on self-expression and imagination. Creative sustainable architecture embraces a new architectural language that,

> resembles some recent fractal architecture—fractured planes, crystal shapes, forms that catch the light and shadow in brilliant chiaroscuro. This is reminiscent of the crystalline structures that Expressionist architects proposed in the 1920s, but folded plates have a different rationale and are

not designed to resemble crystals: they are generated by computers and new conditions so their form-language is quite different (p. 12).

This new architectural language of the 1990s became possible because of advances in structural engineering, the ability to build curved forms through the use of computer modeling, automated production, and the generation of new materials. The progress in sustainable architectural forms owes a great deal to architects who question accepted practices and then re-orient their work toward sustainability using scientific knowledge. Studies by Frank Gehry, the Spanish architect Santiago Calatrava (*Santiago Calatrava's Creative Process* 2001), and Future Systems (Castle 2000; Field 1999; Melet 1999) epitomize the possibility of moving beyond conventional notions of space to create new forms that celebrate environmental messages (Guy and Farmer 2001; Hagan 2001) (Figures 3.20; 3.21; 3.22).

Here, the buildings aim at giving an environmental message, as well as symbolizing a cultural artifact, and that is why they are termed 'sustainable'. Yet the desire for visibility, or for identity, brings forth the individualism on a utilitarian level expressed by the shape of the building. For instance, Future Systems' Earth Centre, a sky-dome made of large areas of glass, responds by squaring the circle of climatic response and transparency by mere technological device (Brennan 1997). However, "whether this system will function properly is incidental to the basic question that green design seems to dictate that the designer work within one of two compounds at opposite ends of stylistic expression" (Brennan 1997, p. 24). Else, according to Hagan (2001), Calatrava's intention is more to ground architecture in a particular view of nature by the structural functionalism, even if,

> [t]here is nothing particularly 'environmental' in this correspondence between organic and non-organic skeletons, but the fact that the correspondence is made indicates a certain valuing of nature that does have environmental implications, in that such valuing could be nudged towards operation as well as configuration (p. 30).

These critiques of the intention for visibility by the aesthetics and the building art stress the conflicts, even complete contradictions, with the discourse of sustainable development, which is inscribed in the quality of the end product in terms of the energy and waste strategies, the choice of building materials, and the technological intensity they utilize. Hagan asserts that, "one of the reasons the

Title of the Project: Bilbao Guggenheim Museum
Location: Bilbao, Spain
Completed: 1997
Architect: Frank O. Gehry and Associates

Figure 3.20 Bilbao Guggenheim Museum, Bilbao, Spain. **Photography** unnotified.

Title of the Project: Sondica Airport
Location: Bilbao, Spain
Completed: 2000
Architect: Santiago Calatrava

Figure 3.21 Sondica Airport, Bilbao, Spain: one of the designs by Calatrava who grounds architecture in a formal representation of animal skeletons within an aesthetic preference. **Photography** Burg & Schuh, Palladium Photodeign.

Title of the Project: Office Building, Project ZED
Location: London, United Kingdom
Design: 1995
Client: The European Commission
Architect: Future Systems

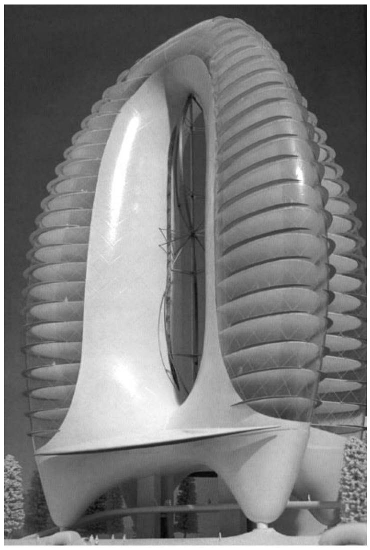

Figure 3.22 Office Building in London, United Kingdom, as energy generator with the wind tribunes and photovoltaics: Project ZED's form and design are arranged so as to maximize the solar and wind energy gain. **Model** Future Systems.

architectural expression of environmental sustainability has not been universally welcomed in environmental circles is that representing a new contract between nature and architecture does not in any way imply the architect has successfully signed up to it" (Hagan 2001, p. 5). In this context, buildings' label of 'sustainable', 'green' or 'ecological' is to become questionable, by simply implying 'superficially sustainable'. Though the complex forms of Frank Gehry in the Bilbao Guggenheim Museum in Spain (Hoyet 1997/1998; Slessor 1997), with non-linear, snakeskin-clad design, is an attempt to imitate the non-linearity of nature by formal predictability, it is "still physically static." The building is "complex in form, but not in operation, and thus still miss[es] the essence of complexity in nature: non-linear change over time" (Hagan 2001, p. 32).[22] An interest in and understanding of an emergent model of nature, or personal experience(s), on the contrary, may harm the Earth, and may cause the development of unsustainable formations in architecture. These deliberately provocative approaches looking to nature conceptually rather than operationally may set aside the ethical framework of sustainable design.

Climatically responsive building design: Thirdly, the eco-centric logic encompasses a sustainable design attitude, viz. climatically responsive architecture, more commonly known as 'bioclimatic building design', or 'climatic design', which deals with human intervention in nature by acting locally.[23] The emblematic issue here is respect for the local values with back-to-the-land practices that prioritize 'climatic concern'. This design approach is in favor of being bound to the land by utilizing the local conditions such as the topography, landscape, microclimatic conditions and the materials of a particular place.

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[22] However, John Farmer, the writer of *Green Shift: Towards a Green Sensibility in Architecture*, explains his view of personal experiences of deconstructivist architects in the following terms: "it would however be a mistake to see buildings like those of Gehry, Himmelblau and Domenig as totally unconnected with environmental issues" (1996, p. 176). As clearly seen, he encourages the 'personal experience' as expressed in Gehry's works. Farmer's interest in Gehry is because of his work which, "demonstrates an ability to trawl back through personal experience to develop what appear as mutant forms initially but which can be read as forms evolving and generating, themselves derived from and responding to the external environment within which they are attempting to establish their unique existence" (p. 174).

[23] There is a terminological multiplicity: the topics of climatically responsive design, climatic design or bioclimatic building design may be substituted for one another to express the same sustainable design approach. Here, the bioclimatic building design is stated by Jones relating the design attitude with a threefold concern, which are "energy, health and well-being, and sustainability" (1998, p. 35). Additionally, Hawkes (1996, p. 13) mentions the bioclimatic architecture emphasizing "the environmental control achieved through working with, rather than against climate."

Therefore, it is possible to assert that these building examples may best epitomize the fulfilment of local sustainable principles among the other global architectural practices for sustainability.

It is hard to distinguish the climatically responsive design approach from environment-friendly or energy-efficient ones, since the climatic criteria are inevitably integrated in all these concerns of sustainable architecture. To remove the conceptual complexity, first the idea of climatic design will be investigated, by examining which buildings can be categorized as climatically responsive within the current sustainable building paradigm.

The attention given to environmental issues, utilization of energy-saving technology and the use of environmentally friendly materials all enable the creation of climatically responsive buildings. The vision here is based on belonging to a place by adapting to the particular outdoor conditions. That is why climatically responsive buildings have a fundamentally distinct strategy which accentuates natural conditions. This means that, in the design stage, the layout and setting of the building are planned according to the climatic conditions, the wind and solar directions and the availability of shelter and exposure. Existing man-made creations are also considered, e.g. the roads, integrated energy systems, water delivery systems, and sewage networks.

As mentioned before, the eco-centric logic is concerned with low-impact technology. The addition of climatic concerns, besides, prioritizes using less technology in the building as well as the least use of high-technology products such as photovoltaic panels, light aluminum sun-shades with their low percentage of active energy gain. The best strategy for this vision is the design of passive buildings harnessing the beneficial attributes of climate without recourse to mechanical systems. Passive energy production for heating, cooling, ventilation and other services is achieved with minimum use and renewable forms of energy, e.g. sun and wind. This approach has inspired such buildings as the Jean-Marie Tjibaou Cultural Center in New Caledonia by the Renzo Piano Building Workshop (McInstry 1998; Melet 1999), the Apartment Building by LOG ID in Switzerland (Geest 1996), the Science Park in Gelsenkirchen, Germany, by Kiessler + Partner (Dawson 1996; Jones 1998), offices in Chile by Enrique Browne (Slessor 1999a), and several buildings by Mario Cucinella (Francis 1999; Petrus 1996; Slessor 1999b) (Figures 3.23; 3.24; 3.25).

Title of the Project: Jean-Marie Tjibaou Cultural Centre
Location: Nouméa, New Caledonia
Completed: 1998
Client: Agence pour le Developpement de la Culture Kanak
Architect: Renzo Piano Building Workshop, Genoa/Paris;
(Award Winner, 1991)

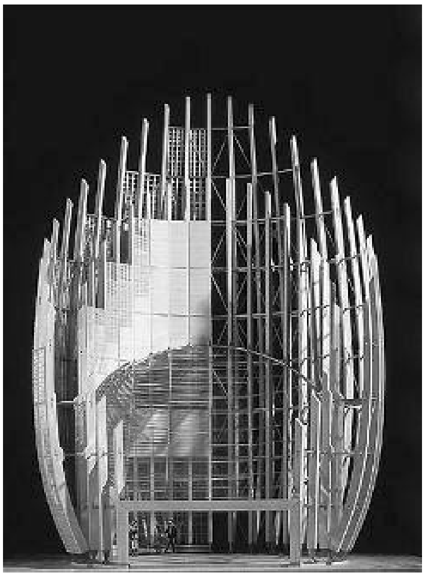

Figure 3.23 The shell-shape structure in Nouméa, New Caledonia, both creating a symbiosis of kanakan tradition and sustainable architecture, and a suction effect permitting natural ventilation. **Photography** Michel Denancé.

Title of the Project: Apartment Building
Location: Biel, Switzerland
Completed: 1993
Client: Stettler AG
Architect: LOG ID (D. Schempp) with ASP

Figure 3.24 South-west façade of apartment building in Biel, Switzerland, which has a passive-gain solar energy strategy by double-height conservatories. **Photography** Reiner Blunck. **Figure** LODG ID.

Title of the Project: Science Park
Location: Gelsenkirchen, Germany
Completed: 1995
Client: Land Nordrhein-Westfalen
Architect: Kiessler + Partner, Munich
Structural Engineer: Sailer + Stepan

Figure 3.25 Dominant long glazed arcade is designed regarding the energy management strategy of Science Park Building in Gelsenkirchen Germany, for summer and winter days. **Photography** Ralph Richters / Architekturphoto.

3.2.3. Eco-Social Logic

The eco-social logic extends the debates about sustainable architecture beyond the concerns with technological dependency and environmental protection to the root cause of ecological problems, the human being. Here, the emblematic issue is 'human'; the eco-social logic puts the human being at the center of concern, yet, within a critical stance. This particular viewpoint stems from the humanist, albeit Eurocentric, paradigm that focuses attention on the sustainable existence of the human being.

The prioritization of the human, in fact, came about because of an awakening to the impact of our unsustainable way of life on humanity: not only is nature in trouble but also the human is in real danger of self-destruction. The humanist rhetoric of the eco-social approach, therefore, overwhelmingly gives priority to the protection of human comfort and health together with the preservation of social and cultural values.

The notion of eco-social logic theoretically overlaps with the social dimension of sustainable discourse. Both of them are in agreement about a single requisite, that is, the constitution of sustainable communities**.** They also claim that the vision of sustainable individuals or communities may be realized fully by means of a strategy proposing healthy, democratic, collective societies, and continuous improvement of quality of life in a wider cultural context (Grindheim and Kennedy 1998; Pepper 1996; *The World Bank Annual Report* 2001).

Hence the role of the building is logically to ensure the sustaining of individual and communal existence (Pearson 1991). Each building is seen as having the potential to help users forge a sense of individual and collective identity and well-being. The eco-social image of the built environment emphasizes the use of appropriate forms, technologies, materials, and design layouts, in order to construct participatory, integrated and healthy buildings that fulfil human needs without damaging the health of the ecosystem.

In the case of building practices, this ideal social agenda of sustainability should first be examined within the dominance of the humanist perspective. The eco-social logic tends to frame the socially sustainable building panorama pragmatically rather than by means of the thorough analysis of wider social factors. In this group of examples, the emblematic issue is the 'medical discourse': human health is emphasized, while the preservation of a diversity of existing cultures is downgraded to a trendy concept, just as a matter of choice. Communal sustainability is, indeed, the most ignored issue in sustainable buildings; only a very limited number of them are discussed by the prominent mainstream. Currently, approaches to eco-social building tend to focus on three design fields: healthy building design; buildings concerning the regional context; building and the participatory space.

Healthy building design: The eco-social logic encompasses a sustainable design approach, viz. the 'healthy building', which deals with the protection of human health inside the building. It utilizes a "medical rhetoric" (Guy and Farmer 2001, p. 145) to relate that the sustainable existence of humanity depends on, at the same time, the creation of a healthy built environment. By linking up with the growing research evidence of medical science, the logic identifies buildings themselves as potentially dangerous environments for personal health. As a result, the role of sustainable architecture is pragmatically to set prescriptions promoting health, and to minimize the role of the building in generating hazards to human survival.

To define what the prominent architectural publications mean by calling a built environment 'healthy' is important, yet one obvious fact is that the building examples presented to us are concerned more with physiological health problems than with psychological ones. Critical attention to physiological problems is now focused on the interior of buildings mostly located in the industrialized countries, since the concern about 'sick buildings' is a more familiar and emblematic issue there for both work and domestic environments.[24] Most of the critique is about a recent discovery that human health is being threatened by the very technologies that were created to protect it (Schmitz-Günther 1998). Pearson (1989, p. 25) states that, "until recently, most people in the West felt their homes were healthy—much healthier than in the past—and this had been achieved by modern technology. But we are now facing new problems caused by the very technology that was designed to improve our lives."

Pearson's point about occupant discomfort refers to the 1980s' conception of the 'sick building syndrome'.[25] Health problems caused by the living

[24] For instance, Mendler and Odell (2000, p. 2) mention that, "according to the U.S. Environmental Protection Agency (EPA), nearly one-third of all buildings suffer from 'sick building syndrome'."

[25] See Appendix E.2.1. Healthy, Biological, and Organic Buildings.

environment have shifted the viewpoint of the 1990s' sustainable architectural practice toward the re-evaluation of the current building fabric and servicing systems with reference to medical discourse (Edwards 1999). Modern buildings, especially the *shinny* cubic work environments and residential units, are now seen as a source of illnesses. Actually all these imply a stand against anonymous, universal environments which are artificially lit, mechanically ventilated, and effectively cut off the human being from the outside world.

In the case of new building practices, the resulting design strategy focuses first on the assessment and re-orientation of technological intensity, and secondly on the creation of toxin-free environments. The mechanization of a building is evaluated in terms of its complexity and intensity as possibly a risky operation and therefore part of the self-destructive process of the risk society.[26] The suggested new sustainable design principles are associated with the promotion of naturally conditioned systems, i.e. natural lighting, heating, cooling and ventilation, as risk-free operations, or mixed systems combining modest levels of mechanization with climatic concerns. Here, the role of technology in building can be a contributor rather than a barrier to the natural world. Isolation from nature is softened by atriums which become the social and visual heart of the buildings, with their small inner-gardens for interaction and communication, intensive planting for fresh air, water falls or fountains for peaceful effect, and the introduction of subtle and relaxing performances of light, shade, and color. Additionally, the occupiers' lack of "control [over] their own internal environmental conditions" (Edwards 1999, p. 172) is lessened by the addition of manually controlled ventilation shafts and natural lighting apparatus.

Indeed, buildings utilizing this logic tend to correspond to climatically responsive buildings exploiting small-scale active systems, low or medium level of technology, natural light and ventilation. This approach has inspired many buildings claming to have healthy, living indoor climate such as the Institute for Forestry and Nature Research, the Netherlands, by Stefan Behnisch (Blundell Jones 2001a; Koster 1998; Melet 1999), Commerzbank Headquarters Building by

[26] Andrew Blowers explains the concept of 'risk society' and of ecological risk from high technology through the modernization process. He states that, "the risk society theory (RST) is the most developed critique of the social consequences of environmental change" (1997, pp. 854-55). "Western modernization has led to a transition from an industrial society to a risk society and with it there comes the confrontation with the self destructive consequences which cannot be overcome by the system of industrial society" (p. 855).

Norman Foster, Germany (Jones 1998; Herzog 1998), and the Götz Headquarters Building, Germany, by Webler + Geissler ("Götz Administration Building" 1997; Lodel 1999, Miles 1996; Webler and Geissler 1997) (Figures 3.26; 3.27; 3.28). In line with their geographical location, it is obvious that most of them could only be constructed in the countries where the economic capacity is sufficient to meet the extra cost of alternative special technologies and management.

The eco-social logic extends the interest in healthy built-environments toward "non-toxic" (Edwards 1999, p. 174; Brennan 1997, p. 25), "toxin-free" (Pearson 1989, p. 26), or "low-toxin" (Elisabeth and Adams 2000, p. 299) buildings. Here, the emblematic issue in building design is the choice of material. The sustainable buildings initially tend to avoid the chemical pollution caused by synthetic building materials and to keep away from materials that are irritating or hazardous.[27] Construction detailing is foregrounded; creating healthy, harmonious, ecologically sound interior spaces has become popular with interior designers. In contrast to airtight windows, insulation foam and impermeable layers of plastic paints and adhesives, building materials that can breathe are preferred. In the return to the traditional building materials and construction methods, the use of natural and tactile materials is promoted; especially materials produced by environmentally friendly methods, without chemicals, and used with organic treatments and finishes.

Buildings concerning the regional context: The eco-social image of the built environment, secondly, is contained in the new buildings with regional characteristics. Indeed, the idea was inspired by the cultural dimension of sustainability with its stress on the continuation of the special qualities of a place. Here, the essential mission of sustainable architecture becomes that of the interpretation of vernacular experience, concentrating its message on the relevance of native culture. The buildings are truly sustainable, because they revitalize local materials and construction techniques, and use traditional space organizations and settlement patterns to create unique architectural style, by interpreting, re-functionalizing and adapting the old values.

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[27] According to the European Commission's Construction Products Directive 89/106/EEC, "building products do not give off toxic gases or are a source of particulate contamination or radiation" (Edwards 1999, p. 174). These are two of six requirements to provide healthy non-toxic conditions in buildings.

Title of the Project: Institute for Forestry and Nature Research
Location: Wageningen, the Netherlands
Completed: 1998
Client: Rijksgebouwen Dienst, Directie Oost, Arnhem
Architects: Behnisch, Behnisch & Partner Architekten, Stuttgart
Structural Engineer: Arohnson Raadgevende Ingenieurs V.O.F., Amsterdam

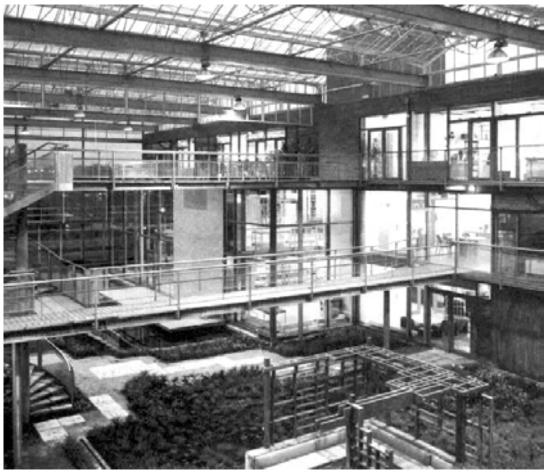


Figure 3.26 Inner garden of Institute for Forestry and Nature Research in Wageningen, the Netherlands, composed of pool and plants playing a role in conditioning the internal environment as well as forming a meeting place. **Photography** Edwin Walvisch.

Title of the Project: Commerzbank Headquarters Building
Location: Frankfurt, Germany
Completed: 1997
Client: Commerzbank Headquarters
Architects: Sir Norman Foster and Partners, London
Structural Engineer: Ove Arup & Partner, London, Krebs und Kiefer, Darmstadt

Figure 3.27 Tall winter gardens of Commerzbank Headquarters Building in Frankfurt, Germany, designed for the amenity of the occupants function as layer of greenery and source of fresh air. **Photography** Ian Lambot.

Title of the Project:
Götz Headquarters Building
Location: Würzburg, Germany
Completed: 1995
Client: Götz GmbH, Metall-u. Angalenbau, Würzburg
Architect: Webler + Geissler Architekten, Stuttgart
Martin Webler, Garnet Geissler
Structural Engineer:
Ingenieurbüro Rudi Wolff

Figure 3.28 The atrium of Götz Headquarters Building in Würzburg, Germany, making a significant contribution to human health, as well as the total energy concept, with the planting, the pool and movable glass roof. **Photography** Roland Halbe.

The prominent mainstream of architectural publications on this subject is neither satisfactory nor unbiased. It tends to be restricted and selective. The profiles of projects selected for coverage are not contingent on how successfully they recall the locality and characteristics of a place, but how they might be able to highlight the work of particular celebrated architects. The projects are mostly drawn from the context of a so-called developing world within the distinctive commentary on local values. The Aga Khan Awards for Architecture, in this respect, have the important mission of sharing a wide range of alternatives in the sphere of Islam.[28] Among the architects of awarded projects and of interest, Hassan Fathy from Egypt (Jones 1998; Hagan 2001); Balkrishna Doshi (Bhatia 1995; Maki 1997); Charles Correa (Digby-Jones 1997; Foh 1995; Rykwert 1999); A.D. Raje (Bhatia 1995) and Raj Rewal (Joubert 1995; Meade 2003) from India; Geoffrey Bawa from Sri Lanka (Brawne 1995) are subjected to special interest because of their reaction against the reductive universality of modernism, and their way to defense the architecture of their cultural region (Figures 3.29; 3.30). These architects, in Hagan's words "indigenous intelligentsia," are posited at a stance "to preserve a heritage against its own people's aspirations for a 'modern' (i.e. western) way of life" (Hagan 2001, p. 118). Additionally, Kery Hill Architects in Indonesia (Macdonald 1995); Glenn Murcutt (Davey 1996a; Davey 1996b; Jones 1998; Vale and Vale 1996) and Gregory Burgess in Australia (Jones 1998; "Uluru Kata Tjuta" 1997) are the noteworthy architects in architectural periodicals, especially with their concern with the reinterpretation of vernacular building construction techniques and the tectonic quality of native materials so as to encourage the sustainability of the regional building tradition (Figure 3.31).

Building and the participatory space: In a few buildings, work on participatory processes in sustainable architecture is revealed by the architects Lucien Kroll in Belgium, Peter Hübner in Germany and David Lea in the United Kingdom. In Kroll's buildings (Blundell Jones 1996b; Kroll 1986) the key interest is in the way buildings are adapted to and grounded within particular local conditions (Figures 3.32; 3.33). There is a superior concern for ecological

[28] The Secretary General of the Aga Khan Award for Architecture, Süha Özkan, explains the aim as follows: "not any of these projects are full or final solutions but, by presenting the successful examples of new directions, the Award seeks to share these ideas and mechanisms" (1997, p. 8). In fact, the program focuses on supporting the sustainable concerns which range from ecological business towers to natural landscaping projects, and sustainable materials from mud brick to re-used colored water pipes.

Title of the Project: Office Complex
Location: New Delhi, India
Architect: Raj Rewal Associates
Structural Engineer: Mahendra Raj

Figure 3.29 Internal courtyard of Office Complex by Raj Rewal Associates, New Delhi, India. **Photography** unnotified.

Title of the Project: Vidhan Bhavan Parliamentary Building
Location: Bhopal, Madhya Pradesh, India
Completed: 1996
Client: The State Government of Madhya Pradesh; **Architect:** Charles Correa; **Contractor:** M/s. Sood & Sood; the Aga Khan Awards for Architecture (AKAA), one of the winners of the seventh award cycle 1996-1998

Figure 3.30 View of dominant circular enclosure of the parliamentary building by Charles Correa in Madhya Pradesh, India, which has designed over the intersection of nine squares, occupied as courtyards, atriums or closed spaces for function of the building. **Photography** Ram Rahman, 1998.

Title of the Project: Marika Alderton House
Location: Yirkkala Community, Eastern Arnhem Land, Northern Territory, Australia
Completed: 1994
Client: Marika Alderton
Architect: Glenn Murcutt

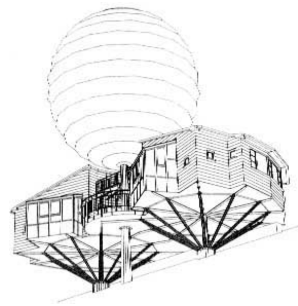
Figure 3.31 Glen Murcutt's experimental house in Eastern Arnhem Land, Australia, inspired by the National Aboriginal Shelter: use of shutters as temporary walls to make the entire house permeable to breezes from the sea. **Photography** Reiner Blunck.

awareness expressed in the means of giving environmental messages, which are channeled through the promotion of participation in architecture as "a sense of *paysage*—the modification of landscape and of the relationships within it rather than the imposition of an object" (Blundell Jones 1996b, p. 70). Here, the role of building is to envelope and facilitate the communication through participants both landscape and human. By using the experimental language of ecological architecture, the building itself humanizes the landscape and participates in the land, rather than imposing itself as an alien object upon it. On the other hand, the way of Hübner (Blundell Jones 1996a) and Lea (Vale and Vale 1996) is to work with the human and to realize self-built projects. They have developed building techniques enabling the involvement of users in the building processes.

Title of the Project: Maison de l'Environnement (Ecological Center) (Completion winner project)
Location: Belfort, France
Completed: Mid-1990s
Client: Conseil Général
Architect: Lucien Kroll

Figure 3.32 Ecological Center embedded into the hill and its lighting towers acting as landmarks in barren landscape of Belfort, France. **Photography** Peter Blundell Jones.

Title of the Project: School Extension
Location: Frankfurt, Germany
Completed: Early 1990s
Architect: Peter Hübner



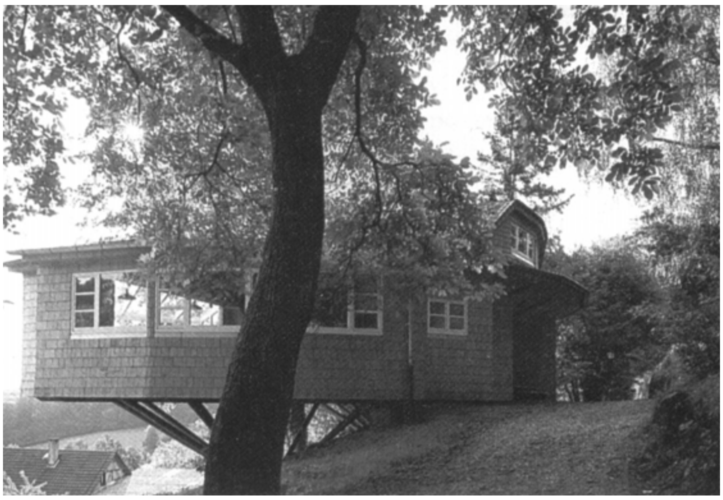


Figure 3.33 School Extension in Frankfurt, Germany, undertaken partly by the pupils and their workshop masters. **Photography** Peter Blundell Jones. **Figure** Peter Hübner.

With these architects, the vision of building is enabling, transparent, appropriate and flexible—one that, by using renewable, natural, recycled and, wherever possible, local materials, serves the needs of occupiers without impacting on the environment unnecessarily. Even though all these criteria fit well into sustainable architectural discourse, the buildings are constructed on unspoiled, virgin stretches of land or in conditions necessitating precise detailing, use of computer modeling, well-educated workers, and specialized firms (Blundell Jones 1996a). In short, they can only be realized well in sterile environments.

3.3. Local Practices and Theoretical Approaches

The competing sustainable architectural practice of the 1990s cannot be adequately explained by mere reference to predefined technological, environmental or ideological visions of sustainability. In the 1990s, "buildings were not viewed as technical artifacts only, but as integrated parts of our everyday lives, and building green as more than reducing the energy consumption" (Jensen 2002, p. 22). Individual buildings are best viewed "as complex hybrids, situationally specific responses to the challenges of sustainability shaped by widely differing motivations and competing social commitments of the actors involved in the particular design and development processes" (Farmer and Guy 2002, p. 12). This context-specific standpoint identifies a widespread but at the same time less known, or even ignored ensemble of practices, i.e. 'the others'.

In point of fact, the sustainable architectural agenda of the last decade cannot be determined solely with a single set of global practices, which was mentioned in the previous critiques; because up to now, the concept of sustainable development has also been the concern and goal of many studies in this neglected part of the practices. This deliberately undefined facet extends the global agenda of sustainable architecture beyond a concern with sterile projects in sterile environments to encompass a 'local discourse'. The sustainable place making activity represents modest-scale, practical, realistic, autochthonous, and context-specific solutions, requiring living with the possibilities and constraints imposed by a combination of the ecological, social, cultural, spiritual, aesthetic, and economic context of a place.

What is needed here is, first, to unpack the general appreciation that frames our thinking about the sustainable architectural panorama offered by the prominent mainstream of architectural publications and, then, to re-examine and re-evaluate it in order to extend the panorama to include local practices, too. Here, we may explain the scope and quality of 'the other' in order to clarify which issues are being ignored.

3.3.1. Socio-Economic and Physical Development Projects

Scope of local practices depending on socio-economic and physical development policies: The notion of 'locality' is the common feature of all these context-specific examples. However, beyond being bound to a place exclusively, these buildings, first and most importantly, represent 'local sustainable development practices', that is to say the practice of a 'sustainable development policy' with local scope. For this reason, a sustainable building project here should be assessed as an integral part of a broad-based, large scale and long-term sustainable development policy undertaken just to address the unique problems of a particular place. Mumtaz and Hooper (1982, p. 11) point out that it is possible to categorize the various sustainable policy measures of local development practices in terms of their primary objectives. They divide the policies into two categories, 'socio-economic' and 'physical', recognizing that each has an impact upon the other. In that sense, the development projects can be grouped according to these two policies as in Table 3.1.

In point of fact, the interest of disregarded or mostly discarded local practices will be different depending on whether the project is placed in a southern or northern country. Evidently, location dictates the development problems that should be tackled within the transformation process toward sustainability, and thus directs the proper policies that should be developed. Thomas and Furuseth (1997, p. 226) emphasize the importance of development of case-specific sustainable planning policy; "its conceptualization and implementation is not a template that can be causally moved from place to place." In the southern communities, the disregarded set of examples correspond to plenty of physical development practices in urban and rural areas whose primary concerns are the rapid urbanization, slum formation, and inadequate and health-threatening building conditions. Besides, much of them constitute broader socio-

Table 3.1 Aim, scope and sustainable development strategies of socio-economic and physical development projects in local practices of the 1990s

Socio-economic development projects	*Physical development projects*
Aim: • encourage the formation of alternative communities or attempt to maintain the existent socio-cultural structure • reorient values of a community or an individual to form socially cohesive and self-sufficient communities	*Aim:* • provide decent living conditions to aid self-healing of a place
Scope (in a broader context): • support of industrialization processes • continuance of small business based on agriculture and livestock • maintenance of extant agricultural activities	*Scope (in a broader context):* • affordable and low-cost housing • urban upgrading and rural revitalization • renovation of existing building stock • introduction of alternative building construction techniques • dissemination of renewable energy use
Strategy: • economic sustainability of the community • concern for technological improvement that will ensure a satisfactory quality of life • decentralization and participatory processes • time and energy of local leaders (whether governmental, community, private sector, or a combination) that will ensure effective implementation	*Strategy:* • inexpensive methods with minimum technical and administrative resources providing and/or bettering the public infrastructure e.g. electricity, potable water, sewage system • promoting awareness of sustainable construction techniques, especially alternative and cheaper ones appropriate to local conditions • upholding the common use of certain goods and exchange of services so that economic advantage can be derived from a collective use of materials and equipment

economic development projects which also take an interest in community improvement, since inadequate living conditions are the main cause of social conflict while jeopardizing personal safety as well.[29]

In the northern countries, the disregarded concern is primarily the social agenda of sustainability. Here, local practices deal with establishing an ecologically oriented society within a belief that the society alone can remove the root causes of the current ecologic crisis. The sustainable design approach is interested in the source of the crisis and connects it with the wider social factors and problems stemming from human domination and degradation of nature. Thus the projects aim at forging a sense of individual and collective identity by enabling participatory processes in the architectural practice. Besides, the building serves the needs of users without impacting the environment unnecessarily and that alleviates the feelings of alienation attached to many examples of modern architecture. The socially unnoticed sustainable practices here range from the participatory, enabling design processes such as the Segal method (Ellis 1987),[30] utilized by Ralph Erskine (Brennan 1997; Collymore 1994; Gundahl 1988), Jon Broome (Farmer 1996) and several architects in the United Kingdom, to architects Christopher Day (Day 1990; Day 1993; Farmer 1996) and Erik Asmussen in Sweden (Raab 1980), who use the Rudolf Steiner design methods advocating a spiritual, holistic, and anthroposophical way of designing (Figure 3.34).

Moreover, the 1990s' rising interest in a healthy built environment corresponds to designing socially healing environments, i.e. designing buildings that respect the spiritual and aesthetic needs as well as the physical ones. To this end, architects like Peter Schmid in the Netherlands (Fuchs 2000; Pearson 1989), Floyd Stein in Denmark (Pearson 1989; Vale and Vale 1996), the Gaia Architects' Group—Paul Leech from Gaia Associates—in Norway (Miles 1991; Pearson 1989; Pearce 1993; Toy 1997) (Figure 3.35), and Sim Van der Ryn in the USA (Van der Ryn 1991) have further extended the social agenda of sustainability

[29] Aliye Çelik (1999), in the report of Habitat's New Strategic Focus on Urban Poverty submitted to United Nations Development Group (UNDG) Working Group on Poverty, briefly explains the need for community improvement projects by highlighting the United Nations Centre for Human Settlements' (UNCHS) focus on and contribution to the poverty-centered problems in the 'developing' countries. For more detailed information about the scope and range of cases in the southern countries see 4.1.1 below: "What to Sustain in the Southern Countries."

[30] On the award winning Segal Method see Self Built Affordable Homes to Rent (2002) in the United Kingdom.

Title of the Project:
Steinerseminaret
Location: Jarna, Sweden
Completed:1992 and ongoing
Architects: Asmussens arkitektkontor gm, Erik Asmussen, Håkan Zätterlund, Steen Kristiansen

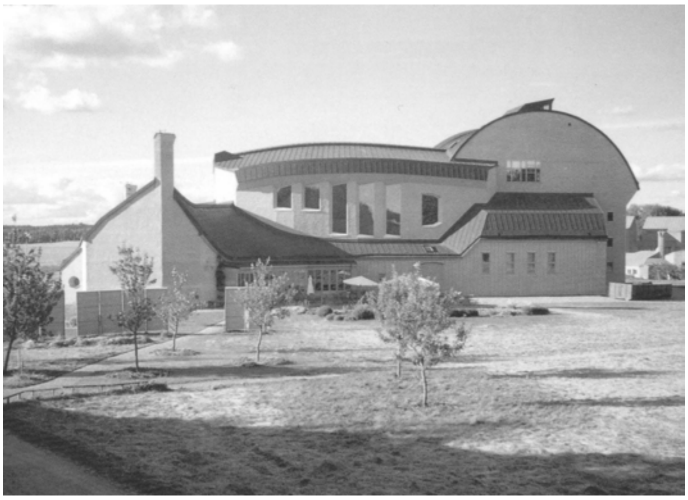


Figure 3.34 Steinerseminaret by Erik Asmussen, Jarna, Sweden. **Photography** Christopher Day.

Title of the Project:
Waterfall House
Location: County Meath, Ireland
Architect: Paul Leech (Gaia Associates)

Figure 3.35 Waterfall House by Paul Leech, County Meath, Ireland. **Photography** Paul Leech.

toward spiritual well-being, psychological wellness and physiological comfort to promote health.

In terms of ecologically sound practices, the Nottingham House (Farmer 1996, Jones 1998)—known as "Autonomous House" (Brennan 1997, p. 23)—and the other buildings of Brenda and Robert Vale in the United Kingdom (Vale and Vale 1996) exemplify the wide-spread but disregarded practices in private, small-scale, modest and decentralized buildings utilizing low and intermediate technologies, and active and passive solar energy systems. These buildings have an autonomous character, severing dependence on a national electrical network, centralized infrastructure of water and waste by reducing energy consumption and increasing passive energy gain. Like independent buildings, independent ecological settlements are realized in a number of alternative communities, i.e. self-reliant communes, organized all over the world including Crystal Waters Permaculture Village in Australia (*Crystal Waters* n.d.; “Crystal Waters” 2003), Kibbutz Lotan in Israel (“Kibbutz Lotan” 2002), Arcosanti in the USA (“Arcosanti” 2003; Burkhardt 1999; “Soleri's Arizona” 1999) and Auroville Universal Township in India (“Auroville Information Reception Centre” 1991; “Auroville Universal Township” 2003; Sullivan 1996) (Figures 3.36; 3.37; 3.38). Initially for Crystal Waters in Australia, the principles of Permaculture (Morrow 1997), the name given by Australian ecologist Bill Mollison for attaining “a self-sustaining, consciously designed system of agriculture” (Lindegger 1991, n.p.), have applied for many of ecological settlements and eco-villages in developing sustainable strategies for site planning and building design. As a result, all these development projects either from the southern or northern countries point out that sustainable architectural practices are not only in the domain of office, parliament, public administration, museum buildings, education, research or cultural centers as highlighted by the ‘developed’ world, but also the everyday problems and their vital, critical solutions are worthy of being noticed by the architecture of sustainability.

Title of the Project: Crystal Waters Permaculture Village
Location: Maleny, Qld, Australia
Completed: Mid-1980s and ongoing

Figure 3.36 Eco-center of Crystal Waters Permaculture Village. **Photography** Twofold Photos, Inc., 2003.

Title of the Project:
Arcosanti
Location: Phoenix, Arizona, USA
Completed: 1956 and ongoing
Architect: Paolo Soleri

Figure 3.37 The site view of the 'city' of Arcosanti in the Arizona desert. **Photography** Ramak Fazel.

Title of the Project:
Auroville Universal Township
Location: Auroville, India
Construction: Between 1970 and 1991
Architect of Matrimandir Building: Roger Anger

Figure 3.38 Aerial view of Matrimandir Building in Auroville Universal Township. **Photography** Auroville Universal Township.

3.3.2. Basic Development Strategies

It is clear now that this lesser known, or even ignored ensemble of local practices cannot be identified by the clichéd sustainable design criteria of the elitist sustainable architectural discourse, but, instead, mostly by reference to context-specific development strategies. The strategy is quite simple: to develop a new context-specific outlook for each case. This outlook proposes 'short-term' strategies based on 'utilization of available resources', 'production with low material and technological intensity', and 'high social involvement' (Selman 1996).

Indeed, the most direct and immediate way of tackling the transition toward sustainability is that of proposing broad and long-term initiatives by creation of economic and political context appropriate to orient technical and social innovations. These long-term strategies undoubtedly imply heavy investments, which are very difficult to implement because these strategies inescapably cooperate with "the culture of 'immediate' which characterizes contemporary societry [*sic*]" or the culture of uncertainty, characterizing the future of the poor (Manzini 1997, p. 47).

For that reason, the local projects implement guidelines for which the sustainable target is interpreted as a smooth transition process, implying 'systemic discontinuity'. Especially in the southern countries, this strategy is beneficial: the projects utilize the short-term, realistic strategies adopted as a transition toward sustainability with partial modification of the program in existence today, rather than attempting to "leapfrog" ones widely employed in the northern countries (Manzini 1997, p. 46). As a result, the local definition of practices stress a more innovative development strategy, that is, to do something even small, i.e. in Manzini's words, "do today something for today, but which anticipates a possible and appreciable tomorrow" (1997, p. 47). Within this general development strategy, the resulting building practices are not precise, nor excellent, but can be defined as modest, unpretentious, usable, practical, realistic, and unique.

Here, one point should be considered that the assessment criterion of this group of sustainable practices cannot solely be the building itself. Obviously, to identify a sustainable architectural practice as a good one only by the physical and quantitative criteria, or to express the success through the numerical reduction of building energy consumption, material-embodied energy, waste and resource-use reduction, high intensity of technology-use, and cost-benefit and life-cycle analysis is not a congruous, accurate approach when evaluating the sustainable qualities of these projects, because the scope of this ignored ensemble of practices requires a different set of criteria, for which the sustainable design approach, the pre-design stages including design and construction processes, financial and marketing propositions and the socio-economic benefits of the end product may be more important than its sustainable architectural qualities.

For example, a building can be of poor architectural quality, i.e. construction, tectonic and/or tactile quality, as dictated by the special conditions of a southern country, yet at the same time, can have a proper development strategy if it is planned locally to address local problems. By this feature, it qualifies as a successful sustainable building. Briefly, the success of the innovative process and the right intention may count for more than the quality of the end product.

In the case of building design, the emblematic issue is 'local sustainability'; and the emphasis is on the consideration of the 'spirit of place', i.e. *genius loci* (Norberg-Schulz 1979), for encouraging the 'sense of place'.[31] The resulting design strategy is adaptive and integrated, but based on a noticeably postmodern and critical stance that intends to counteract the deficiencies of abstract modernist space and the globalism of the International Style. This strategy focuses attention on a notion that sustainable buildings need to be more strongly related to the concept of locality and place.

Within this scope, approaches to building draw directly on analogies with the ecosystems in nature or the patterns in existing settlements so as to benefit from their evolutionary experiences in establishing a sustainable life-cycle.[32] Thereby, the self-sufficiency of community in all aspects of life, e.g. livelihood, nutrition, shelter, education, is to become the primary concern of local practices. In order to ensure the self-sustainability of the people in the case area, the project is designed to attain efficient, living, closed, cyclical processes or systems. This means that there is an emphasis on reducing or severing dependence on centralized infrastructure services of water, energy, and waste. The other significant emphasis is on the considerable extent of intervention, more particularly, the type of intervention and the intensity of proposed transformation in the case area. This generates an obvious question, namely what will happen to the existing buildings within current building practice. In the 1990s, to make use of the existing building stock is an essential sustainable design approach;

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[31] According to Norberg-Schulz (1979, p. 11), "each place had its particular character. In order to settle and live somewhere it was necessary to first of all propitiate the sprit of place"—in other words, understand the "genius loci." In this context, to build means having an understanding and respect for the existing environment with its culture; the building and its process gives people an existential foothold to identify themselves. However, Norberg-Schulz underlines that this knowledge is practically forgotten. Thus he emphasizes the method of phenomenology for the un-earthing of the forgotten as well as the concepts of the sense of place, identity, belongingness, and the creative adaptation.

[32] What is implied here is the pattern language of Christopher Alexander (1977). The pattern language is "a way to understand how the structure of a place can be thought of in terms of relationships and the ways in which events interact with space" (Durmuş 1997, p. 44). Alexander points out that each pattern specifies "a problem, which occurs over and over again in our environment, and then the core of the solution to that problem" (Alexander 1977, p. x) The solution will be different any time, at any place but there is an unchangeable core in every use. This is the 'essence' of pattern that Alexander (1977, p. xiv) introduces as the concept of "invariant property" which each approach to sustainable building should capture in order to succeed in establishing a sustainable life-cycle.

especially in societies having limited resources and economies in transition. Klinckenberg (2002) states that the problems of industrially built blocks in Central and Eastern European countries, the former east-block countries, the shantytowns, slums with poor living conditions in the cities and the nearly abandoned buildings of rural settlements are, therefore, the topics of these disregarded local practices of sustainable architecture.[33]

Using what is locally available actually means an attempt to modify the existing building stock, yet this is not the revolutionary change in current life style which is being promoted, but rather the maintenance and healing of diversity of existing cultures, sources of livelihood, living standards, and so on. In this respect, the main strategy is to make careful additions to the existing buildings toward continuation, rehabilitation and betterment of the built environment.

Thus local practices refer to the local inhabitants and their culturally sustainable existence. The idea of local sustainability in the discourse of sustainable architecture considers not only the economic and ecologic dimensions of sustainability, but also the cultural continuity of a community. By this reasoning, the essential mission of sustainable architecture becomes that of "preservation and conservation of the variety of built cultural archetypes that already exist" (Guy and Farmer 2001, p. 144). Sustainable architecture should act to combine the new buildings "with a concern for cultural continuity expressed through the transformation and re-use of traditional construction techniques, building typologies and settlement patterns, each with a history of local evolution and use" (Guy and Farmer 2001, p. 144).

Learning from vernacular experience: definition of sustainable keys for new projects: The momentum to local cultures in architecture by sustainability has led back to traditional considerations and sensitivity to the physical characteristics of a given site. The concern for learning from the past is not a new point, but "the new importance of vernacular building is that it has vital ecological lessons for today" (Önal 1997, p. 26).[34] Behling and Behling also

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[33] For more detailed information about the problems seen in renovating the existing building stock and the new construction for sustainability in sustainable building in Central and Northern Europe, see the special dossier about the "Sustainable Building in Central and Northern Europe" in *Sustainable Building* (2001, p. 28-40).

[34] Önal (1997) argues the recent reasons for the rising emphasis on vernacular buildings and stresses the inevitable answer that these buildings record lifestyles of the past when people had

maintain that, “it is no coincidence that human groups from different continents, creeds, and cultures appear to have come to similar solutions independently in their struggle with similar environments” (1996, p. 45). Actually, a vernacular settlement with its steady-state character cannot offer a complete alternative within the current needs and contemporary living habits. It has a self-sufficient life cycle based on limited resource capacity, economic activity and no population growth pressure. However, the particular solutions derived from accumulated experience have provided a basis and deep knowledge to emulate in sustainable architecture. These principal solutions are the sustainable and ecological keys often outperforming the most modern buildings by using the old methods which had relied on the best use of materials locally available, the adaptation of local climatic conditions and harmonization with the setting.

The rediscovery of vernacular architecture in local practices gave rise to several nuances in its interpretation. This is, on the one hand, the prioritization of innovative commentary on local values. On the other hand, it is a postmodernist approach expressing vogue nostalgia to revive traditional styles and handling them in the manner of populist aesthetics.

The innovative solutions come from an outlook on doing architecture that holds that if the built environment is expected to follow a non-industrialized, low-tech and intermediate way, the building technology will adapt the traditional construction techniques to current human needs and, thus, the old methods will be transformed into contemporary ones. As mentioned by Durmuş (1997), this means that the devotion to vernacular values cannot simply replicate methods based on the success of old applications, but rather means the installation of modest technical fixes, new production methods for traditional materials and the introduction of some service spaces, e.g. toilet, bath, kitchen, into the inside of buildings to improve sanitary and living conditions. These examples are mostly publicized and awarded by the Best Practices and Local Leadership Programme (BLP) of the UNCHS (Habitat), which displays workable solutions from all over the world—both the North and South— for the use of others.[35]

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to find a sustainable way of life. In fact, Önal implies an inevitable result which has evolved at the end of an obligatory process.

[35] The Dubai International Award for The Best Practices (2003) was first started after 1996 Habitat II, The UN Conference on Human Settlements in Istanbul, Turkey, to make possible the exchange of information regarding successful examples of dealing with the human settlement problems by an attainable, broad-based database from all over the world. This award is co-

In the scope of the 1990s' sustainable architecture, there are also some examples, fortunately fewer in number, at least as far as we know, of trying to imitate the traditional modes of building rather than reinterpreting them. They are insensitive in their design while lowering cultural sustainability to mere representation of particular styles, forms, typologies, and materials far from the local context. Erkarslan calls them "uncontrolled popular imitation of the small and vernacular examples that are mostly devoid of […] qualities of being sustainable, modest, harmonious and integrated with nature" (2000, p. 33). In some sustainable examples, the materials, construction technique, and even the material production methods are clearly being imitated especially by the marginal architects who deny the value of any technological development, its products and tools of today. Slessor characterizes this as a dangerous tendency "towards the nostalgic glorification of some isolated, eco-responsive aboriginal society totally removed from our debauched, technologically sophisticated milieu" (2002b, p. 32).

The choice of the easy way of replication of vernacular architecture is the interpretation of the cultural concept of sustainability in the prominent mainstream. The sympathy to particular names such as Fathy, Doshi, Correa, Rewal, Bawa, Raje encourages many to view this design strategy as a simple vernacular replica. However, the reduction to just populist aesthetics or the combination with the conservative approaches lowers the meaning of cultural sustainability below a concern for continuity and revitalization of vulnerable cultures, and paradoxically threaten their sustainable well-being.

It is not only the idea of replication that causes cultural deterioration but also the direct technology transfer from the industrialized countries. In sharp contrast to local sustainability with its emphasis on 'acting local', some equate, as already pointed out, sustainability with high-technology, modern-day buildings, and "imagine that the latest shiny example of tall, impressive modern-day

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sponsored by Habitat and the Municipality of Dubai, United Arab Emirates, and is presented every two years to up to ten best practices. It encourages the implementations for improving living conditions on which central and local governments as well as the public and private sectors can draw as they search for new ideas, new forms of co-operation, and workable solutions to the problems that confront them. One of the most valuable outcomes of the Best Practices Award is the integration of the southern countries into discussions and research of global interest. See web site of the Best Practices and Local Leadership Programme (BLP) (2003) and the report on *Innovative and Effective Approaches to Housing* (1999).

building must, by definition, be sustainable" ("Sustainable Building in South America" 2002, p. 17).

The comprehension of sustainable architecture as embodied in intelligent buildings is again because of the force of the sustainable architectural discourse of the North. The outcomes of the sustainable architecture as presented in the 'industrialized' countries cause a paradoxical situation particularly in the 'industrializing' ones. Sustainable discourse needs to utilize local materials, technologies, labor and knowledge; however, because the buildings designed are far from their own context, the imported high technology, materials, and inevitably expertise and skilled labor are accepted, too. The admiration for intelligent buildings actually indicates the approval of picturesque formalism and elitist discourse of sustainable architecture imposed by the prominent mainstream, but without noticing the rise of the culture of alienation from place. This is already one of the most central concerns of sustainable discourse.

In the case of applications, the intelligent buildings are actually erected to signify the economic power of an employer or community. They also require skilled labor and sophisticated construction management. In such conditions, to convey a high-tech, smart image in buildings while giving no consideration to environmental aspects and preserving cultural elements, is incompatible with the economic resources, experience and knowledge of most of the southern countries, and at the same time, of the discourse of sustainable development.

3.3.3. Simple Design Tools

Utilization of available resources: In terms of building materials of disregarded local practices, the selection of one building material or another is usually local; the preference is not for imported supplies but always for the locally available and inexpensive ones, which are mostly renewable resources such as—depending on region—earth, sand, cement, bamboo, timber or straw.[36] The use of local materials may be categorized as the first local design tool for this group of examples.

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[36] For more information about the design tool, namely the use of available resources in local practices, see also the sections, 3.1 Low-Cost Building Techniques, 5.1 Environmentally Sensitive Planning, and 7. Community and Economic Development in the report on *Innovative and Effective Approaches to Housing* (1999).

The second local design tool may be described as offering an appropriate formal response to climatic and microclimatic conditions of a particular region, i.e. design with climate.[37] The one distinguishable feature at this point is that the building location, form, components and details, i.e. the building itself is determined chiefly by climatic concerns. This tool unites energy concerns with low-technology and back-to-the-land practices. It is characterized by the least utilization, and thus minimum intensity, of high-technology products such as photovoltaic panels, light aluminum sun-shades, and so on with low percentage of active energy gain. Conversely, the energy design combines passive systems in which climate, topography, building form and orientation are the main determinative factors in energy supply. Especially in the implementations benefiting from vernacular forms, in which mechanical services are almost nonexistent, it is clear that the response to climate is a passive one. Hence, the building can be constructed with passive building components such as traditional sun-breakers made of local materials, the windows, chimneys used as ventilation shafts, the differently oriented spaces according to the seasons, the rooms employed as thermal mass, and so on.

Community involvement: Involving the general public in sustainable building practices, rather than just keeping them informed, is the third key tool in fine-tuning sustainable development objectives to local practices.[38] The real effort required in changing to a more sustainable way of life is not merely to add new solutions, but also to alter the way people think about and carry out their daily activities. This is not simply a matter of money: convincing and integrating the local community toward the goal of sustainability is essential. In this respect, the citizens are among the prime stakeholders in the decision-making process of design, and they may work in the construction of their houses to minimize the building costs. Furthermore, public involvement in a project helps determine the important local issues first, thereby creating local support for larger, more

[37] Actually, this design approach coincides with the eco-centric logic of global practices; the buildings are concerned less with technology keep with the site, climatic concerns, and ambient energy sources. For more information about the design tool, namely climate-responsive design in local practices, see also the sections, 3.2. Construction: Technology & Methods, and 5.1. Environmentally Sensitive Planning in the report on *Innovative and Effective Approaches to Housing* (1999).

[38] For more information about the design tool, namely community involvement in local practices, see also the sections, 1.1 Cooperatives, 3.3 Self-Construction and Mutual Help, and 8. Community Participation and Capacity Building in *Innovative and Effective Approaches to Housing* (1999).

demanding programs. Community involvement can be used actively to create public commitment; personal commitment to sustainable development has indeed been the driving force behind the project's success.

Thus the existence of less known, or even ignored, ensemble of local practices and theoretical approaches of the 1990s informs us that making sense of sustainable innovation in architecture is more than reducing energy consumption, minimizing energy demand, using renewable and ambient energy forms, utilizing technologically sophisticated equipment or just giving environmental messages. A coherent sustainable development strategy brings forth the concept of locality. Yet this does not mean to define the sustainable building as a separate, autonomous, individual entity merely adapting itself to the available materials, climatic conditions, energy sources, ecological values, and local wisdom. Sustainable architecture is an activity that is inseparable from the social and economic context of the region, and is not only proposed for 'sterile' environments but also copes with the problems of over-crowding, unemployment, economic restrictions, unsanitary conditions, affordable shelter, lack of building material, the absence of infrastructure, and so on.

Within this critical outlook that poses a more unique, case-specific, adaptive, comprehensive attitude encouraging locality and sense of place, what is perhaps more important for our topic is to develop and solve the problems by a distinctive definition of sustainable strategies, rather than the use of certain forms, strict codes, or the focus of particular projects presented by the prominent mainstream of publications. The main strategy for sustainable place making, therefore, is simply to solve the problem ourselves, in our own definition and way, by adapting to our preferences and the local conditions.

The discrimination stated by the definitions for sustainable architecture in Chapter 3 also signifies the confrontation between the sustainable architecture of the southern and northern countries. This can be seen clearly if the geographical distribution of the examples of sustainable architecture in the prominent architectural publications is considered. This argument will be scrutinized in Chapter 4, "Critical Overview of Current Sustainable Architecture."

CHAPTER 4
CRITICAL OVERVIEW OF CURRENT SUSTAINABLE ARCHITECTURE

The sustainable buildings all over the world provide examples of very particular design responses to differing development contexts. It is fact that building is shaped by the distinctive cultures of communities and by the widely differing motivations and social characteristics of the actors involved. However, sustainable architecture does not simply develop as a question of cultural background or social construct, but also as an issue of economic priorities and strategies.

The conditions in the countries with low income lead to a different sustainable design approach from that followed by the ones of high income. The economic capacities dictate the alignment of different priorities and strategies to promote sustainable practices in architecture. For example, within the contemporary plane of technological advance reached in the 'developed' countries, there is wide applicability of buildings capable of maximum comfort conditions with a 'minimum' of environmental degradation. They are designed in a technologically complicated manner, fully mechanized to be energy-efficient and user-friendly. Consequently, these buildings, called 'intelligent' buildings, are, unsurprisingly, costly and require big investment. To the contrary, in the 'developing' countries the initial effort is toward creating optimum sustainable solutions through low-cost building, self-build ability, and the minimization of environmental impact.

Apart from this distinction on the architectural agenda, there are also certain cultural and worldview differences that affect the understanding and implementation of the concept of sustainable development and sustainable construction. Indeed, not only are the priorities and strategies quite different, but there are significant dissimilarities in the skill levels, the capacity of the construction industry and government, and the required approach.

In spite of these contrasting issues between southern and northern countries, there is one central common point: sustainable architectural projects around the world provide local answers to global problems. Indeed the promotion of local sustainability has become the pioneering strategy for both groups of countries. Such a strategy depends on the creation of multi-sectoral, comprehensive and local development policies prioritizing the economic, social and ecological dimensions of sustainability. An architectural project within that policy considers the short and long term development goals peculiar to the particular place and its inhabitants. In keeping with the conflicting needs and priorities of the countries involved, the architecture for local sustainability has made possible some sustainable solutions as presented in Table 4.1.

The concept of sustainable architecture in the 1990s has evolved from the position of questioning the need for sustainable design approaches to the viewpoint of inquiring what should be sustained through architectural practices and in what way or manner we should do it. To guide this discussion and lead it to valid generalization, the following two sections will examine the essential questions of 'what to sustain' and 'how to sustain'. In the first section, investigating the scope of projects will clarify the needs, priorities, capacities and problems of the southern and northern countries, while, in the second section, depicting the ways of making sustainable architecture will reflect the confrontation between these two groups of countries. In the following section, the practice of sustainable architecture is analyzed as it fits the needs of the poor and rich parts of the world. Here, the three aspects of sustainable development, that is, social, ecological, and economic sustainability, are utilized to illuminate varying life expectations and basic needs of communities, e.g. shelter, nutrition, employment, infrastructure, energy, and education.

4.1. What to Sustain Through Sustainable Architecture

The critical analysis of current sustainable architectural practices provides brief information about the question 'what to sustain', or more obviously, what kind of requirements lead countries to concentrate more on particular development topics? In the early 1990s, when there was an idea that many problems arose from the unsustainable conditions and life expectations of human beings, the focus moved to analyzing varying socio-environmental needs and their dependence on economic constraints. Meeting the needs of many people with significant differences in priorities is important to the goals of the sustainable development policies of nations. The various policies share a common strategy, that is, improving the built environment through physical intervention. Here, the

Table 4.1 Architectural solutions attained through promotion of local sustainability as the pioneering strategy for sustainability

In the South, architecture for local sustainability has enabled:	In the North, architecture for local sustainability has enabled:
Economic Sustainability	*Economic Sustainability*
• increase in the use of locally available materials in construction instead of expensive imported materials, thereby providing economic advantages for low-income groups • changing the negative perception of low-cost housing as ugly, non-durable, low quality and only for low-income families by using cost-effective building technologies and materials • development of local building skills ensuring further building activities • new opportunities for reducing unemployment	• development of various cost recovery methods, the application of life cycle assessment analyses in the buildings, and sustainable building management • decrease in energy intensity in the building sector by the widespread use of ambient, renewable energy forms, especially solar and wind energy • combination of natural conditioning with technologically sophisticated service systems minimizing the building operating and maintenance cost
Cultural Sustainability	*Cultural Sustainability*
• economic development projects prohibiting the erosion or disappearance of native cultures • reconsideration of local cultural values which are already sustainable, and the realization that the rest of humanity may learn useful lessons rather than seeking to 'improve' them	• to feel deep reverence for natural areas as a part of the local cultural landscape and to revive the 1970s' concern for "spirit of the place" in designing contextually sustainable buildings • development projects that ensure and sustain the existence of remaining native cultures
Social Sustainability	*Social Sustainability*
• awareness of available, decent, alternative, environmentally friendly options in local social structures influencing human behavior to change through collective, democratic, sustainable ways of life • conservation of ethnic, religious and/or cultural character of society • integration of many low-income inhabitants into the economic and social life of the city	• a recovery period against the alienation of the human being from himself, neighbors and natural environment because of the universal culture of modernism • focusing on natural materials and low intensity utilization of technology, thereby increasing understanding of the noticeable physiological and psychological effects of buildings on human health
Ecological Sustainability	*Ecological Sustainability*
• reconsideration of the human dimension in the conservation of natural areas which means the place to live, the source of income, the supply of energy and building materials for many inhabitants	• use of non-destructive building materials and the development of their production industry, since environmental protection and ecological land reclamation have become primary concepts for design

crucial point should be to locate the position of the discipline of architecture within the physical development policies, and to understand the contribution of the construction sector to the development of built environment toward the principles of sustainability. The key terms here are the needs that the architectural practices can and should satisfy—in brief, 'what to sustain through sustainable architecture?'

In a broader context, sustainable architectural practices tend to bear a strategic task to support the local sustainability of the region, more specifically, to provide local solutions for the fulfilment of local needs. The projects in the 'developed' countries primarily focus on urban sustainability issues dealing with larger-scale problems such as urban sprawl, low-cost social housing in the suburbs, urban regeneration, and renovation of existing building stock, as well as small-scale challenges such as the life-cycle analysis of buildings, recycling of demolition waste, and low-energy buildings. In the case of the 'developing' world, the interest turns more toward large-scale local socio-economic development projects by a number of physical development policies based on the need for settlement, infrastructure or shelter applications. In fact, by fulfiling shelter needs of a huge number of people, as well as comfort and labor, these policies have contributed more to sustainability than any other monetary action.

4.1.1. What to Sustain in the Southern Countries

The present-day needs of the South are more complex and challenging; the scale of the problems is more extreme, sometimes even more crucial, and the economic power to address the problems considerably less than in the North. In terms of priorities, the practice of sustainable architecture has generally occurred around the idea of rural sustainability and upgrading of the slums in peri-urban areas.

The problem of rural habitat is an almost overwhelming one; the imbalance between urban and rural development is extreme. While priority has been placed on urbanization and economic development, the rural context has so far been almost entirely ignored.[1] Yet the large cities are already at the point of

[1] A few statistical results taken from the development reports compiled by the World Bank in 2000 clearly demonstrate the point. 70% of the 'developing' world's poor live in rural areas ("Rural Development" 2002). Of those rural peoples of the South, easily half survive under conditions that most of us cannot even contemplate. 69.7 % of rural population in the 'developing'

collapse beneath the unrelenting pressures of immigration from the rural hinterlands. They are surrounded by slums inhabited by starving populations from rural areas.

The various problems in the southern countries are mainly based on the physical or socio-economic conditions of the immigrant settlements in the urban fringes. Their inhabitants are faced physically with lack of proper infrastructure, lack of housing, inevitable slum formation, visual pollution, and insufficient sanitary conditions. These people also struggle with low-income level, unemployment, and the problems of an agricultural life increasingly come under threat.

These countries also share common barriers to the implementation of sustainable construction such as an uncertain economic environment, poor understanding of, and lack of capacity in, the field of sustainable construction, poverty and subsequent low urban investment, lack of accurate data, and lack of stakeholder interest. In such conditions, the practice of sustainable architecture appears difficult, yet it should be noted that the many practices themselves already constitute the certificate of success. In general, the shared point for the sustainable buildings is a design strategy emphasizing the revitalization of values to engage with both socio-cultural and environmental concerns of each particular region. Avoiding the creation of a new universal culture, the strategy tries to sustain the diversity of existing social, cultural, aesthetic, spiritual, ecological, and economic values. The following part will explain particular sustainable design strategies for the fulfilment of local needs by grouping them under three main headings: social, ecological, and economic sustainability.

In terms of *design for social sustainability*, the architectural practices in so-called developing countries have a critical responsibility that cannot remain confined merely within the conventional functions of designing an individual good building. Maintaining the cultural heritage, self-help building, revitalizing the old cites and accommodating large numbers of poor people are all challenges for the sustainable social discourse of architecture. These are itemized in four sections as follows:

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countries can have no access whatsoever to a safe improved water supply. For further information, see the investigation of the World Bank Group expressing the numerical data about rural development in the 'developing' countries.

1. Maintaining cultural heritage and specificity of ethnic origin: In the face of globalization and homogenization, the specificity of the ethnic, religious and/or cultural character of society will become a powerful assertion for the studies of local sustainability in the 'developing' world. The Aranya Community Housing Project in Indore, India ("Aranya Community Housing" 1995; Davidson and Serageldin 1995), is a case in point (Figure 4.1). The project shows to the 'developed' world the possibility of a socio-economic mix, demonstrating how a sustainable project can integrate a variety of societies from different cultures and religions in the same building plot. The project is particularly noteworthy for its effort to incorporate Muslim, Hindu and Jain families from a range of low-to-modest incomes. The project, hence, successfully sets a precedent for co-operation, neighborliness and tolerance criteria of social sustainability as well as courageous cultural assertion.

2. Teaching self-build techniques for the continuation of social and cultural structure: The Barefoot College Project in Tilonia, Rajasthan, India, is an attempt to oppose the loss of social values and traditional cultures by migrating to cities, and to guide people for self-education ("Barefoot Architects" n.d.; Correa et al. 2001; Davey 2001, O'Brien 1998) (Figure 4.2). The project is founded on a proposition, that is, a local self-help system, to preserve and develop its own local store of knowledge by improving the self-build ability of inhabitants, including the women, and then to use this skill for building their own houses.

3. Enlivening social existence for the revitalization of old settlements: The revitalization of existing cities needs creative programs, such as for encouraging local non-profit community organizations and developing case-specific social co-operation models. The success of Aït Iktel Project in Aït Iktel, Abadou, Morocco ("Aït Iktel Project" n.d.; Correa et al. 2001; "Grand Canal" 2001), is based on this social exertion mobilizing the experience of a village where returned emigrants join hands with inhabitants who had remained (Figure 4.3). It is a surprising fact that this project reversed the route of migration from the urban areas to the home settlement. The encouragement of women by installing weaving workshops and an elementary school, the activation of a participatory decision-making process for the problems of the village and the installation of basic electricity and potable water systems through collaborative

Title of the Project: Aranya Community Housing
Location: Indore, India
Completed: 1989 and ongoing
Client: Indore Development Authority
Architect: Vastu-Shilpa Foundation, Balkrishna V. Doshi;
The Aga Khan Awards for Architecture (AKAA), one of the winners of the sixth award cycle 1993-1995

Figure 4.1 Exterior view of two similar houses of Aranya Community Housing project in Indore, India, with more custom-made detailing and ornament. **Photography** John Paniker, 1995.

Title of the Project: Barefoot College Project, Tilonia, Rajasthan, India
Location: Tilonia, Rajasthan, India
Completed: 1988 and ongoing
Client: Barefoot College
Architects: Barefoot Architects of Tilonia;
AKAA, one of the winners of the eighth award cycle 1999-2001

Figure 4.2 Barefoot College Project, Tilonia, Rajasthan, India. **Photography** unnotified.

Title of the Project: Aït Iktel Project
Location: Aït Iktel, Abadou, Morocco
Completed: 1995 and ongoing
Client Association: Aït Iktel de Développement (Mohamed Amahan, President)
Project Conception: Ali Amahan;
AKAA, one of the winners of the eighth award cycle 1999-2001

Figure 4.3 Aït Iktel Project, Abadou, Morocco. **Photography** Christian Lignon, 2001.

work signify the vitality of this strategy, since it is implemented by its own inhabitants.

In such cases as that of Montevideo, the capital of Uruguay (Probst 2002), and the Old District of San Isidro in Havana, Cuba (*Projects Around the World* 2000), the sustainability of the existent settlements may be ensured by governmental efforts. In Montevideo, the dispersed settlement pattern, combined with spatial segregation, causes social exclusion. The rehabilitation of the blighted areas is the main concern of physical development policies. The project by the Uruguay government is a hopeful initiative because it offers new residential opportunities for poor people to use the existing warehouses and infrastructure.

Likewise, the program for the Integral Revitalization of the Old District San Isidro in Havana, Cuba, of the Havana City Corporation intends to revitalize the social existence of the region, which was endangered by the collapse of two-thirds of the houses and extremely poor physical conditions such as inadequate sanitation, absence of running water, and the refuse and contaminated air of the nearby harbor (Figure 4.4).

Title of the Project:
Programme for Integral Revitalization of Old District of San Isidro
Location: Havana, Cuba
Completed: 1996
Client: Havana City Corporation
Project Organizer: Oficina del Historiador, Ramón Collado

Figure 4.4 Renovation of old colonial buildings of San Isidro in Havana, Cuba: the restored house now accommodates a primary school. **Photography** unnotified.

4. Upgrading of slum areas to integrate low-income residents into social and economic life of the city: In many southern countries, industrialization has been accompanied by urban demographic growth. One of the characteristics of this process was the fast expansion of settlements that do not follow the regular urban control procedures. These are the slums, i.e. shantytowns or bidonvilles, on the urban fringes used by displaced inhabitants to integrate themselves into the cities. They are characterized by low-quality housing and the lack of urban and social infrastructure. The upgrading of slums, i.e. the urban upgrading, is the main concern of many sustainable development projects. Here, the main sustainable strategy is to enable and empower the low-income households by improving the living environment of slums while providing a stable ownership opportunity. Actually, the aim is not only to make physical interventions but also to integrate residents into the economic, social and political life of the city.

The two main policies for urban upgrading can be stated as follows: one is to start with the infrastructure, i.e. the provision of basic urban facilities such as electricity, water, sewage, roads, to encourage the citizens to improve their houses as in the projects Integration of Slums in Rio de Janeiro, Brazil (*Projects Around the World* 2000), Restructuring of Spontaneous Settlements in Dakar, Senegal (*Projects Around the World* 2000), and Improving Living Environments for the Low-Income Households, Saudi Arabia ("Improving Living Environments" 2002) (Figures 4.5; 4.6). Some slum regularization and upgrading exercises are part of a larger upgrading plan for an entire city as in Integrated Micro-Urbanization and Improvement of the Habitat in Fortoleza, Brazil (*Projects Around the World* 2000) and Slum Networking of Indore City, India (Davidson 1998). In some cases, financial and marketing policies for the affordability of slum households are emphasized as in the East Wahdat Upgrading Programme in Amman, Jordan (Al-Radi et al. 1992), and the Ismaïliyya Development Projects in Ismaïliyya, Egypt (Serageldin 1989) (Figures 4.7; 4.8; 4.9; 4.10).

The second policy for urban upgrading is the housing or re-housing policy, i.e. the shelter for the poor program, where the role of sustainable architecture is just the provision of affordable housing possibilities in order to transform the temporary, poor shelter into permanent, healthy residences as in the projects of Khuda-ki-Basti Incremental Development Scheme in Hyderabad, Pakistan (Davidson and Serageldin 1995); the Aranya Community Housing Project in

Title of the Project: Integration of Slums
Location: Rio de Janeiro, Brazil
Completed: Mid-1990s and ongoing
Client: The Municipal Housing Department of Rio de Janeiro
Assistance: Inter-American Development Bank

Figure 4.5 The reorganization of a *favela*, an illegal settlement in Rio de Janeiro, Brazil, by the provision of public transport, pavement, sport grounds, rubbish removal, drainage and water supply as in the *favela* of Fernao Cardim. **Photography** unnotified.

Title of the Project: Restructuring of Spontaneous Settlements
Location: Dakar, Senegal
Completed: Mid-1980s and ongoing
Client: Ministry of Urban Development and Housing
Nominating Organization: German Technical Cooperation (GTZ)

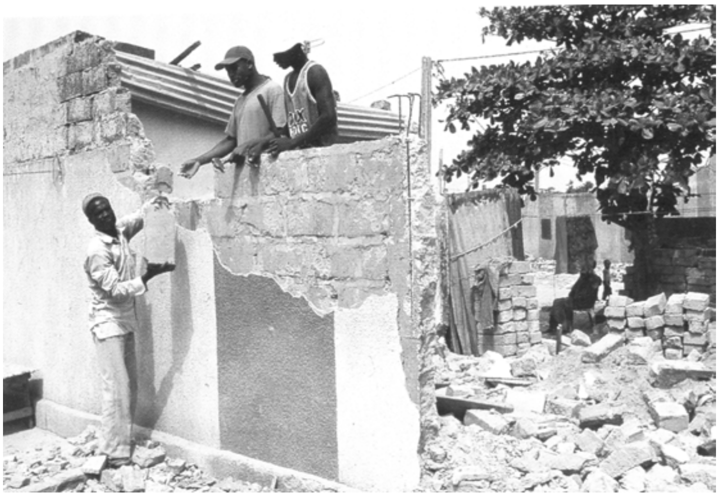


Figure 4.6 After the state developed the slum areas' basic infrastructure—building streets, providing tap water, electricity and sewage canals—and inhabitants of a slum bought a low-priced site, they rebuilt their own houses in Dakar, Senegal. **Photography** unnotified.

Title of the Project: Integrated Micro-Urbanization and Improvement of the Habitat
Location: Fortoleza, Brazil
Completed: 1991 and ongoing
Project Organizer: CEARAH PERIFERIA (State government, Local Authorities, State Institute of Technology, Community Committees, The Federation of 25 clubs)

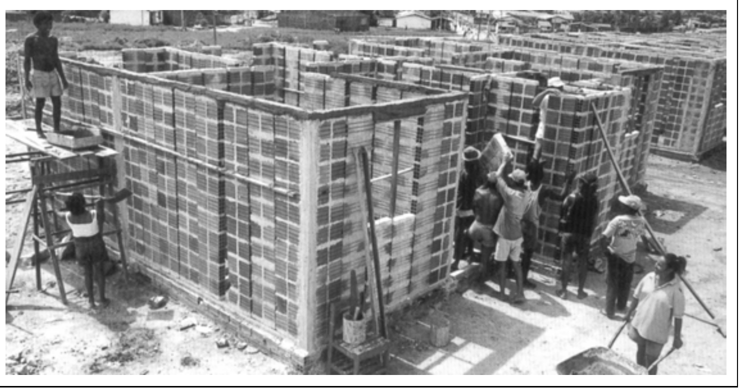


Figure 4.7 The new houses in Forteleza, Brazil, are built by the users themselves within the urban development project of a **partnership** program, CEARAH PERIFERIA. **Photography** unnotified.

Title of the Project:
Slum Networking of Indore City
Location: Indore, India
Completed: 1989 and ongoing
Client: Indore Development Authority
Planner: Himanshu Parikh; AKAA, one of the winners of the seventh award cycle 1996-1998

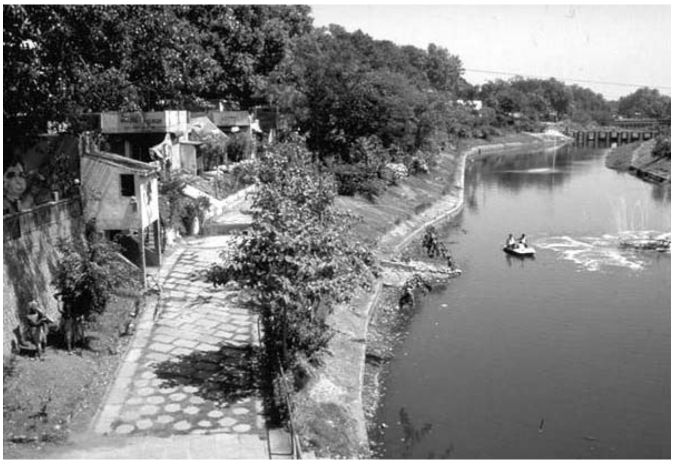


Figure 4.8 Rehabilitated river bed, newly paved streets, footpaths, storm drainage, sewerage hook-ups, and street lighting by the project of Slum Networking in Indore, India. **Photography** Ram Rahman, 1998.

Title of the Project:
East Wahdat Upgrading Programme
Location: Amman, Jordan
Completed: 1980 and ongoing
Planners: Urban Development Department, (Yousef Hiasat, Director) Amman
Funding: The World Bank, the Government of Jordan, the Housing Bank; AKAA, one of the winners of the fifth award cycle 1990-1992

Figure 4.9 Aerial view of East Wahdat Community in Amman, Jordan, with surfaced walkways. **Photography** Jacques Betant, 1992.

Title of the Project:
Ismaïliyya Development Project
Location: Ismaïliyya, Egypt
Completed: 1978 and ongoing
Client: Governorate of Ismaïliyya
Architect: Culpin Planning (David Allen), London, the United Kingdom
Funding: The British Government;
AKAA, one of honorable mentions of the third award cycle 1984-1986

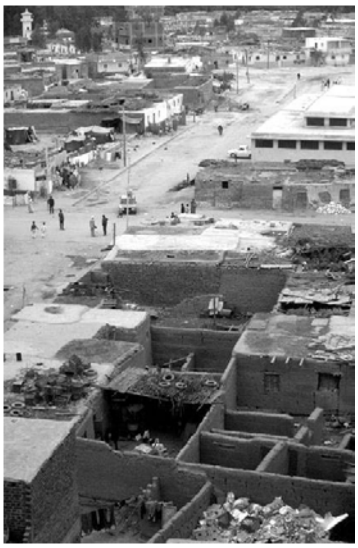


Figure 4.10 Aerial view showing both upgraded and deteriorating buildings of Ismaïliyya, Egypt. **Photography** Chant Avedissian, 1986.

Indore, India (Davidson and Serageldin 1995); the Grameen Bank Housing Programme, Bangladesh (Al-Radi and Steele 1994); Kampung Kebalen Improvement in Surabaya, Indonesia (Diba 1988; Serageldin 1989); the Shelter Upgrading in Agadir, Morocco ("Shelter Upgrading" n.d.), and Housing Project in Guatemala City, Guatemala ("Housing Project" 2001) (Figures 4.11; 4.12; 4.13).

Both policies focus on the whole slum area and its long-term needs by offering varying funding possibilities and providing technical assistance. They call for the active engagement of the client community by variable do-it-yourself methods. All these improvement efforts are themselves sustainable architectural practices, because the projects utilize the local human, material and financing resources. However, it is a fact that most of them are less or even not at all concerned with the ecological factor, environmental pollution, energy efficiency, waste and water management in their designs, unlike their corresponding urban regeneration projects in the northern countries.

In terms of *design for ecological sustainability*, the ecologically contested issues for sustainable architecture mainly center on the need for minimizing the ecological footprints of people with low income, specifically in their natural environment. This is a vital concern, because the inhabitants of the so-called developing world tie up the surrounding ecosystems more than do their counterparts in the 'developed' ones. For such people, nature means the place where daily life passes, the field where the agricultural activities are performed, the source of income, the means of sustenance, the supply of energy and building material. Therefore, the critical role of sustainable architecture here is to lead people to obtain their needs from nature, yet in an alternative way which entails the use of local, ambient resources, and by simple, practical, inexpensive and environmentally sound technologies. The challenges for ecological sustainability may be itemized under three headings as follows:

1. Wise management of local / natural resources by using modest, low-impact technologies: The ecological consideration of the utilization of local resources becomes vital where the ecosystem health can easily be disrupted. In Rajasthan, India, where the long dry seasons cause water scarcity, the people in Barefoot College in Tilonia constructed underground rainwater collection tanks next to the houses providing a year-round water supply while ensuring the continuance of agricultural activity and water cycles without disturbing the

Title of the Project:
Khuda-ki-Basti Incremental Development Scheme
Location: Hyderabad, Pakistan
Completed: 1989 and ongoing
Clients and Planners: Hyderabad Development Authority, Tasneem;
AKAA, one of the winners of the sixth award cycle 1993-1995

Figure 4.11 Courtyard of a house in newly obtained plot in Khuda-ki-Basti, Hyderabad, Pakistan. **Photography** Murlidar Dawani, 1995.

Title of the Project:
Kampung Kebalen Improvement
Location: Surabaya, Island of Java, Indonesia
Completed: 1981
Client: Surabaya Municipal Government

Figure 4.12 View of a house in Kampung Kebalen, Surabaya, Indonesia, before the upgrading and improvements. **Photography** Kamran Adle, 1986.

Planner(s): Kampung Kebalen Improvement Programme, with the Surabaya Institute of Technology, and the Kampung Kebalen Community
Funding: The World Bank
AKAA, one of honorable mentions of the third award cycle 1984-1986

Figure 4.13 A street view of Kampung Kebalen in Surabaya after improvements. **Photography** Kamran Adle, 1986.

ground water reserves of the region (Davey 2001). Furthermore, any efforts to stop the removal of topsoil, cutting trees for the building materials and components, e.g. doors, windows, are encouraged by using locally appropriate technology options in the applications of Cost-Effective and Affordable Housing through the Building Centre Movement in India ("Cost-Effective and Affordable Housing" 2002).

2. Restoration of agricultural land for both coping with environmental destruction and guaranteeing the sustainable existence of the community: In a rural community contingent on agricultural activity, sustainable existence is interrelated with the ecological restoration of land and resources by using ecological methods of agriculture. Mountain-River-Lake Regional Development Programme (MRL) in Jiangxi, China (*Projects Around the World* 2000), for instance, is a broad-based land reclamation and sustainable economic utilization project persuading forty million people to attach importance in planning to the connection between destruction of environment, underdevelopment, and poverty.

3. Ecological Agriculture for the Constitution of Self-sufficient Communities: Sometimes huge development problems can be broken down into smaller scale, practical solutions as in the ideal farm model of the Intensive Integrated Homestead Farming Project in Bangladesh (*Projects Around the World* 2000) (Figure 4.14). The project is noteworthy with its agricultural model guiding the small farmers and landless settlers living in this most densely populated country in the world. This strategy for the rural areas aims to secure their

Title of the Project:
Intensive Integrated
Homestead Farming Project
Location: Bangladesh
Project Organizer: Rangpur
Dinajpur Service (RDRS)
(NGO)

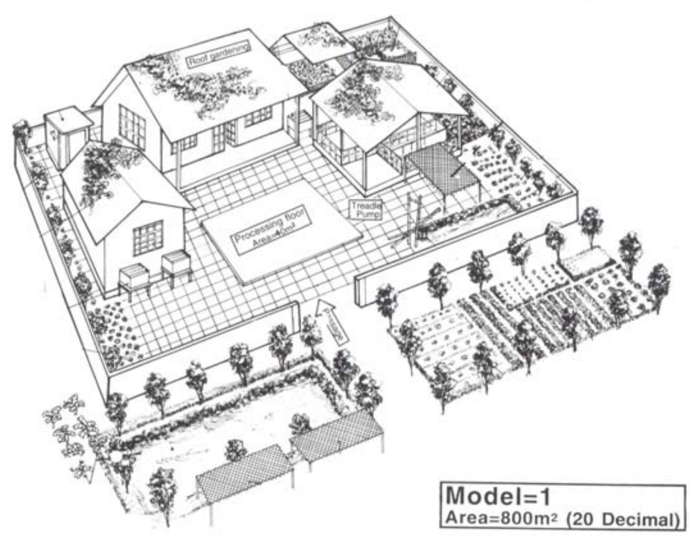


Figure 4.14 Layout of the proposal of a homestead model for rural Bangladesh with poultry shed, field, pond, and residential unit. **Figure** unnotified.

livelihood on small plots, around 800 m^2 areas covering the field, poultry shed and residential building by intensive, ecological and cyclical cultivation methods.

In terms of *design for economic sustainability*, local sustainability generally fails in the southern countries, unless the individuals, families or communities live within a process of self-generated economic growth. Therefore, considering the economic sustainability of the region, it is essential to make any settlement itself a more desirable place to live in and, in the course of time, to give opportunity for its inhabitants to earn more and to save enough. This process itself brings about other advances, that is, the improvement in the physical conditions of these settlements. The studies concerning self-generated, sustainable economic growth can be itemized in three sections as follows:

1. Development of agriculture-based local economy: Agriculture is the key economic activity fostered as a development strategy for rural or semi-rural areas in the countries with low income. The Sekem Initiative, Egypt ("Egyptian Society" n.d.; "Mısır'da Örnek bir Ekolojik Yerleşim" 1999; "Sekem" n.d.), and the Mozambique Agricultural Rural Reconstruction Programme (MARRP), Mozambique (*Projects Around the World* 2000), epitomize the success of this strategy encouraging local development through agricultural economy rather than mere industrial activities (Figure 4.15). Indeed, these settlements demonstrate that the increase in the productivity and growth of farm economies can also bring about a sustainable life style and settlement pattern for the rural poor.

Title of the Project: Mozambique Agricultural Rural Reconstruction Programme (MARRP)
Location: Mozambique
Completed: 1992 and ongoing
Project Organizer: Mozambique Agricultural Rural Reconstruction Programme (MARRP)

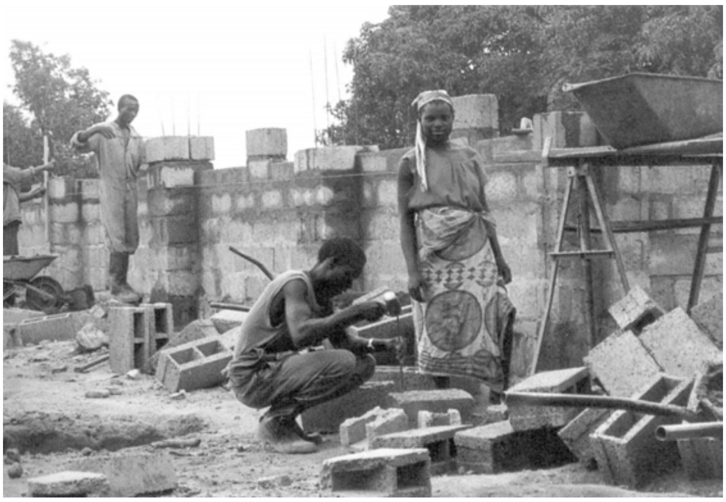


Figure 4.15 Do-it-yourself building within agriculturally based rural development program and re-establishment studies of basic living conditions in post-war Mozambique. **Photography** Beate Quiltzsch-Schuchmann.

In some cases such as development projects in Aït Iktel, Morocco (Correa et al. 2001), and Barefoot College in Tilonia, India (Correa et al. 2001), the economic activity of poor communities which are traditionally dependent on modest-scale agricultural production for their livelihood is invigorated with the provision of basic socio-economic services such as workshops, schools, entertainment and health centers. For instance, the economic system proposed by the Barefoot College Project is based on a modest level of the local economy which is respectful of the capacity of the inhabitants. Here, the basic aim is to improve the comfort conditions of the rural poor without causing resource depletion in the rural context, while the 'developed' world realize this only with the heavy industry, complicated engineering systems, and digital electronic techniques.

2. Employment generation and self-generated economic systems: Housing and building construction actually contribute to a sustainable level of employment generation and economic development while directly serving the needs of the built environment. Job creation by skills upgrading and training, and the use of appropriate technology, further lead to increased productivity, improved quality and the use of materials in effective, efficient, and economic manner.

In the case of the Agricultural Training Centre Building Project in Nianing, Dakar, Senegal (El Jack 1982; Holod and Darl 1983; Taylor 1982), respect for the living conditions of the poor is important. The role of sustainable architecture here is to make possible the integration and spread of a simple, low-cost and low-technology building system appropriate for the social and economic issues in Senegal. This experimental building is illuminating because the emphasis was upon generating an inexpensive building system using locally produced material and maximum local labor rather than a dependence upon imported materials, machinery, and expertise.

The Bamboo Housing National Project in Costa Rica is the other case: the use of locally produced material in the building sector is strategically promoted (Figure 4.16). Here, the bamboo as an "alternative cost-effective and seismically sound building material" ("Bamboo Housing" n.d., n.p.) helps setting up a self-generated economic system based on the cultivation of massive bamboo, the construction of low-cost housing and the production of furniture and handicrafts for export. What is more important for our topic is the existence of an institution, FUNBAMBU—a private, non-profit foundation (“Bamboo Foundation” 2002)—that ensures the sustainable implementation of the program, termed ‘Bamboo Housing National Project’. The project contributes to the training of “400 people in building, cultivating and crafting of bamboo” (“Bamboo Housing” 2002, n.p.). Thus it enables permanent employment in several sectors, provides housing opportunities for low-income families, as well as preventing the deforestation, especially in the river basin of Costa Rica.

Title of the Project: Bamboo Housing National Project
Location: Costa Rica
Completed: 1995 and ongoing
Client: Ministry of Housing and Human Settlements, Ministry of Planification and Ministry of Foreign Relations
Sponsors: The Royal Government of the Netherlands and UNDP

Figure 4.16 Bamboo Housing National Project, Costa Rica. **Photography** unnotified.

3. Affordability in housing construction: The provision of affordable housing is another imperative need wherever housing has become costlier for low-income society. To bring down the cost of construction and to transfer at the grass roots level a decent standard of housing, one way is to utilize building technology options leading to cost-effective and affordable results. The Self-Contained Housing Delivery System, Thailand (“Self-Contained Housing” n.d.), the Cost-Effective Environmental Friendly (CEEF) Shelter Development Strategy, India (“Cost-Effective Environmental Friendly” n.d.), and the Cost-Effective and Affordable Housing through the Building Centre Movement, India (“Cost-Effective and Affordable Housing” 2002), are successful precedents with their low-cost construction techniques, technology transfer and training of the artisans for the homeless in poor areas. In addition, particularly the Building Centre Movement in India demonstrates for many similarly situated countries that low-cost housing for low-income families does not have to mean low-quality, non-durable, and ugly building practices.

4.1.2. What to Sustain in the Northern Countries

In the case of northern countries, there are significant differences in the sort of requirements, the scale of problems, the accessibility of resources and, thus, the scope of the projects. Designing sustainable buildings is more concerned with self-evolving and healing processes for urbanization; the concepts of regenerative design, restoration and conservation are mostly discussed for the urban areas and the periphery, since the population is concentrated more in urban districts in the countries with high income.

There is a special interest in 'ecological sustainability' that becomes an emblematic issue for many projects in the cities. Environmental problems are considered in large-scale urban sustainability policies with a great emphasis on the quality of the built environment and the minimum negative impact of buildings on ecosystem health. In most cases, the focus on the ecological dimension of sustainability combines with the implementation of economic strategies, e.g. limiting resource use and re-using the existing ones, for funding and running costs in the building construction, transportation and infrastructure sectors. Social integration and cultural protection strategies are concerned with human health, urban development, urban ecology and regeneration of traditional districts of cities. Allergies, respiration and the food chain are the main human health topics. Decentralization of cities, i.e. urban sprawl, forms the main problem for urban development. The cultural and natural dimensions of the urban landscape, city parks and green belts are as important as the conservation of traditional settlements and the continuance of their cultural characteristics. Finally, many issues for the urban sustainability may be summed up under three main headings as follows:

1. Sustainable urban management policies for cities: The sustainable architectural practices in the urban areas of the North are considered within the particular programs for the sustainable urban development. The strategic planning approach of a city toward sustainability guides the architectural projects and programs from the initiative to the implementation stages. The City of Berlin is a good example because it employs a sustainable urban management program including spatial planning to achieve a compact city, traffic management to reduce traffic, energy conservation to diminish climate change, and social integration to restructure and regenerate parts of the city ("Successful Local Implementation" 2001).

Within the scope of urban regeneration, many sustainable architectural practices have been realized through long-term community-management programs to transform cities into sustainable, i.e. "humane, lively and healthy" (*Projects Around the World* 2000, p. 720) urban areas, as described in the New Gate 21 Project by the government of the Czech Republic and implemented in 25 Czech cities. Furthermore, as seen in the Tampere 21 Project of Tampere in Finland (*Projects Around the World* 2000), interest in the concept of the healthy city led to the implementation of an environmental management system, developed according to the international ISO 14001 Standard, in order to reduce pollution of air and noise, and to improve the quality of potable water. The advantage of such a standardized management system is clear, when it is noted that three quarters of all buildings in Tampere were connected up to an energy-saving long-distance heating system.

2. Increase in the concern for ecological, social and economic sustainability issues in housing design: The introduction of sustainable concerns into the local development policies has affected many governmental boards, associations and consultants to develop sustainable housing policies. Especially the housing associations and housing departments of local authorities have started to work for energy efficiency, energy-saving and ecological issues in housing. The realm of low-rise multi-family residential architecture has been linked to low-energy, low-cost ecological housing projects especially in the European countries.

Several solar villages such as Solar Village in Majorca, Spain, by Richard Rogers Partnership (Herzog 1998), and Solar City in Linz-Pichling, Austria, by the partnerships of Richard Rogers, Norman Foster and Thomas Herzog (Hagan 2001; Herzog 1998), were newly designed urban districts. Besides, the Solbyn—The Sun Village—Ecological Housing Estate in Dalby, near Lund, Sweden (Edwards and Turrent 2000; Thurell 1996), as one of the vanguard projects, was based on the strategy for energy saving in the construction of houses with emphasis on solar energy, biodynamic cultivation with allotment lots next to the housing group, living in harmony with nature by using compost toilets, root cellars, a car-free settlement pattern and togetherness through having a common house. In fact, the rise in the number of ecological neighborhood projects has increased the process of conurbation and suburbanization, and has caused, to some extent, social exclusion in the city centers while encouraging urban sprawl as experienced in Myrstacken Ecological Housing in Malmö, Sweden (Thurell 1996) (Figures 4.17; 4.18; 4.19).

In contrast, the Greenwich Millennium Village Project of HTA and Ralph Erskine (Derbyshire 2000), one of the latest housing projects designed near the Millennium Dome in London, represents an intention to reverse the contemporary trend toward the depopulation of city centers (Figure 4.20). It successfully indicates a changing trend in sustainable shelter policies, that is, social housing. Here, the concepts of flexibility, adaptability, and organic incremental improvement are the key design approaches to provide a wide range of choice for inhabitants. This new attitude for an urban place envisages creating sustainable places that people want to live in, rather than meeting the aspirations of people who want to go to suburbs. This intention may also be observed in the urban renewal projects such as Uhousing in Gelsenkirchen, Germany (Blundell Jones 1997), seeking both ecologically and socially sustainable resident groups with mix of dwelling types, functions and surprisingly diverse open areas (Figure 4.21).

While ecological and social building concepts have been gaining momentum, many housing projects are still dominated by economic constraints. Practices such as the Bamberton Housing in Bamberton, Vancouver Island (Dauncey 1996), the Co-operative Housing in Canada ("Co-operative Housing" n.d), the Heinrich Böll Settlement in Berlin-Pankow, Germany (Hanel et al. 1999), the Cotton Tree Pilot Housing in Queensland, Australia (Chambers n.d; "Cotton Tree Housing" 2000) (Figure 4.22), and the Alberta Sustainable Home Project in Alberta, Canada (Rieger and Byrne 1996), are particularly noteworthy for indicating what level of ecological consideration is possible to realize under given financial constraints for housing.

Apart from these housing initiatives, the search for healthy, ecological living environments leads many people in high-income countries to form intentional communities, a group of residents sharing the same goal, that is, to set up a sustainable community. Thus co-housing and eco-village projects have arisen in the inner city by renovating the existing building stocks or in the suburbs and the far flung rural areas by forming new neighborhood groups (McCamant and Durrett 1994). The aim is the creation of self-reliant societies that exercise local

Title of the Project: Solar City Project
Location: Linz-Pichling, Austria
Completed: 1995 and ongoing
Client: The Municipality of Linz
Architects: Norman Foster and Partners, Herzog + Partner, Richard Rogers Partnership in association with Future Systems

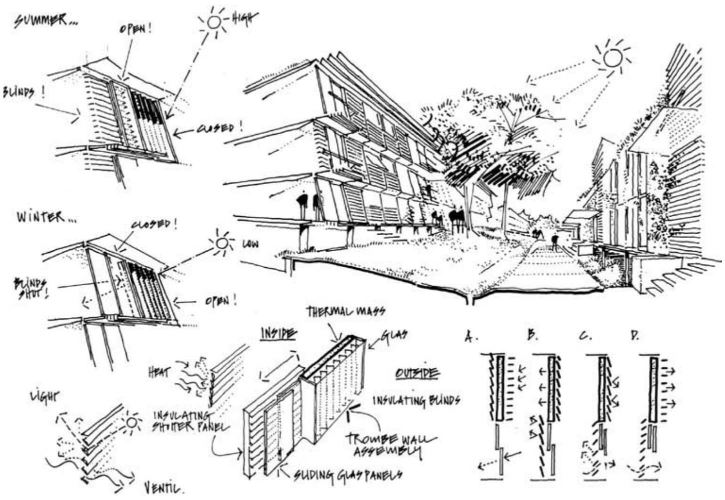


Figure 4.17 Linz-Pichling Solar City Project, Austria, incorporating extensive use of solar energy. **Figure** Norman Foster and Partners.

Title of the Project: Solbyn—The Sun Village—Ecological Housing Estate
Location: Dalby, near Lund, Sweden
Completed: 1988
Architects: Krister Wiberg

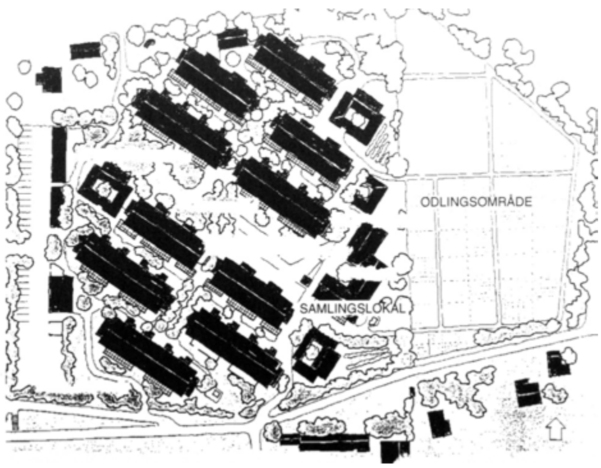


Figure 4.18 The houses of Solbyn in Dalby, Sweden constructed for cutting down energy consumption and storing heat in the structure of the house. **Photography** unnotified. **Figure** Krister Wiberg Arkitektkontor.

Title of the Project: Myrstacken Ecological Housing
Location: Malmö, Sweden
Completed: 1992
Architect and Designers: Krister Wiberg and the residents of Myrstacken

Figure 4.19 Inner main core of Myrstacken Ecological Housing in Malmö, Sweden, for pedestrian use alone. **Photography** Zeynep Durmuş Arsan, 1999.

Title of the Project:
Greenwich Millennium Village Project
Location: London, United Kingdom
Completed: 1999 and ongoing
Client: Countryside Properties plc, Taywood Homes, Moat Housing and Ujima
Architects: HTA (Hut Thompson Associates) and Ralph Erskine;
(Winner of Greenwich Millennium Village Competition)

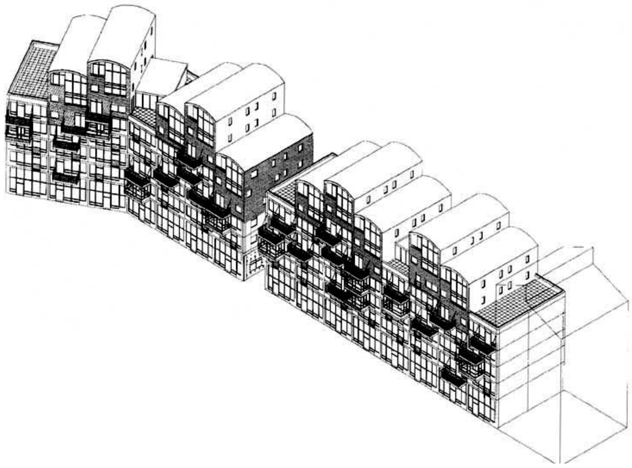


Figure 4.20 Greenwich Millennium Village Project, London, United Kingdom. **Figure** HTA and Ralph Erskine.

Title of the Project:
Uhousing
Location: Gelsenkirchen, Germany
Completed: 1997
Architects: Szyszkowitz – Kowalski, Graz
Structural Engineers:
Buro DI Birner, Buro Duffel
First prize winner of housing competition as part of the IBA Emscher Park, 1990

Figure 4.21 Uhousing, located in a heavily polluted former industrial site of Gelsenkirchen, Germany, was encouraged to adopt a green strategy in terms of both healthy environment and low energy use. **Photography** Peter Blundell Jones.

Title of the Project:
Cotton Tree Pilot Housing
Location: Sunshine Coast, Queensland, Australia
Completed: 1995
Client: The Government of Queensland
Architects: Clare Design

Figure 4.22 Cotton Tree Project in Queensland, Australia, as pilot public housing searching for an affordable housing scheme that is socially, environmentally, and aesthetically appropriate to the region. **Photography** unnotified. **Figure** Clare Design.

control, take responsibility for their environment, run a local economy and achieve the maximum use of human resources. The initial focus here is on resident participation in the planning and construction processes of both community and built environment.

3. Commitment to sustainability when designing public buildings: Sustainable discourse has influenced the contemporary demands of urban life, and echoed through many low-energy, less-polluting, environmentally friendly and/or intelligent offices, parliament buildings, public administration and museum buildings, education, research and cultural centers. This commitment to sustainable discourse in the architecture of northern countries has specifically identified a range of subjects such as energy efficiency, energy generation, storage and use, water consumption and recycling, waste collection, separation and recycling, green spaces, and healthy buildings and the elimination of dangerous materials.

4.2. How to Sustain Through Sustainable Architecture

How to sustain is an essential question, if we wish to portray the wide-ranging architectural versions of the sustainable approach in southern and northern countries. The sustainable responses, at first look, seem to depend on the economic capacity and income levels of countries, thus the critique could be founded on an economic axis. However, the selection of one way or another of making sustainable practices cannot be adequately interpreted either purely from the local phenomena of sustainable discourse nor from the economic inequity between the two poles. There are certain paradoxical applications when questioning sustainability in the South that are not synonymous with the interpretation of the concept in the North. This is indeed bound to the more complex system of undefined laws of the twenty-first century in which not only the cultural, social, economic, ecological, aesthetic and ethical dimensions play a determining role, but also identity problems, stylish trends, technological improvements, market research, economic compulsions, and politics all orient the answers to the question of how to sustain.

The sustainable agenda focuses on the fact that solutions can only be appropriate if arrived at on a local level. Yet some of the resulting practices do not seem to epitomize this global precept in architecture even if they are called sustainable. What is needed here is to analyze the copious innovation and interpretation in architectural practices which take local sustainability as a real design strategy for sustainable agenda, and understand the paradoxical practices by stressing their nonlocal context. At this point, the following questions simply will serve as a framework for analysis while somewhat differing from the multiple opinions and perspectives of sustainable architectural examples as seen in Table 4.2. These questions symbolize particular aspects of the sustainable design practice, and the implementation of a local agenda may be analyzed within these four different aspects, namely regionalism, building technology, project initiators, and pre-design phase. These four different but, at the same time, complementary facets indicate in which ways local sustainability is promoted as a pioneering design strategy and in which cases the local agenda is ignored or misinterpreted.

Table 4.2 Four questions and related facets examining in what ways local sustainability is a design strategy for sustainable architectural practices

1. How did cultural values, regional characteristics and social expectations become revitalized, especially as revealed through the policies of social sustainability?	Regionalism
2. Which building technologies were employed in transforming the rural and urban habitats? What materials and construction techniques were used and how valid are they still in terms of cost and appropriateness for economic sustainability?	Building Technology
3. Who initiated the sustainable building projects and supported the local activities? Whose expertise and funding were employed in the building design and construction processes?	Project Initiators
4. How were the design and construction processes planned? Which actors and stakeholders were involved in the pre-design stages?	Participatory Agenda

Here, regionalism, and also to some extent contextualism, come to the fore. The regionalist attitude completely supports what the cultural aspect of sustainable development proposes. Yet this design approach has nuances in the case of practice. Especially the technological aspect of a building, including the construction technique and material, and the technology for production and consumption of energy, bears decisive role in influencing the local and regional character of building.

The other aspect leading to the sustainable end product undeniably are the initiators. In the case of the ‘developing’ world, only the small group of initiators, especially the ones who own the technology, funds and expertise, can materialize the sustainable response. The design and construction processes of a sustainable practice are also determinative, since the participation or exclusion of any local actor in the design, construction and management processes of a building affects the realization and/or success of a project.

4.2.1. Regionalism as a Strategy of Cultural Resistance for Local Sustainability

It is obvious that the sustainable viewpoint of the early 1990s motivated the revival of regionalism in architecture. While the intention focuses on local sustainability, the sustainability of local values and the continuity of cultural existence have become the initial precepts in the sustainable architecture of both groups of countries. Especially with the 1996 Habitat II, The United Nations Conference on Human Settlements held in Istanbul, Turkey, the debates on sustainable architecture drew attention to a design approach that maintained that all old and new settlements should be re-evaluated in terms of their urban patterns and architectural qualities within the sustainable point of view, and that the new designs should consider the formers’ qualities without falling into mimicry (*Shelter* 1997).

Within the idea of the revision of existing values according to the sustainable standpoint, regionalism in architecture regained importance as in the 1980s. Critical Regionalism, i.e. the concept of the 1980s outlined by Frampton, underpins sustainable principles that offer the possibility of resisting the current tendency of reducing the environment to a commodity. Its salient cultural precept, defined by Frampton (1983, p. 162: for which see Appendix E, p. 516 below), as a “cultural strategy,” is the “place creation,” or the “enclave,” that is to say, the bounded fragment against the placeless and alienating consumerism of universal culture. Thus the strategy advocated by the concept of Critical Regionalism has become a basis for sustainable architecture in the 1990s.

The last decade was the period of re-invention of vernacular settlements in terms of their sustainable values. The harmonious, natural, stable and timeless myth of traditional buildings was decoded to design new sustainable buildings, adjusting the geography, culture, climate, and economy of the place. The role of architecture as one of the professions responsible for sustainable development, therefore, is to design buildings and urban spaces with knowledge of local cultures and existing resources and making use of renewable forms of energy and materials locally available. Indeed this sustainable approach implies a broader, more comprehensive version of the regionalist design approach.

Given the previous popularity of and admiration for the critical regionalist approach, the essential mission of sustainable architecture has become that of advocating a new comprehension to eliminate the problems, especially of cultural degeneration, which are caused by the modernization and globalization processes in both the North and the South. The phenomenon of universalization prevalent in modern culture has cut the continuity between tradition and the individual, and thus of the place. Here, the regional aspect of sustainable design serves as a design strategy to resist the abstract modernist space, the International Style, kitsch, and nostalgia or populism.

This strategy simply defines a critical stance for sustainable architecture to express the culture of people as well as their direct relationship with the place. More obviously, the strategy of resistance is valid when the sustainable transformation of the place, plus the cultural existence of people are made certain. In that sense, the cultural strategy of sustainable architectural discourse needs to be reviewed in terms not only of the sustainability of the regional qualities of the built environment but also of the sustainability of community.

With such a point of view, the sustainable architectural response to a place and to a community itself becomes the cultural strategy. This evokes two critical questions: does the sustainable architectural discourse suggest particular cultural strategies to resist the loss of identity? and what are the characteristics of resistant design strategy (or strategies) for a particular community and place?

The replies are already hidden in the essence of sustainability; the strategy is simply local sustainability. The regional aspect of sustainable architecture emphasizes a need for developing a local architectural vocabulary and differentiating it in line with local concerns. In other words, each building has its own message, and each building requires its own level of sustainability. What is needed is a strategy to design buildings adapted to the local, regional, physical, ecological, and cultural characteristics of that place.

Hence, it is clear that interpretations vary—a sustainable building may be constructed in a harmonious adaptation in one place, as well as by contrast to the existing environment in another place. Leaving aside some exceptions, it is possible to make generalizations on nuances of this cultural strategy from the point of confrontation between 'developed' and 'developing' countries. The projects in the former are in a wide contrasting array; they range from the perception of locality as a complete rejection of technology to fostering a sense of belonging through spirituality. Instead, in the latter, the use of features of traditional architecture, material and construction techniques are mostly preferred. Particularly in the rural parts, the response is toward the continuance of existing vernacular experience. The following section will clarify the various interpretations of regionalism as a strategy for local sustainability in line with the approaches of southern and northern countries.

4.2.1.1. Regional Aspects in the Southern Countries

1. Relying on optimum local response to keep peculiar conditions: In some cases, where people try to survive in rural areas, traditional communities have developed construction practices that utilize natural local materials and traditional construction techniques, by reusing what they can find and leaving demolition waste to biodegrade. There is in fact a store of accumulated experience which contains all previous solutions, thus the practices mostly rely on the traditional methods through re-use of materials and construction techniques.

Some of these projects are vital instances of architecture without architects as in Aït Iktel Project in Morocco (Correa et al. 2001), signifying how the villagers themselves can continue the regional qualities, while old buildings are cared for and new installations are added to provide very basic services. Here, the local architects, i.e. the local craftsmen, become important by spreading their skills to layman, as experienced also by the Barefoot Architects in Tilonia, India (O'Brien 1998).

Whether these practices relying on intermediate traditional building methods are viable in the current urban context is uncertain. Most of the building projects in urban areas have an innovative character in terms of resource generation and community organization, yet the regional quality may be poor. Here, it is better to evaluate the building practice within its peculiar conditions and priorities. It should be initially accepted that they are local physical development projects employing local resources, labor and skills limited by the economic capacity. Poor quality of construction, immature tectonic and tactile taste, and distance from building typologies and authenticity do not in themselves mean that the building is unsustainable, if the building is already erected in the local context and implies an appropriate local response to its peculiar conditions.

Affordable housing programs for the poor are especially subject to this challenge. The housing deficit has mostly been met by housing estate policies, but these dwelling clusters are monotonous in character and far from any regional quality and variety. In such cases, the success of low-cost housing projects depends on their innovative design approaches: for example, the Aranya Community Housing Project, India (Davidson and Serageldin 1995), serves an alternative dwelling scheme that makes possible endless variations toward affordability, and gives a regional flavor (Figure 4.23).

Title of the Project: Aranya Community Housing
Location: Indore, India
Completed: 1989 and ongoing
Client: Indore Development Authority
Architect: Vastu-Shilpa Foundation, Balkrishna V. Doshi;
AKAA, one of the winners of the sixth award cycle 1993-1995

Figure 4.23 Aranya Community Housing, Indore, India. **Photography** John Paniker, 1995.

2. Re-examination of traditional architecture for the question of designing new buildings in old settlements: Many architectural attempts encouraging the self-help construction methods in existing traditional settlements are faced with the problem of integration of the new into the old, in other words with designing new buildings in old settlements. This requires developing a particular design strategy that has to do with a re-examination of roots but also involves a reconciliation of both contemporary needs and traditional methods. A newly erected building is expected to reflect the sprit of its own time, i.e. the

Zeitgeist. Yet the real question arises here of how to make contact with, and respond to, the traditional settlements.

There are innovative interpretations of vernacular accumulation such as the SOS Children's Village in Aqaba, Jordan (Correa et al. 2001), the Kahere Eila Poultry Farming School in Koliagbe, Guinea (Correa et al. 2001), and the Deepalaya School for Slum Children in New Delhi, India ("Anangpur Building Centre" n.d.; Laul 2001) (Figures 4.24; 4.25; 4.26). Here, the building stock of the villages is used as a model, and locally available building materials are employed, while the local characteristics of the villages are maintained. The preservation and conservation of local intermediate building technologies are always preferred rather than the application of sophisticated ones. In that sense, these are hopeful

Title of the Project:
SOS Children's Village Project
Location: Aqaba, Jordan
Completed: 1991
Client: SOS Children's Village Association of Jordan
Architects: Jafar Tukan & Partners;
AKAA, one of the winners of the eighth award cycle 1999-2001

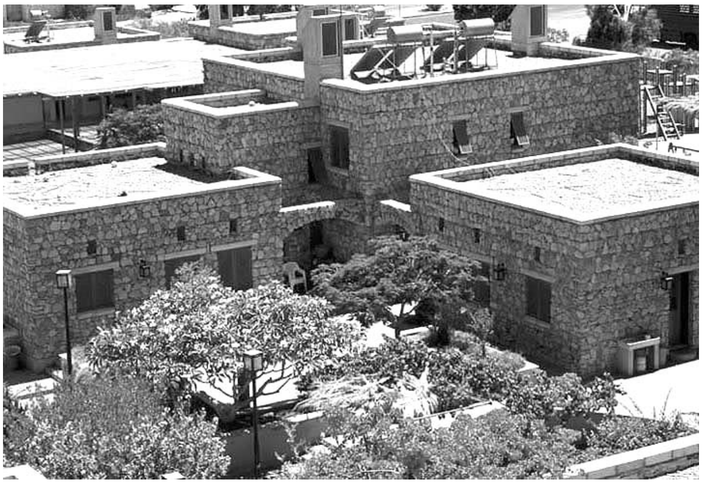


Figure 4.24 The use of stone as a new precedent for local building in Aqaba, Jordan, where the traditional houses have been lost: safe and calm playgrounds within the dense urban fabric. **Photography** unnotified.

Title of the Project:
Kahere Eila Poultry Farming School
Location: Koliagbe, Guinea
Completed: 2000
Client: Centre Avicole Kahere
Architects: Heikkinen-Komonen Architects;
AKAA, one of the winners of the eighth award cycle 1999-2001

Figure 4.25 Courtyard view of Kahere Eila Poultry Farming School, Koliagbe, Guinea. **Photography** unnotified.

Title of the Project: Deepalaya School for Slum Children; **Location:** New Delhi, India
Completed: 1995; **Municipal Partner:** The Slum & JJ Department of the Municipal Corporation of Delhi; **Business Partner:** Anangpur Building Centre

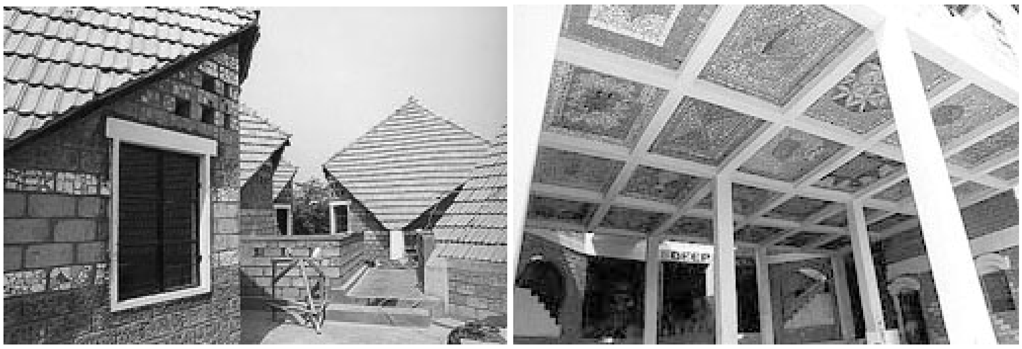


Figure 4.26 Deepalaya School for Slum Children, New Delhi, India. **Photography** Anil Laul.

attempts to recognize and distill the current needs and modern technology as well as match traditional materials and methods to the local context. Therefore, the resulting construction is a modern interpretation of the vernacular architecture that can qualify as a new architectural language composed of the mixture of the modern and the local.

3. Demonstration of creative potential and easy-applicability of local materials: Building materials can play an impressive role in the maintenance and continuance of regional qualities as in the Panafrican Institute for Development in Ouagadougou, Burkina Faso (Al-Radi et al. 1992) (Figures 4.27; 4.28). Especially when the cost of construction is greatly reduced by a wise, rational building system, the replicability of material production and construction techniques effectively contributes to the spread of sustainable building practices in many similar areas. In that sense, the Stone Building System in Dar’a Province, Syria (Al-Radi et al. 1992), and the Self-Contained Housing Delivery System in Thailand (“Self-Contained Housing” n.d) offer good schemes denoting an architectural ingenuity with their material-based building systems, especially suited for building by unskilled citizens (Figure 4.29).

4. Tectonic and tactile quality of a building expressing regional context: Apart from replicability of building systems and materials, demonstrating the tectonic and tactile essence of an architectural product as a constructional craft comes very near qualifying a project as sustainable. The architecture of the Nianing Agricultural Training Centre, Senegal, develops a simple structural theme into a rich tectonic quality bearing composition of light,

Title of the Project: Panafrican Institute for Development
Location: Ouagadougou, Burkina Faso
Completed: 1984
Client: Panafrican Institute for Development (Malick Fall, Director; Faya Kondano, Administration)
Architects: ADAUA

Figure 4.27 Construction process of vaults in the building of Panafrican Institute for Development, Ouagadougou, Burkina Faso. **Photography** Kamran Adle, 1992.

AKAA, one of the winners of the fifth award cycle, 1990-1992

Figure 4.28 Roof top view of the Panafrican Institute for Development, Burkina Faso. **Photography** Kamran Adle, 1992.

Title of the Project: Stone Building System
Location: Dar'a Province, Syria
Completed: 1990 and ongoing
Client: Ministry of Education, Damascus
Architects: Raif Muhanna, Ziad Muhanna, and Rafi Muhanna, Damascus; AKAA, one of the winners of the eighth award cycle, 1990-1992

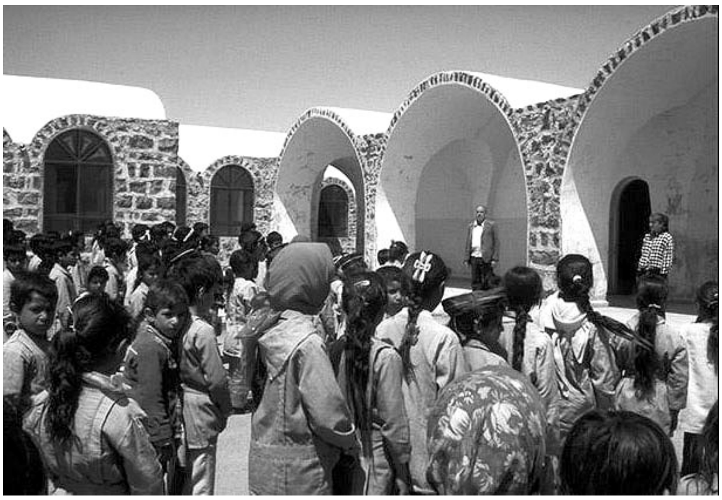


Figure 4.29 Application of stone building system in a school of Dar'a Province, Syria: use of regional basalt stone, found in abundance on farm land, rather than of reinforced concrete frame as commonly done. **Photography** Kamran Adle, 1992.

texture and color which is in turn based on barrel vaults made out of sand and cement bricks (El Jack 1982, Holod and Darl 1983, Taylor 1982). The variation of open, closed, and transitional spaces in the building of the Entrepreneurship Development Institute of India in Ahmedabad, India (Al-Radi et al. 1992), provides light and shade, and expresses the geo-environmental context of India, in other words the tectonic details and rich accumulation of India's past. The Kaedi Regional Hospital in Kaedi, Mauritania (Davidson and Serageldin 1995), besides, emphasizes the tectonic theme as a constructional craft just by indicating structural and material probity (Figures 4.30; 4.31; 4.32).

5. A design strategy based on adaptation, transformation and interpretation rather than direct quotation, imitation and mimicry of building typologies and components: Designing sustainable buildings in the southern countries, besides, requires a critical stance that suggests escaping from mimicry, viz. the mimicry of vernacular architecture and the mimicry of the solutions of the northern countries. The first one means to sidestep the complete imitation of old experience, and to refrain from adding culturally unsustainable fixes to existing traditional building typologies. Adding insulation made from synthetic materials, while there are already wise traditional solutions which do not require insulation, designing Arab wind towers as merely objects in an office block or imitating the thermal mass effect of adobe with thin reinforced concrete walls do not integrate a sustainable solution in terms of cultural and economic considerations and sustainable design. Likewise, the unthinking replication of any design originally for the North often fails to harmonize with the values of a particular place and people of the South—and vice versa, though that would be a very rare species of imitation. There is indeed an unconsidered fact that the urban transformations and construction activities are taking place faster than planning actions in the southern countries and that their velocity and character are completely different from those of the northern countries. Consequently, simply to replicate methods whose success is based on other conditions, to import the air-conditioned ecological high-rise building type or to add ubiquitous sustainable symbols like the stainless-steel or light aluminum sun-shade elements on the building façade unavoidably fails in the local context, and is particularly inappropriate in the context of low-income countries' lack of resources.

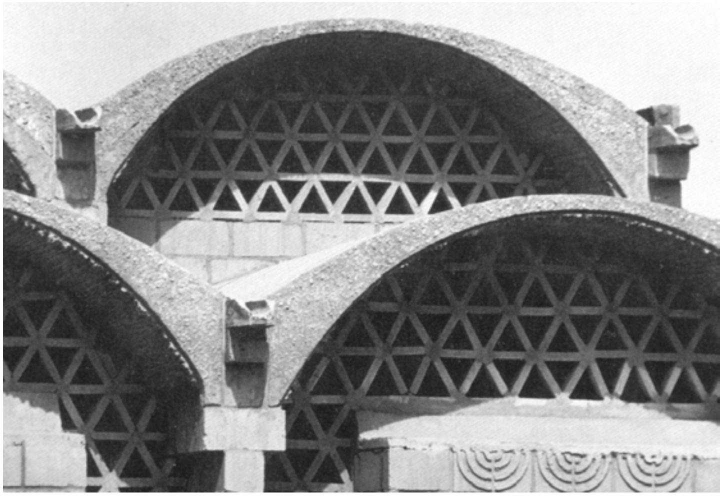
Title of the Project: Agricultural Training Centre; **Location:** Nianing, Dakar, Senegal **Completed:** 1977 **Client:** Ministry of Education, Dakar, Senegal **Architects:** UNESCO/BREDA (Kamal El Jack, Pierre Bussat, Oswald Dellicour, Sjoerd Nienhuys, Christophorus Posma, and Paul de Wallik); AKAA, one of the winners of the first award cycle 1978-1980	

Figure 4.30 Vault detail from Agricultural Training Centre, Dakar, Senegal. **Photography** unnotified.

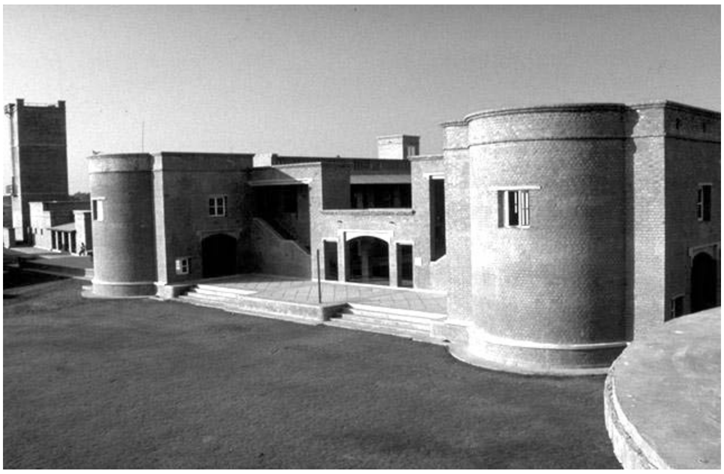
Title of the Project: Entrepreneurship Development Institute of India; **Location:** Ahmedabad, India **Completed:** 1987 **Client:** Entrepreneurship Development Institute of India (Viharibhai G. Patel, Director) **Architect:** Bimal Hasmukh C. Patel; AKAA, one of the winners of the fifth award cycle 1990-1992	

Figure 4.31 Entrepreneurship Development Institute of India in Ahmedabad, India. **Photography** Ram Rahman, 1992.

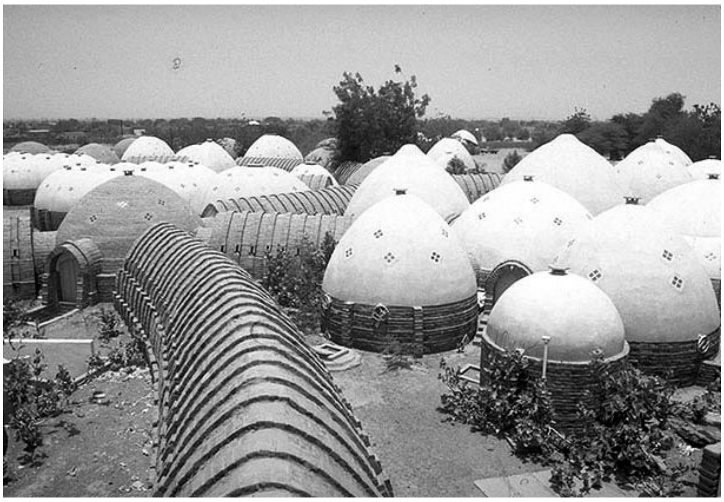
Title of the Project: Kaedi Regional Hospital **Location:** Kaedi, Mauritania **Completed:** 1989 **Client:** Ministry of Health, Nouakchott, Mauritania **Architect:** Fabrizio Carola, Association pour le Développement naturel d'une Architecture et d'un Urbanisme Africain (ADAUA); AKAA, one of the winners of the sixth award cycle 1993-1995	

Figure 4.32 Aerial view of the hospital complex in Kaedi, Mauritania. **Photography** Kamran Adle, 1995.

The point made here is not to reject the benefits from the vernacular or the other experiences which will ease the journey toward sustainable development. The Pearce Partnership's building for commercial development, Eastgate, in Harare, Zimbabwe (Jones 1998; Slessor 1996a), Ken Yeang's green towers in Malaysia ("Menara Mesiniaga" 1997; "Office Towers" 1996; Powell 1999; Richards 2001; Toy 1997), Vaudou and Allegret's library building in the Caribbean Islands ("Breath of Fresh Air" 1997), and the Norwegian architects' Chhebetar orphanage building in the Gorka district, Nepal ("Greetings from Nepal" 2001), draw inspiration from vernacular building approaches, and then transform or interpret them in line with contemporary needs (Figures 4.33; 4.34; 4.35). These encouraging buildings may be viewed as indicative of the way to adapt vernacular responses with an appropriate formal response to climatic and microclimatic conditions, rather than to quote directly extant building typologies and components. In short, within this design strategy it is suggested that sustainable architectural examples should move away from universal and technologically based clichéd design approaches since these often fail to coincide with the cultural, social, ecological, aesthetic, and economic values of a particular place or people.

4.2.1.2. Regional Aspects in the Northern Countries

1. Changing lifestyles and regenerating lost relationships: There are practices intended to revitalize the traditional way of life and values with supportive social structures. The eco-villages such as the Lebensgarten in Germany (Grindheim and Kennedy 1998; "Lebensgarten" n.d.), the Farm in the USA (Bates 1996; "Success Stories" n.d.; "The Farm" 2003), the Findhorn in the United Kingdom (Edwards 1999; "Findhorn Ecovillage" 2003; Grindheim and Kennedy 1998; Inglis 1996), co-housing units first in Denmark, and eventually throughout Europe and the USA (McCamant and Durrett 1994), and the Steiner Villages ("Camphill Communities" 2003) are in essence modern attempts, i.e. modern pilot communities, to re-establish the sense of place and community by living a sustainable, satisfying lifestyle in harmony with each other, with all other living beings, and with the Earth (Figure 4.36). Indeed, they provide a testing ground for cultural resistance in order to at least regenerate the lost social relationships by taking basic lessons from the sustainable way of life and design

Title of the Project:
Eastgate Building
Location: Harare, Zimbabwe
Completed: 1996
Client: Old Mutual Properties
Architects: Pearce Partnership, Harare
Structural Engineer: Ove Arup & Partners

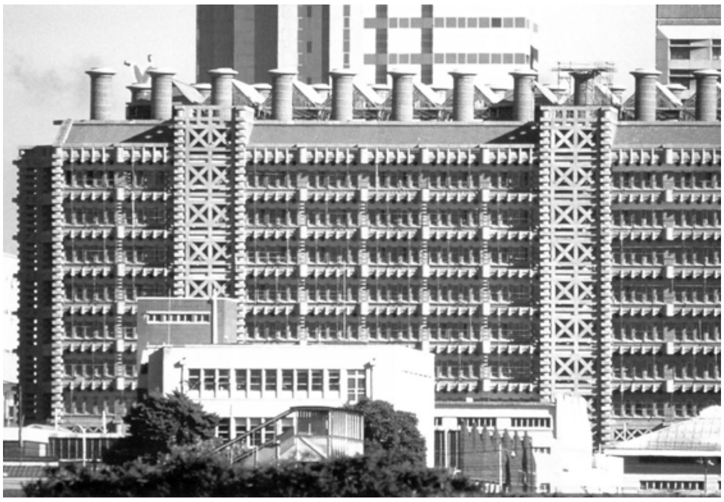


Figure 4.33 Heavily articulated façade made of brick, precast concrete sun-shades, and the wind chimneys differentiate this commercial building in Harare, Zimbabwe, among the other conventional ones. **Photography** David Brazier.

Title of the Project:
Library
Location: Guadeloupe, The Caribbean Islands
Architects: Vaudou and Allegret (Valerie Vaudou and Laurence Allegret)

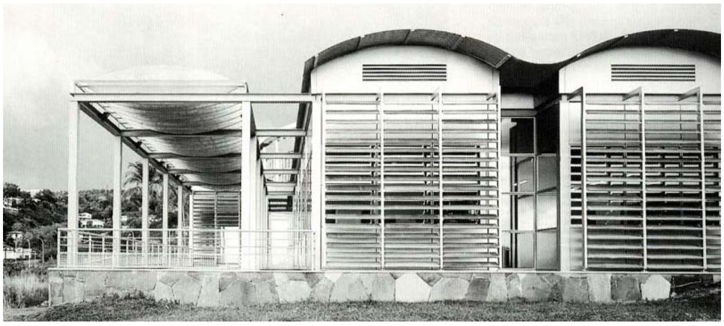


Figure 4.34 Respect for the local context by wise use of prevailing wind in hot, human tropical climate of Guadeloupe in the Caribbean Islands. **Photography** unnotified.

Title of the Project:
Chhebetar Orphanage
Location: Gorka district, Nepal
Completed: 1995
Architects: Hans Olav Hesseberg and Sixten Rahlaff, in collaboration with Eli Synnevåg, Norway

Figure 4.35 Norwegian architects' radically different proposal to the former concrete block project of Chhebetar Orphanage in Gorka district, Nepal**,** was developed by studying local traditions, materials, technology and resources. **Photography** Hans Olav Hesseberg and Sixten Rahlaff.

Title of the Project:
Sun and Village Co-Housing Community
Location: Beder, Denmark
Completed: 1980 and ongoing
Architects:
Arkitektgruppen Regnbuen, Denmark and the inhabitants of the co-housing

Figure 4.36 Sun and Village Co-Housing in Beder, Denmark: owner-occupied housing community with a common house and common area. **Photography** unnotified.

of small-sized traditional settlements. Each communal living unit tries to maintain, re-create or find a new cultural expression of human connectedness with nature and place while transforming the physical built environment to reflect these deeper values. Here, the building materials and techniques are far removed from any regional context, yet the main concern is already with the re-creation of the regional milieu. Thus the choice of materials is toward the renewable and natural ones such as stone, earth, straw, timber, cob, and bamboo, and toward re-used and recycled materials such as car tires and glass bottles. Besides, alternative natural building methods such as straw-bale, rammed-earth, modular contained earth, are all combined with a call for experimental architecture (Bruce King 2000).

2. Rejection of technology-dependent lifestyle: Some architects seek to renew the idea of critical regionalism by repositioning regional aspect as a non-modern, reactionary response to the contemporary, modern, technologically-dependent lifestyle. Here, the design approach by buildings called sustainable is to criticize the incremental technology of 'civilized' society by making use of the technological waste. The approach is to regard "waste as a resource" (Vale and Vale 1996, p. 56). The technological waste is re-used within an artistic manner by representing itself as 'kitsch', while at the same time within an environmentally respectful design attitude. This approach is epitomized by many buildings in North America, as well as in Latin America, constructed with earth or the garbage of the industrialized world. One of them is Michael Reynold's work on domestic earth-ships in New Mexico ("Earthship" 2003; Elizabeth and Adams 2000; "What is an Earthship" 2003) where self-sufficient homes are made from used tires, bottles and other waste materials, filled and plastered with earth (Figure 4.37). Else the other is the natural-healthy house approach of the Gaia Group in Norway (Pearson 1989) fostering the move away from technologically based design approaches. It seeks to base the design activity on the *Feng Shui*, i.e. the Taoist art and science of auspicious setting and layout, Christopher Alexander's Pattern Language (Alexander 1977) approach emphasizing that the people, themselves, are the best designers, and Rudofsky's stress on architecture without architects (Rudofsky 1964).

Title of the Project: Earthship House; **Location:** Northern New Mexico, USA
Completed: 1970s and ongoing; **Architects:** Michael Reynolds

Figure 4.37 'U' Module Earthship Houses in Northern New Mexico, USA, constructed by earth-tire brick, i.e. used automobile tires pounded with earth. **Photography** Solar Survival Architecture.

3. New manifestation of local culture by reinterpreting vernacular experience of a particular place: Some cases, especially the buildings for tourist facilities such as Uluru Kata Tjuta National Park Cultural Center in the Uluru, Australia ("Uluru Kata Tjuta" 1997), are the reinterpretation projects of vernacular experience to concentrate their message on the cultural relevance of the native culture grounded within particular local ecological conditions (Figures 4.38; 4.39). These projects are sustainable, because each has a clear design strategy to derive its building features from a recall of ancient construction technique, and reflects the local culture through the characteristics of the region. Here, the most important point is successfully to express the sprit of place, without kitsch. The resistant strategy in Uluru is that the architects' preference was to live in the area and to collaborate with the local community over a month, before the design stage started. For this reason, the project ensured the least possible disturbance to the Uluru National Park.

Title of the Project: Uluru-Kata Tjuta National Park Cultural Centre
Location: Uluru (Ayers Rock), Australia
Completed: 1995
Client: Mufifjulu Community and Parks Australia
Architects: Gregory Burgess Architects

Figure 4.38 Aerial view of two serpentine buildings representing mythic snakes to Aboriginal people of Uluru, Australia. **Photography** Craig Lamotte.

Figure 4.39 The process of making sand bricks for Uluru-Kata Tjuta National Park Cultural Centre, Australia. **Photography** Craig Lamotte.

4.2.2. Building Technology as a Tool for Local Sustainability

Indeed, the technological aspect of sustainable design is a controversial subject; here the initial intention should be to understand how sustainable architecture employs the technological improvements of the last decade. The emphasis, therefore, is on the type of technologies, viz. high, medium or low technologies, and the intensity of utilization of technology in sustainable buildings.

4.2.2.1. Technological Aspects in the Southern Countries

1. Integration of new, low-tech, affordable, and replicable construction techniques into the existent building practices: The integration of contemporary technology into building for the poor in the rural and urban context needs special design strategies. Notably when innovation in building materials and methods is considered or planned, the technological aspect of sustainable architecture should be questioned. Where making housing affordable for the vulnerable section of society is concerned, the Building Centres in India are a case in point (Cost-Effective and Affordable Housing" 2002). They promote the utilization of low or medium type of technologies in construction, and introduce cost-effective and, at the same time, environmentally friendly building materials and techniques, e.g. funicular shells, bamboo-mat based walls, composite ferro systems, with saving of 15% to 40% over conventional costs. Here, the real achievement is the creation of appropriate technologies developed with local wisdom, their transfer from lab to land, and the production and marketing of building materials and components in India.

On the other hand, cases such as the Kaedi Regional Hospital, Kaedi, Mauritania (Davidson and Serageldin 1995), and the Agricultural Training Centre Building Project in Nianing, Dakar, Senegal (El Jack 1982, Holod and Darl 1983, Taylor 1982), exemplify the introduction of new low-cost construction techniques employing local materials and skills, rather than the improvement of existing ones (Figures 4.40; 4.41). Indeed, the creation of new building systems is bold and risky because of an attempt to replace hundreds of years of historical development. These efforts, aiming first at physical development through architecture, have started discussions in the architectural profession as to whether making this kind of intervention causes cultural degeneration or not.

In the case of earthquakes in India, "the quest for the ultimate building block" (Laul 2002, p. 10) led to the Anangpur Building Centre in India developing a load bearing construction system composed of interlocking hollow core blocks (Figure 4.42). Anil Laul (2002, p. 11), the head of this Centre, points out that the studies resulted in "a sustainable product that reduces environmental impacts, integrates efficient use of resources, resists earthquakes, is locally responsive and promotes greater equity." The wall system includes diagonally placed, male and female profiled blocks which are manufactured on-site by using

Title of the Project:
Kaedi Regional Hospital
Location: Kaedi, Mauritania
Completed: 1989
Client: Ministry of Health, Nouakchott, Mauritania
Architect: Fabrizio Carola, Association pour le Développement naturel d'une Architecture et d'un Urbanisme Africains (ADAUA)
AKAA, one of the winners of the sixth award cycle 1993-1995

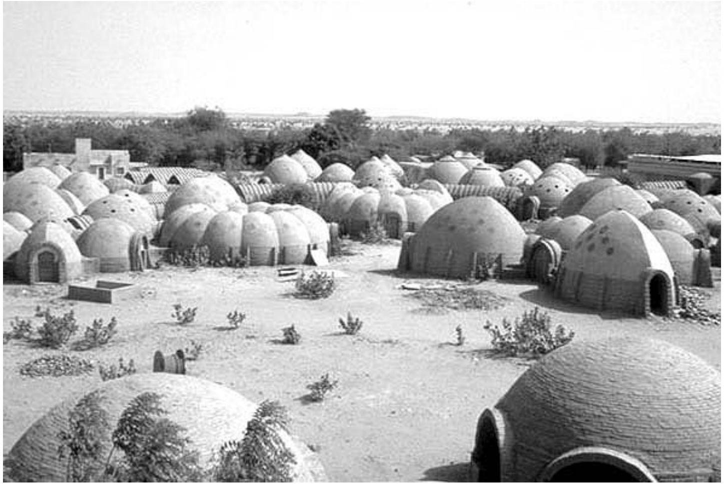
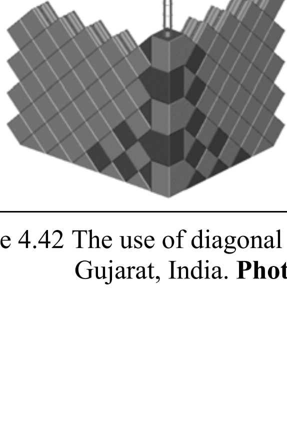


Figure 4.40 Kaedi Regional Hospital, Kaedi, Mauritania. **Photography** Kamran Adle, 1995.

Title of the Project:
Agricultural Training Centre
Location: Nianing, Dakar, Senegal
Completed: 1977
Client: CARITAS, Ministry of Education, Dakar, Senegal
Architects:
UNESCO/BREDA, Dakar (Kamal El Jack, Pierre Bussat, Oswald Dellicour, Sjoerd Nienhuys, Christophorus Posma, and Paul de Wallik)

Figure 4.41 Building in Dakar, Senegal, functioning as training centre for agriculture and masonry construction. **Photography** Christopher Little, 1981.

Name of Building Material: Hollow core building blocks
Title of the Project: Medical Centre
Location: New Dudhai, Gujarat, India
Developer: Anil Laul in Anangpur Building Centre, India



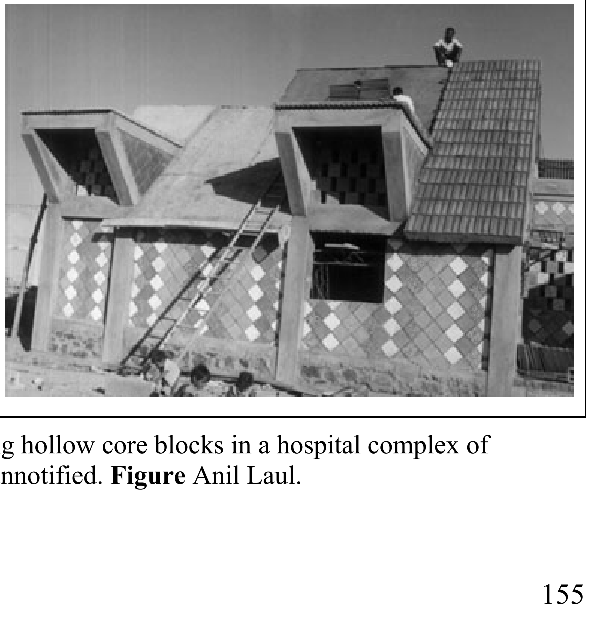


Figure 4.42 The use of diagonal interlocking hollow core blocks in a hospital complex of Gujarat, India. **Photography** unnotified. **Figure** Anil Laul.

molds. This building technique was tested in earthquake-resistant housing in Guajarat, India, as well as the construction of public buildings and landscape design ("Anangpur Building Centre" n.d.).

Actually, the innovative construction techniques serve as prototypical structures, supporting self-reliance of poor people to improve existing local qualities rather than to imitate or destroy in the service of the modernization process. What is important about these projects, here, is their use of human potential as opposed to essentially technological means of industrialization. In that sense, these attempts may be understood as an architectural experimentation to revitalize masonry construction by training the other masons. The experience is the result of outside intervention, and the construction system is not indigenous to the place. However, the buildings were erected at least by respecting the local context including local labor, materials, and traditional skills.

2. Admiration for high technology: The technology-dominated attitude for more progress in the 1990s empowers the reliance upon mechanical service systems, and this inevitably causes increase in the technological intensity of building materials and construction. Technologically sophisticated applications, viz. of intelligent buildings and smart designs, have distributed over a wide region these prestige buildings, mostly and unsurprisingly placed in the domain of the affluent parts of the world.

There is also a rising interest in smart examples in the South, in countries such as Uruguay, where smart buildings are celebrated as introducing a sustainable solution into the country (Probst 2002). However, the construction and spread of intelligent buildings in countries having severe economic problems is controversial in terms of cost and appropriateness of these building types, especially in respect to the struggles for the economic sustainability of the community. On the other hand, there are a number of wise restrictions on the construction of intelligent buildings in the 'developing' world. First, intelligent buildings are mostly sited in central business districts of the world capitals. They are the sign of power, i.e. big business, and thus logically expensive and require big investments. To be able to cover the installation and consumption cost of automation systems is only possible over a long time, compensated for by lower running costs. For this reason, these are unfeasible buildings for poor communities. Second, it is clear that the building sector is intimately linked with the quality of life of its citizens. While the challenge of a society with livelihood problems is to survive and improve life expectations toward economic development, efforts should concentrate on erecting buildings with minimum cost and maximum comfort conditions, rather than offering luxurious ones.

3. Practices for the use of renewable energy forms: The current concern with sustainable energy among the southern nations is not embodied in any policy or development strategy, since the incremental economic growth and the fulfilment of contemporary basic needs seem more urgent issues than the ethical responsibility for future generations and natural ecosystems. Most of them have no energy policy as yet.[2] Furthermore, energy consumption is increasing and is still considered an indicator of progress: more progress = more energy, despite the fact that they depend on imported energy. Many nations do not even have any thermal legislation, or other control mechanism. In brief, these are currently fundamental problems in achieving sustainability in terms of energy concern.

In those cases where there are no energy standards to follow when designing a wall, ceiling, or using a new material, it is questionable how energy-efficient the buildings are designed to be. Yet there are, fortunately, individual programs developed by local and/or international initiatives to develop awareness of energy efficiency as well as the utilization of passive energy systems in buildings. For example, the partnership of the World Wildlife Fund (WWF) China and International Network for Bamboo and Rattan (INBAR) launched a complicated project, Promotion of Energy-Efficient Buildings: Integration of Bamboo and Renewable Energy Technologies, for the rural population of Southwestern China ("Bamboo for Energy-Efficient Building" 2002) (Figure 4.43). Bamboo was promoted as the main building material, readily available in the region, instead of the use of red bricks causing erosion and loss of agricultural land. What is more important than the extent of the project is that it unites energy savings and renewable energy technologies with the extensive use of bamboo. In this respect, the project utilizes local resources such as local climate conditions

[2] Apart from the absence of energy policy, the energy production and consumption systems demonstrate unsustainable patterns characterized by growing dependence on imported fossil fuels, rising energy demand, and CO^2 emissions.

and local materials combined with solar energy design principles and technologies such as passive solar design, photovoltaic plants and solar thermal water heaters.[3]

Title of the Project: Integration of Bamboo and Renewable Energy Technologies Project
Location: Various regions, Yunnan Province, China
Beginning: 2002
Project organizer: World Wildlife Fund (WWF) and International Network for Bamboo and Rattan (INBAR) together with the Urban & Rural Planning & Design Institute of Yunnan and BEAR Architecten Gouda, the Netherlands

Figure 4.43 Dai Village House introducing solar energy, solar hot water, solar cooling and biogas to the bamboo houses of Yunnan province, China. **Photography** INBAR.

Even though fewer in number, projects for the use of renewable forms of energy has been encouraged; solar energy is especially in favor. Solar collectors are used in rural areas for heating water, photovoltaic cells for generating electricity. The project of Power to Woman—Solar Energy for Vietnam by a national NGO, Vietnam Women's Union, is an example of integrating women from rural parts of Vietnam into a social development project by installing photovoltaic systems in the houses of remote villages ("Power to Women" 2002). This, simply put, means that the green electricity generated by the PV plants helps women to have more opportunities to earn money, generate income, and improve their living standards. The female population is essentially chosen, since they play an important role in communicating the benefits of solar energy.

4.2.2.2. Technological Aspects in the Northern Countries

The sustainable development discourse has succeeded, to some extent, in directing innumerable investigations regarding any energy issue in the design of sustainable buildings. These investigations concern low energy consumption and renewable energy use within the idea that a building itself can even be a

[3] Furthermore, using bamboo in houses and school buildings provides low building costs combined with energy savings for the public, while at the same time offering employment opportunities in rural areas.

renewable energy supplier, rather than merely a consumer. In essence, the trio 'building technique', 'building material' and 'energy' have become strictly bounded emblematic issues of sustainable design, and in line with global attention, energy efficiency in building is highlighted. Here, one crucial point for sustainable architecture is that the use of high technology for energy efficiency in the processes of production of building materials, building construction and management coincides with the spread of the energy-efficient design approach which, as said, is much more in the domain of high-income nations.

The energy concern has generated one of the most controversial issues of domestic and international policies, and sustainable energy policies hitherto have been determined mostly in reference to national economic interests. Even if sustainable energy production and use were targeted for all countries from different economic levels, clean/renewable energy has become much more the concern of the North.[4] This fact proves how vital economic priorities are for the sustainable energy agenda of a country.

Moreover, to abandon the use of fossil fuels for energy supply becomes a crucial goal of global sustainability. Particularly, there is an interest in larger studies for an exhaustive assessment of local, on-site and, at the same time, renewable forms of energy such as wind, solar, tidal and regenerable forms of energy such as biomass.[5] However, one point should clearly be understood, namely that most northern countries avoid ratifying or applying the Kyoto Protocol, even though they strongly urge the southern countries to ratify it. It should be questioned here whether sustainable development is a global precept for all nations or just for the South.

The emphasis given to sustainable energy in high-income countries has brought up an accompanying concern, that is, whether to standardize in the construction industry regarding energy efficiency: the European Union and its policies for sustainable building and housing is a good case in point. The European Village, known as Bo01 in Malmö, Sweden ("First Impressions of

[4] The energy concern has been an interest on the sustainable agenda since The United Nations Conference on Environment and Development in Stockholm in 1972. The last World Summit on Sustainable Development of 2002 in Johannesburg once more indicated that the important issue is still the requirement of consensus on a global energy agenda that should be incorporated into national energy strategies.

[5] The former can cause no direct environmental emissions, while the latter can produce emission of minor relevance. See Herzog (1998) for the detailed explanation of renewable and regenerable forms of energy.

Bo01" 2001), is both a demonstration and test case of an attempt to use standardized sustainable products (Figure 4.44). Smits et al. describe the aim of the project as follows: "to provide the basis for preparation of harmonized standards at European level; to achieve the greatest advantages for a single internal market and to ensure conditions for a harmonized system of general rules in the construction industry" (2002, p. 28).

Title of the Project: European Village Project (Bo01)
Location: Malmö, Sweden
Completed: 2001 and ongoing
Project organizer: Swedish National Board of Housing, Building and Planning (Boverket)
Projects actually built from: Czech Republic, Denmark, Hungary, Lithuania, Norway, Poland, Slovenia, Sweden
Architects: Various from EU countries

Figure 4.44 European Village Project in Malmö, Sweden, is also a demonstration project of zero-energy building design. **Figure** unnotified.

Within the context of this emphasis on energy policies and standardization of the construction industry, another attempt was the increase in studies for diverse technological possibilities which would facilitate and accelerate transformation toward sustainable development. Thus the functional, structural, and aesthetic integration of energy technologies, especially the solar energy technology, was the central concern for technologically sophisticated building design of the 1990s. A large number of new products and systems have been developed for supplying energy from ambient energy sources and minimizing the consumption where needed. For instance, new types of glass enabling translucent thermal insulation, improved shading and daylight deflecting systems, intelligent façades, double-skin walls and energy supply tools such as photovoltaic panels and heat pumps become the incorporating building elements of this great stress on energy efficiency. Furthermore, energy-efficient lighting, the use of natural and mixed-mode ventilation, more cost-effective air-conditioning and comfort cooling, and solar-supported energy supply systems are all combined with sophisticated energy management systems in high-technology energy-efficient buildings.

1. Significance of the choice of building materials in terms of the embodied energy invested and the technology used: In the northern countries, some practices aim at making huge differences in global environmental sustainability by the careful choice of building material, more particularly, by drastically reducing the use of energy-intensive materials, i.e. cement, steel, aggregates, glass and aluminum. These buildings celebrate any attempt that minimizes technological intensity, and thus energy consumption, required for building materials in the processes of production, transportation, maintenance, alteration, demolition and recycling. Peter Hübner's various timber-based buildings (Blundell Jones 1996a; Herzog 1998; Blundell Jones 2001b), Edward Cullinan's Westminster Lodge in the United Kingdom (Jones 1998; Toy 1997) (Figure 4.45), Shigeru Ban's numerous buildings made of paper tubes (Jones 1998; "Paper Tube Architecture" 1997) (Figure 4.46), and Gregory Burgess's buildings for Aboriginal peoples (Jones 1998; "Uluru Kata Tjuta" 1997) utilize healthy, recycled, natural-based materials or alternative ones from waste.

Others compensate the concern for high-embodied energy of materials with the careful gain of energy and its more effective use. On the one hand, these buildings, many in number, are constructed out of the materials needed for high

Title of the Project: Westminster Lodge
Location: Dorset, United Kingdom
Completed: 1996
Client: Parnham Trust
Architect: Edward Cullinan Architects

Figure 4.45 Westminster Lodge in Dorset, United Kingdom, as a demonstration project of innovative timber technology. **Photography** Electa Archive.

Title of the Project:
Paper Log House
Location: Nagata, Kobe, Japan
Completed: 1996
Client: Takatori Catholic Church
Architect: Shigeru Ban

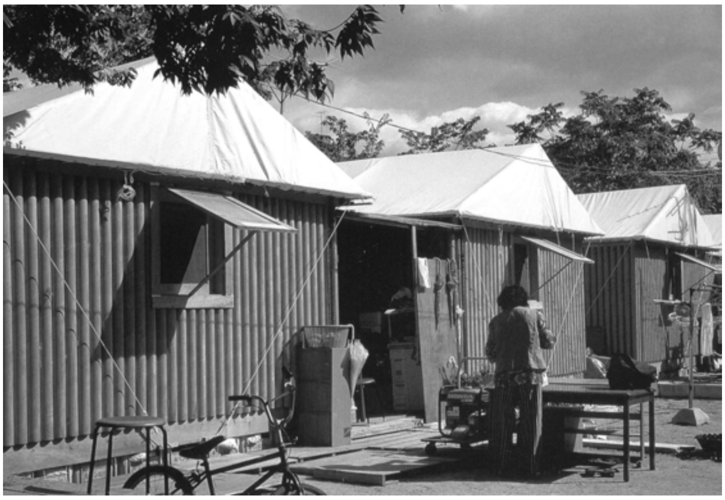


Figure 4.46 Paper Log Houses as emergency housing after Kobe earthquake of Japan in January 1995. **Photography** Scinkenchiku-sha.

technology and high energy. On the other hand, they have well-measured energy management programs. The vanguard of sustainable architecture can be exemplified as follows: Jubilee Campus, University of Nottingham, United Kingdom, by Michael Hopkins and Partners ("Jubilee Campus" 2001); Hall 26 Building in Hannover, Germany, by Thomas Herzog and Partners (Jones 1998; Hagan 2001); Office Towers in Malaysia by Yeang and Hamzah (Richards 2001); the Götz Headquarters Building in Würzburg, Germany, by Webler and Geissler ("Götz Administration Building" 1997; Lodel 1999; Miles 1996); the Eden Project and Regeneration of Paddington Basin in the United Kingdom by Nicholas Grimshaw and Partners (Davey 2000; Melvin 2001; Toy 1997); Commerzbank Headquarters Building in Frankfurt (Jones 1998) and the Reichstag-New German Parliament Building in Berlin, Germany, by Norman Foster and Partners (Dawson 1995; Herzog 1998); Daimler Benz Offices in Berlin, Germany, by Richard Rogers (Herzog 1998); Headquarters for iGuzzini Illuminazione in Recanati, Italy, by Mario Cucinella (Francis 1999), and Jean-Marie Tjibaou Cultural Centre in New Caledonia by Renzo Piano (McInstry 1998; Melet 1999) (Figures 4.47; 4.48; 4.49).

Title of the Project:
Jubilee Campus,
University of Nottingham
Location: Nottingham,
United Kingdom
Completed: 1999
Architect: Michael
Hopkins and Partners
Financing: European
Commission (THERMIE
Programme) and the
British Ministry of Energy
(DTI)
Consultant: Ove Arup
&Partners, London
Competition winner

Figure 4.47 The Jubilee Campus Project in Nottingham, United Kingdom, implementing low-energy concept for the business school and the education faculty. **Photography** Martine Hamilton-Knight.

Title of the Project:
Reichstag-New German
Parliament Building
Location: Berlin,
Germany
Completed: 2000
Client: The German
Parliament
Architect: Norman Foster
and Partners, London

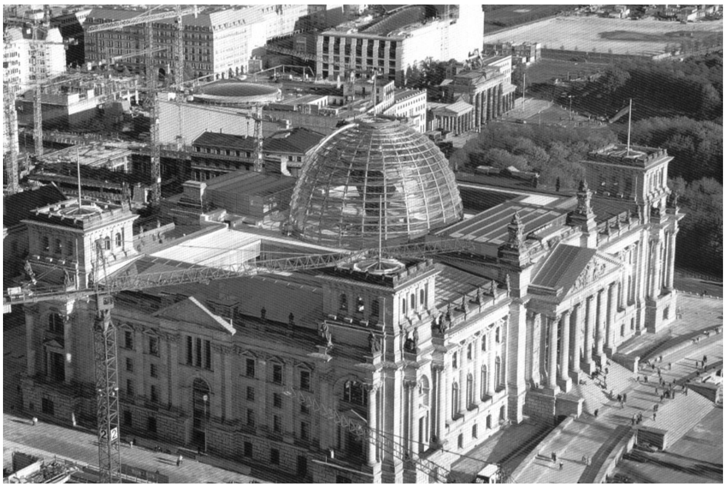
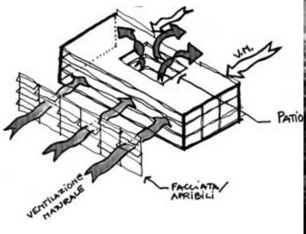


Figure 4.48 The roof of Reichstag in Berlin, Germany, as a major public space, as well as energy supplier of the building. **Photography** unnotified.

Title of the Project:
Headquarters for iGuzzini
Illuminazione
Location: Recanati, Italy
Completed: -
Architect: Mario
Cucinella (MCA)



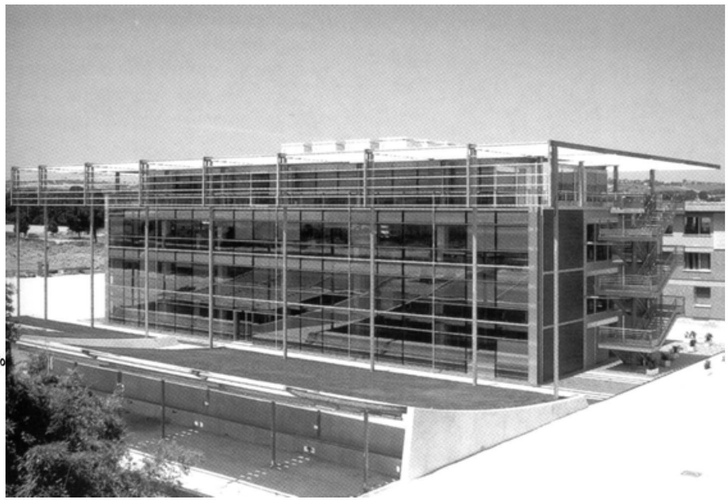


Figure 4.49 Headquarters for iGuzzini Illuminazione, Recanati, Italy: glass box enabling natural ventilation. **Photography** unnotified. **Figure** MCA.

4.2.3. Project Initiators as Non-profit Supporters

The key actors, i.e. the project initiators, can improve the realization of sustainable practices. In that sense, NGOs can make a difference in introducing and promoting building for sustainability into the local agendas of countries. They influence individual citizens and local governments to realize independent, country-specific projects that fill some of the knowledge and technology gaps. NGOs can bring together the general public, sometimes organized into community-based organizations (CBOs), with the local and central governmental bodies, academicians and the private sector. Actually, each NGO offers an opportunity to establish dialogue between local government, small companies and polluting industries.

NGOs can play a variety of roles within the building process, namely providing housing guidance, information, and counseling to the local people, training and skills upgrade to utilize alternative, innovative sustainable building materials and technologies, "initiating projects, supporting local activities, acting as advocate/agent," and "being responsible for the entire project management" (Dulski 2001, p. 22).

4.2.3.1. NGOs

These organizations "play their biggest role in countries where the government was not very active in the field of sustainable building" (Dulski 2001, p. 23). They come into existence to deliver the message when the government fails to do so, particularly in countries with less economic power, and when the governmental supply systems are often unable to reach the poor and disadvantaged groups in society. Dulski (2001) takes up the attraction of NGOs in some southern countries, particularly as "in Latin America (e.g. Peru)" as that, "there is a long tradition of local organizations that try to improve living conditions by themselves" (p. 22). For example, in the case of the Self-Management in Popular Shelter and Habitat Program in Venezuela ("Self-Management" n.d.), the enabler body, ASOVIV—Civil Association for Shelter, is composed of slum inhabitants. It was established to offer financing and integral technical assistance to associated slum families, and thus to procure the construction continuity and the consolidation of housing in the slums of Venezuela. Compared to the situation in Latin America, the NGOs have only recently started working in the former communist countries in Russia and the other Central and Eastern Europe. They have dealt unavoidably with the privatization of residential buildings, increasing rents and lack of maintenance.

It is noteworthy that there are already some governments which have a managerial and/or financial role in sustainable building projects. The Housing & Urban Development Cooperation (HUDCO) of the government of India, the Ministry of Urban Employment and Poverty Alleviation, is one of them (Cost-Effective and Affordable Housing" 2002). It encouraged the establishment of many local building centers in 1998 with an effort to replicate this initiative across the country. In fact, the establishment of many local building organizations, as seen in India and Venezuela, renders the applications easily constructed, and guarantees the success of sustainable building projects. These centers are the dissemination centers of operational activities such as training, production, construction, and guidance for building.

In the northern countries, the NGOs realize projects and initiate campaigns to make residents and governmental bodies aware of ecological and sustainable issues, even if most of the governments already play a major role concerning sustainable building. The example of the influence exerted by NGOs may be witnessed in the Village Action Movement of Finland (*Projects Around the World* 2000). The renewal of villages in rural Finland is realized by the individual village committees, yet at the same time, there is a country-wide networking of villages for reciprocal self-help in the neighborhoods. Besides, environmental NGOs such as in Australia (Dulski 2001) can press for a new legislative framework in the environmentally sustainable building sector that requires long term environmental sustainability plans and reporting.

Moreover, public and private partnerships have truly proven to be expedient vehicles for implementing sustainability projects. The expertise and funding of business is a valuable asset for government actors wishing to implement new approaches. The studies of the Council for Sustainable Development in Barcelona (Klinckenberg 2001) are a good case in point. The council, representing the local government, the business, NGOs and university experts, has led the process to adopt a solar ordinance in Barcelona. According to this regulation, "every new built or renovated home must be equipped with a solar boiler, with enough capacity to cover at least 60% of the hot water demand"

(Klinckenberg 2001, p. 21). The success of the project is to bring together the local authority, the public, and the solar boiler manufacturers with a balanced business plan.

4.2.3.2. International Organizations

Apart from these national NGOs, there are international non-governmental organizations which support projects in sustainable architecture. In the early 1990s, the attention to global problems, especially of people in livelihood troubles, created new perspectives for the international private programs. These were established to satisfy the increasingly urgent demands of people, not only for a longer, happier and healthier life, but for achieving this without violating regional differences, damaging traditional cultures or destroying the natural environment that make life worth living. They can provide firstly the project and organizational support with knowledge and expertise, secondly donation and funding aid, and lastly labor by actively participating during the realization process of the project.

The United Nations Development Programme (UNDP) and the World Bank are the most important and well-known programs encouraging single local sustainable development practices in the South with financial support and expertise. More specifically, the International Council for Research and Innovation in Building and Construction (CIB) and the United Nations Environment Programme—International Environment Technology Centre (UNEP-ITC)[6]—have agreed to cooperate by developing and implementing a program in sustainable construction in the southern countries. This program aims at enabling and stimulating the implementation of appropriate tools and technologies ("UNEP and CIB" 2001).

Independent sustainability programs like the OPET Network of the European Commission ("Introducing the OPET" n.d.) and the Healthy City Project of the United Nations ("Healthy Cities" 2003)—World Health Organization (WHO)—are broad-based initiatives active throughout Europe which help a group of countries to implement predefined sustainable instruments or methodologies: the former, for instance, is set up to disseminate information on

[6] UNEP-ITC serves for co-operation between the sources and environmentally sound technologies, and plays a role in strengthening the capacities of people living in target areas to make sensible decisions about technologies for sustainable community, energy, and infrastructure.

and to promote the benefits of new innovative energy technologies between The Netherlands, Bulgaria, Latvia, Slovenia, and Hungary. The latter, composed of 1100 Healthy Cities in 29 countries of Europe, is based on an implementation of a methodology, namely New Gate 21, for renovating cities and transforming them into sustainable and healthy ones. There are also international organizations such as Habitat for Humanity International ("Habitat for Humanity" 2000) and ITDG—Intermediate Technology Development Group ("ITDG" 2003)—which concentrate their work in the rural areas of the South. They serve as a provocative intermediary for co-operation among the inhabitants to build simple, decent, affordable houses. By community-based works and organizing voluntary work camps, they encourage people to work together to address their housing problems, instead of waiting for others to solve them.

In fact, the role of international organizations in the sustainable building process should be carefully investigated to determine whether it is an innocent, harmless attempt or not. In many North-South partnerships, the funding of projects of the South is provided initially or partially by the governmental bodies of the northern countries, the international corporate bodies such as the European Union, the World Bank, the UNDP, UNESCO or the international monetary bodies such as the Inter-American Development Bank. Especially the British, French, German, and American governments' participation inevitably brings to mind the colonial rule of these countries over the so-called developing world, most of which is already in a post-colonial period with attacks on their democratization process and autonomous development.

In fact, the ways in which particular ways of realizing a sustainable building have their roots in commercial practices searching for a market, as well as in political, religious or missionary ideas and practices, cannot be ignored. This means accepting the idea that sustainable architecture, especially in the low income nations, is dependant on the contingent and dynamic strategies of the development actors with the power to implement their chosen design strategy. On the one hand, the strategy can create controllable and manipulatable communities dependent on foreign financial support. On the other hand, these multicultural studies can lead to deterioration and loss of identity rather than enrichment. It is, hence, important to understand how the power relations among competing development interests frame communities' sustainable conception and subsequent design strategies. Such comprehension may help identify any divergence in conditions between the South and the North and the role of initiators in the provision of more sustainable lifestyles.

4.2.4. Participatory Agenda as an Instrument for Local Sustainability

It is important to recognize that the real effort to achieve a more sustainable way of life is not only to add new solutions, but also to change the way people think and carry out their daily activities. Therefore, the best way to create public commitment to sustainability is to involve the development actors in the sustainable development process. For sustainable architecture, this means a participatory process which integrates the local actors in the decision-making, design, construction, management, and/or maintenance phases.

The direct participation tool in architectural practices helps in creating awareness about the available alternative options in terms of not only the cost effectiveness but also the structural, functional, and aesthetic sufficiency. The ecological urban development project, Tampere 21 in Finland (*Projects Around the World* 2000), includes active citizen involvement in the planning and decision-making processes, and encourages the citizens to turn this scheme into a cyclical process, for example, by training the unemployed young people to restore housing and public buildings by using ecological materials. Indeed the projects highlighting active involvement empower the socially sustainable development of settlements by facilitating public involvement as an instrument for local sustainability.

4.2.4.1. Resident Participation in Building Design

Resident participation in the design process is an essential asset in sustainable housing examples mostly seen in community housing, i.e. the co-housing, projects of northern Europe and the USA (McCamant and Durrett 1994) and in affordable, low-cost housing projects such as the Development Project in Aït Iktel, Morocco (Correa et al. 2001), Self-Management in Popular Shelter and Habitat Program, Venezuela ("Self-Management" n.d.), and Shelter Upgrading in Agadir, Morocco ("Shelter Upgrading" n.d.). Logically, most residents are inexperienced in both collective decision-making and the building industry. They have also little knowledge of financing, design and construction issues. However, the participatory development process makes the household agree with the decisions, and improves the degree of satisfaction and cohesiveness for their houses and surroundings. It creates a sense of community and belongingness, while the involvement of residents from the earliest stages motivates them to take responsibility for the project's success.

Sustainable architecture actually necessitates a change in life-styles of users that the architect can only facilitate. In cases when the users play an active role during the design process, architects have a role to "assist groups in clarifying their objectives and requirements, and in facilitating the design programming process" (McCamant and Durrett 1994, p. 163) without dictating decisions to the group. They facilitate the group discussion by laying out the range of possibilities, outlining important considerations, and providing inspiration and resource materials. Besides, the architects make technical issues understandable to lay persons; they consult about the alternative design solutions and the consequences of different choices, especially their advantages and disadvantages. The relationship between architect and residents, the cohesiveness of the group and the architect's ability to translate social, economical, and ecological goals into the built environment toward sustainable development are all important. Various participatory techniques through the design process such as questionnaires, models, field trips, meetings, discussions, and paper furniture cut-outs help promote involvement of residents. Models with movable pieces and field trips to experience different architectural solutions and building densities are considered the most useful techniques for both architects and residents.

4.2.4.2. Resident Participation in Building Construction

Resident participation in the construction process is also an essential benefit especially for the sustainable housing practices in which the affordability is an important concern for the owner-residents. It is important to learn the construction techniques to re-use the skill for further studies as well as to boost the cultural acceptance of the building.

Involving local citizens in the construction process by upgrading their skills and motivation is a well-tested sustainable model; the key attempt here is to establish an appropriate housing delivery system ensuring the upgrade of skill levels of the local construction workers and artisans, who will disseminate the sustainable building options. As experienced in the Building Centres and the works of Barefoot Architects in India, in the Agricultural Training Centre Building Project in Nianing in Dakar, Senegal (El Jack 1982, Holod and Darl 1983, Taylor 1982), and the Kaedi Regional Hospital, in Kaedi, Mauritania (Davidson and Serageldin 1995), men and women masons, carpenters, and plumbers were trained for the construction of their buildings (Figure 4.50).

The other vital strategy is to provide opportunity for improving the self-build ability of families to construct the houses themselves, seen in the Grameen Bank Housing Programme in Bangladesh (Al-Radi and Steele 1994), Barefoot architects in India (Correa et al. 2001), the National Housing Programme in Namibia ("National Housing" n.d.), Co-operative Housing for Empowered Communities in Canada, ("Co-operative Housing" n.d.), and Self Built Affordable Homes in the United Kingdom ("Self Built" 2001) (Figure 4.51).

Indeed there are particular programs, called 'co-operative self-help', 'self-built', 'built-together' or 'do-it-yourself' programs, whose broader goal is to promote participatory construction processes. Among these self-help models, Dittmann (2001, p. 370) explains that, "the site-and-service concept is a well-tried settlement model" for the refurbishment of slum settlements, in which the people build their own houses step by step in line with a procured site and services. In this model, the "access is provided to the site, and each plot of land has a small prefabricated cell, containing a shower and toilet, plus an external water supply for a future kitchen" (Dittmann 2001, p. 370). The Rohini Development Project in New Delhi (cited in Dittmann 2001) and the Aranya Community Housing Project in Aranya, India, set successful precedents for the site-and-service model of infrastructure-based self-help housing, with a marked layout in each sector guiding settlement pattern and service units on Balkrishna Doshi's plan (Figure 4.52).[7] Alternatively, Dittmann adds that, "the core-and-expansion concept provides a larger living space and a smaller kitchen in addition to the services cell" (2001, p. 370). The shell house model, on the other hand, provides accommodation in multi-storey, high-density developments. The dwellings are laid out in rows along the access galleries and composed of divisible lofts with

[7] In the Aranya Community Housing Project, the homeless inhabitants can start with a foundation or a service core existing in the site. The people build their own houses with brick, cement or stone available locally on site. However, they are free to use any material for the construction and decoration. The payment plans are also based on the average income of each family. On this participatory model, see Davidson and Serageldin (1995).

Title of the Project:
Rainwater Harvesting Structure
Location: Tilonia, Rajasthan, India
Completed: 1988 and ongoing
Client: Barefoot College
Architects: Barefoot Architects of Tilonia;
AKAA, one of the winners of the eighth award cycle 1999-2001

Figure 4.50 The construction of geodesic dome in Barefoot College Project, Tilonia, Rajasthan, India. **Photography** Rajesh Vora, 2001.

Title of the Project: Grameen Bank Housing Programme
Location: Various Locations, Bangladesh
Completed: 1984 and ongoing
Clients: Landless Members of Grameen Bank
Planner: Grameen Bank (Muhammed Yunus, Director);
AKAA, one of the winners of the fourth award cycle 1987-1989

Figure 4.51 A typical house plot in Grameen Bank Housing Programme, Bangladesh, composed of a concrete slab foundation, reinforced columns, bamboo studs and bamboo mats. **Photography** Anwar Hossain, 1989.

Title of the Project:
Aranya Community Housing
Location: Indore, India
Completed: 1989 and ongoing
Client: Indore Development Authority
Architect: Vastu-Shilpa Foundation, Balkrishna V. Doshi;
AKAA, one of the winners of the sixth award cycle 1993-1995

Figure 4.52 Aranya Community Housing in Indore, India, as a case of site-and-service model of infrastructure-based self-help housing. **Photography** Yatin Pandya, 1995.

only sanitary units.

Finally, it can be stated that the utilization of human resources through appropriate empowerment and enablement methods has contributed to the achievement of many sustainable architectural practices in a local context. What is more important here still, the continuity and success of projects have a further ripple effect, i.e. long-term applicability and replicability for later implementations. In this regard, when planning to introduce a well-tried self-help system into a case, it is essential to foresee its potential for replicability, its possible impact and frequency while considering the fact that each case needs context-specific solutions.

CHAPTER 5
SUSTAINABLE ARCHITECTURE IN TURKEY

Turkey has a very limited number of practices which may be characterized as sustainable building.[1] In spite of the fact that it is hard to develop a critical approach within the limited scope of the present study, the current examples nevertheless enable us to observe the panorama of sustainable architecture in Turkey. Initially, they indicate unique architectural solutions belonging exclusively to this country. Therefore, within the scope of the criticism of sustainable architecture in Turkey, the fundamental approach should be to consider the ecological, social, cultural, spiritual, aesthetic and economic conditions of the case area. In addition, the recent rural and urban development policies and the priority given—especially starting in the early 1980s—to economic development efforts help us understand the mode of the implementation of the idea of sustainability and attendant architectural practices in Turkey.

The United Nations Conference on Environment and Development in Rio de Janeiro of 1992 was the first conference to whose conclusions the governmental boards of Turkey agreed, promising officially to realize the sustainable development goals through the development process. The formal body of this conference promoted the development of local working groups toward sustainability. The Local Agenda 21 studies in Turkey, therefore, were the preliminary attempts to implement the sustainable principles. These efforts have accelerated local development studies and thus enabled the formation of action plans of cities for the next century.

Habitat II, the second United Nations Conference on Human Settlements Conference held in Istanbul in 1996, spent extra attention on the concept of sustainability in Turkey. Both the earlier preparation phases and the discussions throughout the conference activated the introduction of notions of sustainable development into the architectural agenda of Turkey. Today, 23 settlements in

[1] The sustainable architectural practices discussed in this chapter have been compiled in respect of the author's survey based on the literature reviews and the personal interviews that were realized to date. Except the valuable written sources by Demirbilek and Irklı Eryıldız (1999), Eryıldız (2003a), and Tönük (2001), the author did not encounter a study fully listing the sustainable architectural building and design examples of Turkey. Some of the examples are going to be published for the first time in this dissertation. All accumulated samples will be stated in this chapter, yet only the particular ones, especially representing the core idea of the aspect, have been subjected to discussion.

Turkey have their own LA 21 groups and most of them have been actively encouraged by the local governmental boards ("IV. Taslak Rapor" 2002, p. 22).[2] The conference also caused an increase in the number of non-governmental organizations (NGOs) studying sustainable issues, and an increase in academic research in the universities into related topics.[3]

Even if the term 'sustainability' has been a global concept for more than a decade, it can be asserted that it is still a new subject in Turkey. The significance and necessity of developing a native sustainable approach is not appreciated adequately by formal bodies, non-governmental organizations and individuals. Thus concern for sustainability has not been widely practiced, at least, as might have been expected after the last Habitat II Conference in Istanbul. In short, the acceptance of the concept as an inseparable part of daily life and the broad-based transition to sustainable building activity will require an adaptation period in Turkey. One reason may be inadequate governmental involvement in establishing a sustainable built environment: political efforts, and architectural and planning policies promoting and supervising the sustainable course of development are inadequate. The attempts at sustainable building in Turkey, therefore, are very limited in comparison with the total building stock. On this basis, it can be inferred that the sustainable buildings of Turkey indicate the importance of individual efforts, rather than governmental endeavors, and the unavailability of a broader strategy for sustainable architecture. Most of the specimen were indeed built by non-governmental entities. The attempts at sustainable building in Turkey may be classified as follows in terms of their clients:

1. Private enterprise: by individuals and communities, e.g. NGOs, CBOs
2. Government: local or central governmental organizations and formal bodies, e.g. ministries and universities.

[2] See "IV. Taslak Rapor"—The Fourth Preliminary Draft—(2002) for the analysis of LA 21 studies in Turkey, and the Turkish view of the concepts of sustainable development and governance declared through the national preparation process for the World Summit on Sustainable Development, Johannesburg, in 2002.

[3] There was a symposium held in 2000 in Istanbul, examining the history of environmentalism and environmental protection in Turkey. See Atauz (2000) for the articles, especially the ones in the last part issuing the historical evolution of practices for environmental conservation in Turkey.

5.1. Sustainable Architecture in Turkey by Private Enterprise

The majority of buildings in Turkey characterized as sustainable were built by individuals and non-governmental organizations. Especially after the United Nations Conference on Human Settlements in Istanbul, 1996, newly erected local organizations and groups of people living in big cities developed an interest in sustainability. They searched for the possibility of changing in an ecological direction both their own living habits and their built environments. Thus the concept of sustainability quickly entered into architectural practice in such buildings as private houses, small housing groups, housing and public buildings for earthquake regions, eco-villages and buildings for touristic purposes.

5.1.1. Eco-Villages

The problem of migration from rural to urban areas has been accelerating in Turkey since the 1950s. The uncontrollable movement to the cities has caused unplanned growth in urban fringes where many poor people must struggle with unsanitary, harsh living conditions. Apart from the continuous migration and growth of slums, other vital problems include pollution, lack of infrastructure, lack of housing, inadequacy of the current housing stock, high population density and unsupervised building construction.

In such conditions, some of the inhabitants living in large cities in Turkey are dissatisfied with city life. This reaction to the urbanization process has led to individual building efforts joining with a search for more ecological, peaceful, moderate way of life closer to nature. Thus eco-villages in Turkey have come about because of both the necessity to live in a more sustainable way and to form an alternative settlement model. They are a reaction to the living conditions and the social life of grimy modern cities. The eco-village, therefore, is an attempt to form a small-scale settlement, not in an urban mode, with a planned community giving importance both to the individual person, his/her self-improvement, and to communal life (*The Earth Is Our Habitat* 1996).

The eco-village movement is new in Turkey. The groups behind the eco-village movement are mostly non-governmental associations directly related with the concept of sustainability. They prefer to create a new environment rather than converting an existing one. Despite the existence of very numerous groups interested in realizing an eco-village, there are only two members registered with the Global Eco-Village Network (GEN) in Turkey ("Global Ecovillage" 2003): the Ankara Güneş-Köyü (The Ankara Sun-Village), Ankara ("Ankara Güneş-Köyü" 2003), and Eko Foça-Foça Ecological Village, Izmir ("Ekofoça" 2002; Durmuş Arsan 2001d) (Figure 5.1).

Title of the Project: Eko Foça-Foça Ecological Village
Location: Bağarası, Foça, Izmir
Completed: 2000 and ongoing
Community: Eko Foça Ecological Living Group (Tunca Bökesoy, Bahattin Odabaşı)

Figure 5.1 One of the buildings of Eko Foça emulating a traditional Foça house in Izmir, Turkey. **Photography** Zeynep Durmuş Arsan, 2001.

The eco-villages of Turkey are planned as low-density settlements located mostly in rural areas close to big cities. Their economic plan is based on a self-sufficient system. Therefore the primary sources of income are ecological agriculture and educational facilities. Moreover, they stress respect for local cultures and vernacular characteristics of the region. Most of the buildings, therefore, are constructed with local, natural and recyclable materials such as timber, stone and mud-brick.

There are quite a few eco-villages which have gone beyond the planning phase. One reason may be the small number people who are really willing to leave their previous life style behind. Another is based on economic factors; for many individuals, a rise in economic capacity parallels a rise in age, further limiting the number of volunteers. One more reason can be the land-ownership question which is subject to severe debates in the early stages. Many eco-villagers in fact are opposed to the idea of owning land or a house because they believe in sharing, yet this causes conflicts in the ownership phase. As a result of these factors, the organization process of an eco-village is slower than any other kind of building process. The examples show that the realization of an eco-village will have the best chance for success if the ownership organization statute is in the form of a cooperative.

The Hocamköy Eco-Village Project of the Anatolian Ecological Communal Life Movement (Gürgen 2000, "Hocamköy" 1998; "Türkiye'de bir Eko-Köy" 1998) was the first eco-village in Turkey. It was organized by a group of young people from universities who decided to create a new living and production model in the town of Hasandede, Kırıkkale, in the central part of Turkey (Figure 5.2). In this project, the aim was to find practical solutions to immediate ecological problems of Anatolia in co-operation with the local peasants and farmers. One such problem is due to the large-scale migration of villagers looking for a better life in the cities, where they settle again in poor slums. Hocamköy members, intending to establish a self-sustaining village, tried to offer an alternative directly relevant to the villagers. Additionally, the project had a plan to renew the destroyed parts of the barren lands of Central Anatolia through ecological restoration and finding a niche between ecosystems.

Title of the Project: Hocamköy Eco-Village Project; **Location:** Hasandede, Kırıkkale **Completed:** 1996-1998 **Community:** Hocamköy Ecological Life Cooperative and Anatolian Ecological Communal Life Movement supporters **Builders:** Adobe House: Arslan Demir (mason), and supporters of Anatolian Ecological Communal Life Movement

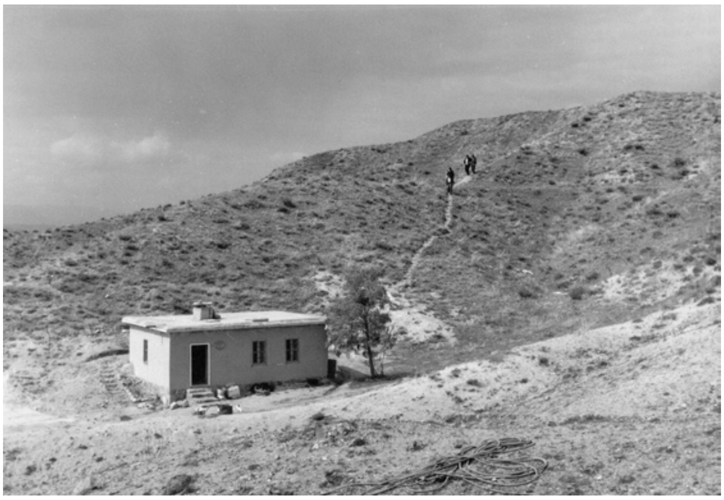


Figure 5.2 Hocamköy house of many growing hopes: first building of Hocamköy Eco-Village Project in Kırıkkale, Turkey, constructed with adobe. **Photography** Zeynep Durmuş Arsan, 1998.

The land studies of the Hocamköy Eco-Village Project between 1996 and 1998 concentrated more on the restoration of the fields and agricultural facilities and building mud brick house. Additionally, two projects of this society were funded by the United Nations Development Fund (UNDP), Global Environment Facility—Small Grants Programme (GEF/SGP) as follows:

1. Use of Renewable and Local Energy in Rural Areas and Small Settlements in 1998 on a Community Level by Hocamköy Ecological Life Cooperative ("GEF/SGP (1993-1999)" n.d.);

2. Training Center for Sustainable Livelihood in Hasandede Eco-Village in Central Anatolia in 2000 by Harman Anatolian Society for Ecology ("GEF/SGP (2000 –)" n.d.).[4]

The Hocamköy Eco-Village Project in Kırıkkale ended by 1998 and then transferred to the Harman Balaban Eco-Village Project in Ankara, and executed by the Harman Balaban Housing Cooperative founded in 2001. (Durmuş Arsan 2001a; Hacaloğlu 2000; Harman n.d.). The goals and the organizational structure of the Hocamköy Eco-Village Project have contributed a paradigm for coming eco-villages, and provide practiced knowledge for creating new eco-villages in Turkey.

5.1.2. Private Houses and Housing Groups

A traditional settlement may present sustainable features as a source of inspiration for new buildings. Both its life cycle and the built environment reflect the evolutionary characteristics that belong to the region. Vernacular building experience is a basis, therefore, for sustainable building in the regional context. Remarkably, there is a rising interest in sustainable architecture by urban citizens settled in rural areas, favoring a regional context and reaccepting local traditions as a paradigm. The resulting sustainable examples are mostly private houses respecting the vernacular characteristics of the region expressed in the building form, dimensions, building techniques and materials. Sensitive location of building mass also points to a contextual coherence with the settlement pattern.

[4] The aim of the first project, also termed as "the Application of Renewable and Local Energy Sources in Rural Areas and Small Scale Settlements," was "to demonstrate that solar, wind and biogas energy sources which are abundant local and renewable sources can be the right solutions for our global problems," and "to prove that such a model could be recommended in the development of an ecologically sustainable life style in small scale rural human settlements" ("Brochure 1" 1998). This project was realized with the contributions of Ege University Solar Energy Institute, TÜBİTAK-MAM, Laterna Alternative Energy Corporation, Atd Corporation, and DAĞSAN Corporation. The second project, also termed "Education and Implementation of a Sustainable Lifestyle Model in Small Scale Settlements," targets active community participation. "While pursuing theoretical & practical training programs for all the different sectors within the community, the community will actively be involved in the practice & planning of activities during the 14 month duration period of the project" ("Brochure 2" 2000). This project was realized with contributions from Sustainable Agriculture and Farmer's Cooperation, Turkish Ministry of Agriculture, and the Rural Affairs-Research, Planning and Coordination Council.

Vernacular building tradition still continues in most rural parts of Turkey. In spite of the popularity of the reinforced concrete skeleton system, the use of local materials and traditional construction techniques fortunately persist. The old construction tradition can also be practiced in most of the new sustainable examples in Turkey. There is a conscious reference to traditional craftsmanship and construction techniques with the use of local materials such as stone, mud brick and brick. The sustainability of local construction techniques is essential in two traditional buildings in Karakaya, Bodrum, Muğla, designed and self-built by Victor Ananias (Ananias 1998; Durmuş Arsan 2001c; "Feride-Alp Karakaya" 1998) (Figure 5.3), Erol Toprak House in Belen, Fethiye, Muğla, designed and constructed by Ahmet Kizen, 2000 (Durmuş Arsan 2002a) (Figure 5.4), and

Title of the Project: Two Traditional Buildings: Karakaya House and Sazlam; **Location:** Karakaya, Bodrum, Muğla; **Completed:** 1998; **Designer and Builder**: Victor Ananias

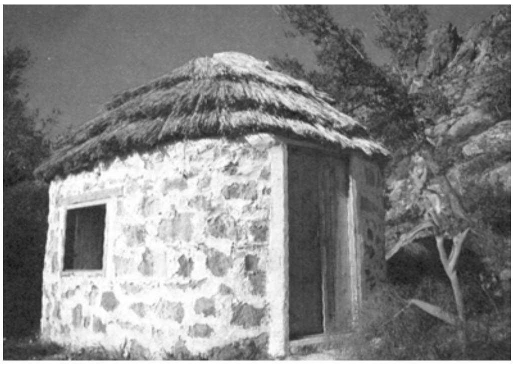


Figure 5.3 Karakaya house in Muğla, Turkey, rejecting cement for local mud, and Sazlam, a round building covered with local reeds—a natural element sated with Sufi symbolism—for the spiritual dimension of sustainability. **Photography** Buğday.

Title of the Project: Erol Toprak House
Location: Belen, Fethiye, Muğla
Completed: 2002
Client: Erol Toprak
Architect and Contractor: Ahmet Kizen

Figure 5.4 Respect for the local building materials, construction techniques and human health as manifested in Erol Toprak House, Muğla, Turkey. **Photography** Zeynep Durmuş Arsan, 2002.

Muammer Karakaş Residence, made of adobe brick in Güdül Valley, Ankara (Durmuş Arsan 2001a). They have a strong tectonic quality exhibited in the work of local craftsmen with qualified craftsmanship and details.

The material probity is differently treated as in Bora Topluoğlu House in Taşburun Village-Akyazı, Sakarya, 2002 (Topaloğlu 2002) (Figure 5.5), and Nesrin and Osman Tok House in Konya, 2000 (Durmuş Arsan 2001b) (Figure 5.6). In the former, a new construction system, building with straw-bales, is for the first time executed in a private house in 2002: the two storey building was constructed by Bora Topluoğlu himself, after he had completed the training course on the straw-bale construction system in Hasandede, Kırıkkale in 2000. The latter is unique with its material strategy: Nesrin and Osman Tok's choice for their

Title of the Project:
Bora Topluoğlu House
Location: Taşburun Village, Akyazı, Sakarya
Completed: 2002
Client: Bora Topluoğlu
Builder: Bora Topluoğlu

Figure 5.5 Two-storeyed house in Sakarya, Turkey, constructed with straw-bales. **Photography** Bora Topluoğlu, 2002.

Title of the Project:
Nesrin and Osman Tok House
Location: Konya
Completed: 2000
Client: Nesrin and Osman Tok

Figure 5.6 Re-used solid bricks and natural stone constituting an extraordinary wall texture in tower-like house of Nesrin and Osman Tok in Konya, Turkey. **Photography** Zeynep Durmuş Arsan, 2001.

two-storey house in Konya second-hand building materials such as full-brick on walls, timber beams at floors, and wooden frames for windows.

Sustainable architecture, moreover, should respect local sustainability in terms of its social and ecological aspects. Deep understanding of local cultural values, preservation of natural habitat and significance given to collective memory are important issues for designing new sustainable dwellings. For example, the Ahmet Kizen House in Fethiye, Muğla (Durmuş Arsan 2002a), and Nail Çakırhan Residence in Akyaka, Muğla (Cantacuzino 1985), emphasize the local characteristics of their respective region both by building construction technique and the life style they propose (Figures 5.7; 5.8). Ahmet Kizen House is

Title of the Project:
Ahmet Kizen House,
Location: Yanıklar Village, Fethiye, Muğla
Completed: 2002
Client: Nuran and Ahmet Kizen
Architect and Builder:
Ahmet Kizen

Figure 5.7 Ahmet Kizen house in Muğla, Turkey, not only exemplifying various ecological building features but also symbolizing a way of life respecting natural cycles, organic agriculture, and sustainable traditional architecture. **Photography** Zeynep Durmuş Arsan, 2002.

Title of the Project:
Nail Çakırhan Residence
Location: Akyaka Village, Muğla
Completed: 1971
Client: Nail and Halet Çakırhan
Designer: Nail Çakırhan
Carpenters: Ali Duru and Cafer Karaca, Muğla; Aga Khan Awards for Architecture (AKAA), one of the winners of the second award cycle 1981-1983

Figure 5.8 Entrance view of Nail Çakırhan Residence in Akyaka Village, Muğla, Turkey. **Photography** Samir Abdulac, 1983.

a building of the Pastoral Valley Project (Durmuş Arsan 2002a), a self-sustainable training center for traditional construction techniques and organic agricultural facilities, for local and international visitors. The project stresses the use of local building materials and techniques derived from the Fethiye region.

At the same time, Sun-Rock—*Güneşkaya*—Solar House Design in Kayseri (Özesmi et al. 2001; Özesmi 2002b; Schmeing et al. 2001) comes to the fore among the other sustainable housing instances regarding the concept of local sustainability as a main design strategy and with its intention crossing beyond the building's function as housing. The house, which is the work of multidisciplinary effort, was actually designed as an educational center with strong philosophical commitment and social concern. The design team, comprised of two environmental engineers, two architects, a mechanical engineer, and a ceramic artist, attribute a mission to the building that offers opportunity for the "re-definition of globalization" and "domestication of globalization by changing lifestyles" (Özesmi et al. 2001, p. 207). This may be evaluated as an invitation to alternative living by designing alternative buildings. This invitation at once implies a rejection of individual, specialized projects realized in sterile environments. The project distinguishes itself by pioneering respect for social transformation, as also seen in the eco-village projects of Turkey, toward ecological sustainability, not only for individual improvement, but also, especially, for social change (Figure 5.9).

Title of the Project: Sun-Rock—*Güneşkaya*—Solar House Design
Location: Kayseri
Design: 2001
Design Team: Uygar Özesmi, Astrid Schmeing, Çiğdem Yurtsever, Stacy Özesmi, Necdet Altuntop, H. Fazıl Ercan

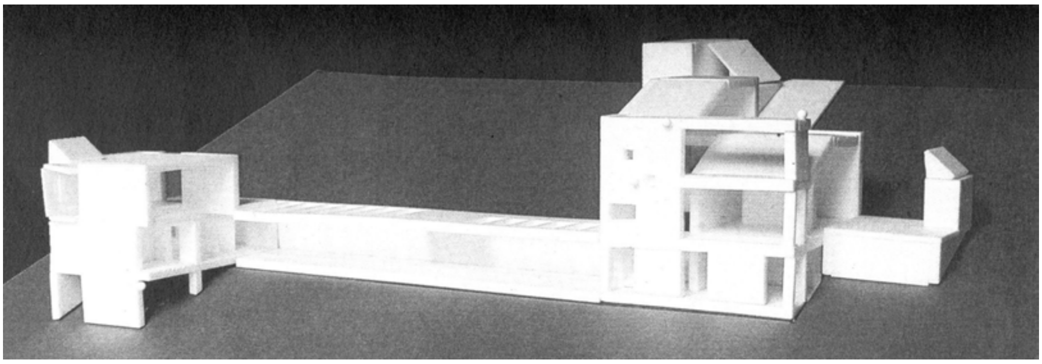


Figure 5.9 Shelter of the modest—*alicenap*—humanist view: Sun-Rock—Güneşkaya—Solar House in Kayseri, Turkey. **Model** Astrid Schmeing.

The Kırlık complex is a village project designed as a small Mediterranean town for permanent living close to Marmaris, Muğla ("Kırlık Köyü" n.d.; "Marmaris'te Dört Dörtlük bir Köy" 2001). It is composed of private houses constructed only of stone and timber. In spite of its respectful intention to local context, the village is contrary to the concept of sustainability because of the function of its houses, since the inhabitants of the village live there only in summer for one to three months. In fact, widespread ownership of secondary housing, in other words summer housing, damages the natural ecosystem of most coastal parts of Turkey. Because of insufficient planning regulations, they spread out and disturb the resiliency of the natural environment for a small vacation. Similarly here, the two storeyed buildings of the Kırlık complex utilize architectural characteristics of the Mediterranean region merely for visual effect, seemingly in the postmodern view, without serving any sustainable life expectations. Furthermore, by using imported timber and expert construction techniques, many buildings tend to demonstrate the stylish timber-plank houses far from their context (Figure 5.10).

Title of the Project:
Kırlık Village Project
Location: Beldibi, Marmaris, Muğla
Completed: 2000 and ongoing
Client: Yıldırım Yiğiter ve Rana Karadoğan
Contractor: Yıldırım Yiğiter Ltd. Şti.

Figure 5.10 Timber-plank houses of Kırlık Village in Muğla, Turkey, using NASCOR EnerGard wall system. **Photography** Zeynep Durmuş Arsan, 2002.

In point of fact, there was a rising interest for timber buildings at the end of the 1990s. Timber housing seems a hopeful market: the use of timber as a construction material, more than just for the production of furniture, has been encouraged by the National Timber Union of Turkey (Erengezgin 2000a). As a result, even though fewer in number when compared with the reinforced concrete building stock of Turkey, we may cite among the growing stock the Serhat Akbay House in Urla, Izmir (Akbay 2002; Sayın 2002), and the Green Valley Housing Cooperative in Afyon by by Ça-Ba Design as essential examples with their construction quality and detailing (Figures 5.11; 5.12). The interest of the construction sector in timber has also been growing: for example, the OYAK construction firm was planning to build new American type timber houses in the urban fringes of Ankara and Izmir for permanent use ("OYAK" 2002). A Canadian firm, NASCOR ("Nascor Ahşap Yapılar" n.d.), which is the supplier of timber housing products, has introduced its packaged houses, series of timber skeleton building types using NASCOR EnerGard wall systems, into the Turkish building market ("Packaged Housing" 2002): Timber Housing in Afyon and

Title of the Project: Serhat Akbay House
Location: Yağcılar Village, Urla, Izmir
Completed: 1999
Client: Serhat Akbay
Architect: Serhat Akbay

Figure 5.11 Construction strategy of Serhat Akbay House in Izmir, Turkey, supporting the economic sustainability of the region: the timber components processed in a small atelier with three local carpenters and the owner, himself, in Urla. **Photography** Aydın Çetin Bostanoğlu.

Title of the Project: Green Valley Housing Cooperative
Location: Afyon-Ankara Road, Afyon
Completed: 2002
Client: NASCOR Turkey and Atatürk Construction
Architect: Ça-Ba Design, Bursa (Çelik Erengezgin)

Figure 5.12 Housing Group in Afyon, Turkey, respecting clients' preferences researched by questionnaire and realizing them in three different types of timber skeleton house. **Photography** Bilal Tatar, 2002.

Kırlık Houses in Muğla are several of these applications.[5] Another firm, KAR-TAŞ Ltd., has produced the Kargı Log Houses in Kargı, Çorum, for people who want to live in timber houses (Demirkan 1999), which tendency particularly has been observed in the Bolu region in recent years. Most of these examples, including the Kırlık houses, are used as secondary housing on the periphery of urban sites. When there is no consistent policy for conservation of forest areas—as there is not in Turkey—and no healthy forest management programs are applied, the increase in the use of timber extracted of Turkish forests emerges as a strange way to implement sustainable architecture. This extraction, moreover, resides side by side with the import of Canadian or other countries' timber products, adding to the impression of a contradictory development in sustainable architecture of Turkey.

There is yet another group of paradoxical housing examples developed newly in the urban fringes of Istanbul: the buildings of Alkent 2000 Recreational Town ("Alkent" 2002) and Tepekent Experimental Ecological Village Design ("Tepekent" n.d.) integrate the particular notions of sustainable design in order to increase the quality of the building in a more commercial, trendy manner (Figures 5.13; 5.14). The initial design concept of these larger scale housing neighborhoods is to create a living environment which is livable, healthy and ecological. Here the qualities that make them more popular and charming, as well as differentiating from the other types of housing groups in Istanbul, are their pretentious advertisement about their recreational autonomy, 'green' open areas with low density housing. Architectural characteristics are based on luxurious and secure living environment with the high resource consumption and production of waste that contradict the discourse of sustainability. Similar to the trend of low-density housing in urban fringes, the smart housing projects in the peri-urban of Istanbul such as Flora Digital Project by Bülent Onur-AKROS Architecture ("Flora Digital" 2001; "Teknoloji Akıllandırıyor" 2000) and Aqua Manors Smart Homes by Sinpaş ("Aqua Manors" n.d) are the other type of so-called sustainable housing examples, yet additionally use intelligent home technologies (Figure 5.15). Zağpus (2002) points out that these buildings aim at taking people away from the chaos of the city and bringing them close to nature, as well as providing

[5] For more information about NASCOR EnerGard wall systems, see http://www.aresenerji.com/pr_ecohouse_wall.html (17.09.2003) and http://www.nascor.com/default.htm. (17.09.2003).

Title of the Project:
Alkent 2000 Recreational Town
Location: Büyükçekmece , Istanbul
Completed: 2000 and ongoing
Client: Alarko Corporation

Figure 5.13 M type 'sustainable' villa in Yeditepe district of Alkent 2000 Recreational Town, Istanbul, Turkey. **Photography** unnotified.

Title of the Project:
Tepekent Experimental Ecological Village Design
Location: Tepecik, Büyükçekmece, Istanbul
Completed:
1999 and ongoing
Client: Lalezar Group
Coordinator: Tepekent Housing Construction Cooperative Union, Zeki Bora (Chairman)

Figure 5.14 House type among 44 villa types in the Tepekent Experimental Ecological Village in Istanbul, Turkey, composed of 1831 villas. **Figure** Tepekent.

Title of the Project:
Aqua Manors Smart Homes
Location: Çekmeköy, Istanbul
Completed: 1992
Architectural Design: SİNPAŞ
System Design: IBM Turk

Figure 5.15 A smart home in Aqua Manors Housing Complex, Istanbul, Turkey. **Photography** unnotified.

maximum home comfort. Here, the residents of these houses are able to program the system according to their own needs by networks of both cable and wireless systems in the house. The admiration for the utilization of high-technology in the home-environment proposes a new life-style, high-standard of living, security, comfort as well as the complex infrastructure, specialized firms and skilled labor, technology-dependency, more consumption, and an ironic tie with nature.

Contrary to the use of sophisticated technology in housing, the solar house, constructed in 1996 in Güzelbahçe, Izmir (Okutucu 2002) and Durusu Park Houses by Ali Kerestecioğlu in Istanbul (Kerestecioğlu 1999; Tönük 2001) are unique instances with their passive solar design (Figure 5.16).

Title of the Project: Durusu Park Houses
Location: Durusu, Istanbul
Architects: Ali Kerestecioğlu

Figure 5.16 South-facing openings and a sunspace, and the use of timber as construction material minimize the heating loads of Durusu Park Houses in Istanbul, Turkey. **Photography** unnotified.

There are other passive solar housing projects such as Detached Eco-House Design by Çelik Erengezgin (Erengezgin 2002a), Eco-House Design for a competition in Canary Islands by Demet Irklı Eryıldız and Semih Eryıldız (Eryıldız 2003a; Irklı Eryıldız and Eryıldız 2001a), Energy Conscious Dwelling Design for the Climatic Conditions of Ankara by the research project held in Middle East Technical University in 1993 (Demirbilek et al. 2000), and Solar Housing Estate Proposal for Kayseri by Çetin Göksu (Göksu 1999) (Figures 5.17; 5.18). However, these latter projects were not constructed because they were mostly conceptual projects devoted to sustainable issues as a design proposal. Else the financial constraints stop the design and/or construction process. In this case, the solar residence in Izmir, currently in use, constitutes an exclusive precedent that was constructed by the private enterprise (Figure 5.19). The house has been monitored for six years in terms of the passive solar heating and cooling performances of the Trombe Wall, sun spaces and ventilation shafts. The architect

Title of the Project:
Detached Eco-House Design
Architect: Ça-Ba Design, Bursa (Çelik Erengezgin)

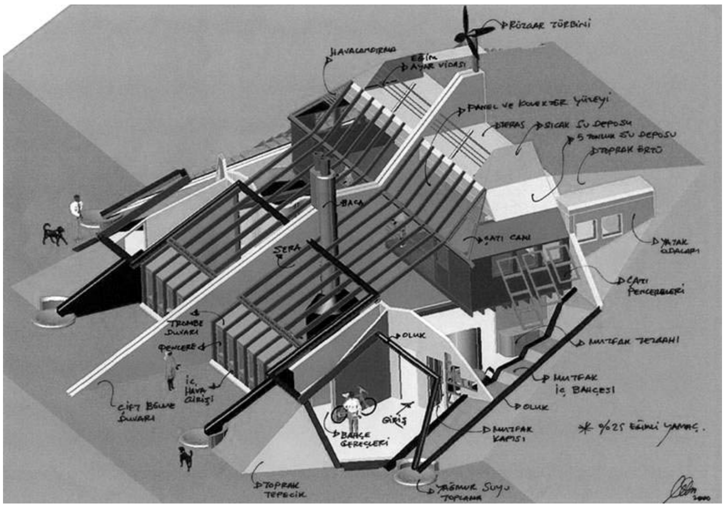


Figure 5.17 Eco-house project envisaging a self-sufficient, sustainable life style both by the ecological building and its residents. **Figure** Ça-Ba Design.

Title of the Project: Eco-House Design for International Competition on Bio-Climatic House for a Center in Canary Islands
Location: Canary Islands, Spain
Completed: 1995
Architects: Demet Irklı Eryıldız, Semih Eryıldız

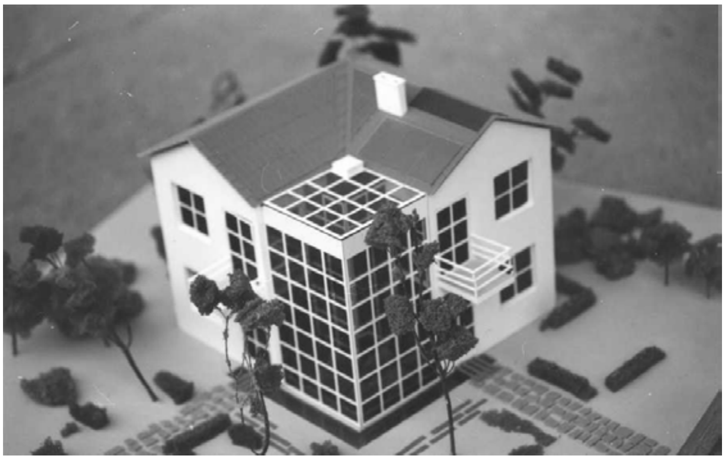


Figure 5.18 Eco-house design prioritizing energy efficiency, water management, and re-usable, healthy building materials to attain comfortable, qualified, aesthetic and healthy home environment. **Model** Demet Irklı Eryıldız and Semih Eryıldız, 1995.

Title of the Project:
Solar House
Location: Güzelbahçe, Izmir
Completed: 1996
Client: Kemal Demiröz
Architect: Fikret Okutucu

Figure 5.19 Solar House in Izmir, Turkey, permanently in use: the view of sunspace facing west and the Trombe Wall facing south. **Photography** Fikret Okutucu.

of the building, Fikret Okutucu, declares that the 11.6% budget increase in construction cost just to implement the passive system building components brings in 86% savings in heating expenditures: instead of the 2735 kg. fuel oil this building would consume in one heating season, now it consumes 150 kg. per season. Given the Izmir climate, the extra investment is ratified in five years and four months (Okutucu 2002).

5.1.3. Buildings in Earthquake Regions

Sustainability of life became an important concept for Turkey after the Gölcük earthquake in the Marmara region on August 17, 1999. Most of the reinforced concrete buildings collapsed, thus the building practices and related regulations to date had to be revised. Besides, a vital demand appeared for the accommodation of thousands of people, living in tent cities, who had lost their relatives and houses as well. To live with the possibility of an earthquake is now a critical approach for designers in Turkey. The new arrangements in the building sector consist mainly of the use of new materials and construction techniques, which are resistant to the impact of earthquakes. There are several efforts, experimental or practical, concerned with improving the lives of earthquake victims and maintaining life in the case of an earthquake.

Straw-bale buildings have been favored since the concern for fatal disasters became so intense in Turkey, because of its practical application in a short time. They are built of a cheap material, namely straw-bale that is easy to find and effortless to maintain without any need for skilled craftsmanship. The first straw-bale building, thus, was built at the end of a course and workshop study on ‘Straw-Bale Housing for Homeless People’ in central Turkey, Hasandede, Kırıkkale, 2000 (Eryıldız 2003a; Irklı Eryıldız and Başkaya 2000; Irklı Eryıldız 2001; Irklı Eryıldız and Eryıldız 2001a). The one-storey timber-frame building is, in fact, a demonstration project for similar housing projects in earthquake regions. Totally covering 40 m^2 areas, the building has a timber-skeleton system rising on stone foundations and covered with galvanized metal sheets; the walls are filled with straw-bales and plastered with a mud and straw mixture. The building is planned for occupation by the local governmental boards of the Hasandede town to serve the village as library or post-office (Figure 5.20).

Solar House and Science Park in the United Nations (UN) Tent City, Izmit, 2000 (“Izmit BM” 2000; “Solar House” 2003) is the other building which was constructed in March 2000 with the co-operation of the Clean Energy Foundation (“Clean Energy” 2002), two sponsors from the private energy sector, and Hacettepe University (Figure 5.21). It was financed by the UN Development Fund (UNDP), Global Environment Facility—Small Grants Programme (“GEF/SGP (1993-1999)” n.d.) as a permanent building at the center of the city of Izmit. The purpose of the building is to serve as a Science Park, i.e. as a scientific-

Title of the Project: Straw-Bale Building
Location: Hasandede, Kırıkkale; **Completed:** 2000
Architect: Demet Irklı Eryıldız
Contributing Organizations: Harman Anatolian Society for Ecology, Global Eco-Village Network (GEN) and Gazi Un., Dept. of Architecture
Trainer: Harald Weding
Builders: Workshop members, volunteers, and supporters of Harman Anatolian Society for Ecology

Figure 5.20 Constitution phase of walls of the first straw-bale building in Kırıkkale, Turkey, with straw-bales laid into timber frames of. **Photography** Zeynep Durmuş Arsan, 2001.

Title of the Project: Solar House and Science Park in the UN Tent City
Location: Izmit; **Completed:** 2000; **Main Sponsor**: UNDP-GEF/SGP
Contributing Organizations: Clean Energy Foundation, Turkey, KALDERA DAĞSAN Solar A.Ş., Konya, DUNASOLAR Photovoltaics, Hungary, and Hacettepe University Department of Physics Engineering

Figure 5.21 Multifunctional solar building in the UN Tent City, Izmit, for earthquake victims: the building was demolished by the municipality of Izmit. **Photography** Clean Energy Foundation.

experimental playing area, for the children living in the United Nations Tent City and to provide a lighted open area in the case of new earthquakes. The steel building is covered with 40 units of solar collectors and photovoltaic panels of 3kW. The electricity from photovoltaic panels is operated for the illumination of the building and the surroundings. The solar collectors supply the hot water for two shower cabins and a washing unit closer to the building.

The open area is designed as a park or gathering place to be lighted by electricity produced independently on site. Since the Gölcük earthquake occurred at 03.05 at night and the electricity was cut off, it was realized that some buildings and open areas should be designed not to be affected by any interruption of power whenever unusual events take place. Therefore, the project was first planned for the inhabitants of the tent camp to offer them a safe and comfortable built environment. The inner space functions as a science park area including games, sets and posters about simple scientific knowledge and experiments. This provides different social activities for people living in these tents for a while.

The self-build approach to sustainable housing, followed by Victor Ananias, Bora Topluoğlu and Nail Çakırhan as mentioned above, was a well-used method for the low-cost housing projects in the earthquake regions. For instance, *Imece* houses—a do-it-yourself project—are noteworthy in demonstrating the power of the civic engagement of villagers in constructing their homes themselves ("Dayanışmanın En Güzel Örneği" 2001; "İmece Evleri" 2003).[6] The 191 victim families from Hacı Süleymanbey, Aksu, Çay and Değirmentepe villages in Düzce, Adapazarı, whose houses were demolished in the Gölcük earthquake, came together to build their own houses. Additionally, the Beriköy housing project ("Beriköy" n.d.) in Söğütlü, Adapazarı, organized within the partnership of Habitat for Humanity International and the ÇEKÜL Foundation, has offered affordable housing opportunities to earthquake victims. The project housed a total of 69 families—50 permanently and 19 secondarily—selected out of 953 applicants (Figure 5.22). The primary selection criteria were to be 'the victim of the earthquake', 'homeless' and 'to be born within the boundaries of the province of Adapazarı'. In fact, the peculiarity of this housing project is the encouragement

[6] The name of the project, *imece*, in fact, symbolizes the solidarity, mutual help, collective work and togetherness in the traditional social structures, especially of the rural villages. The word *imece* means, "to gather to do the work of one person in cooperation, and then turn into the others' works to finish together respectively" (Ağakay 1966, p. 365).

of the do-it-yourself method by Habitat for Humanity. The system proposes the solidarity and collective work of neighbors—*imece*—and the integration of residents into the process of building construction will decrease the building cost. The proposed housing process actually conveys a sustainable development model focused on the realization of long-term credited—twenty years—social housing, particularly considering the economic, social and environmental health aspects of sustainability ("Beriköy" n.d.).

Moreover, some housing projects for the Gölcük region, the other region devastated by the same earthquake, were designed, but are yet to be constructed. In the project of sustainable housing for the victims of the Gölcük earthquake by Hülya and Ferhan Yürekli, the emblematic issue is the energy efficiency of the building (Figure 5.23); natural lighting and passive solar energy are prioritized by

Title of the Project:
Beriköy Housing Project
Location: Söğütlü, Adapazarı
Completed: 2000 and ongoing
Coordination: ÇEKÜL Foundation and Habitat for Humanity International

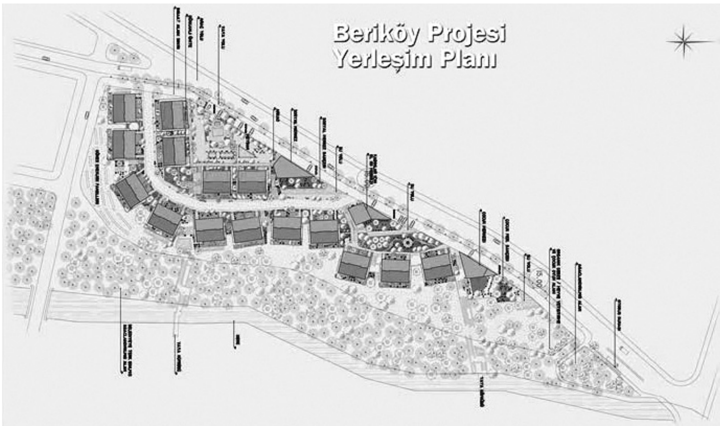
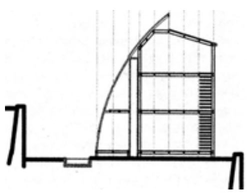


Figure 5.22 Site plan of Beriköy housing project in Adapazarı, Turkey, demonstrating the organization of fifty houses and three community centers. **Figure** unnotified.

Title of the Project:
Sustainable Housing Design for the Victims of Izmit Earthquake
Location: Değirmendere, Izmit; **Design:** 2000
Coordination: ÇEKÜL Foundation; **Architects:** Hülya and Ferhan Yürekli



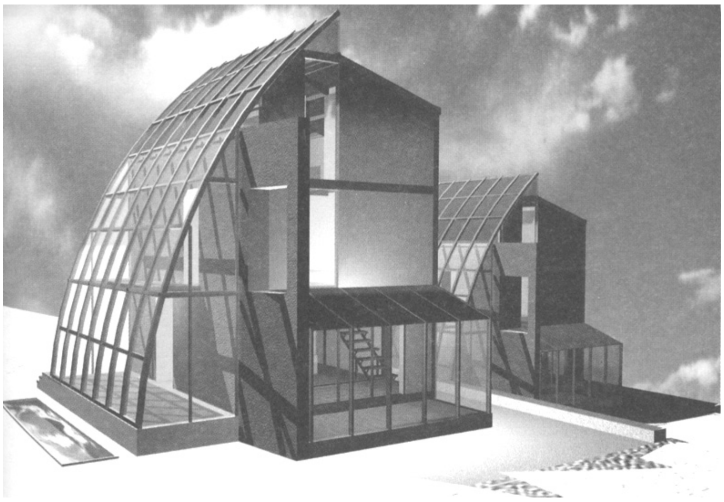


Figure 5.23 Passive energy systems characterizing the housing project on north-facing sloppy land of Izmit, Turkey: view of two-storeyed sunspace with Trombe Wall behind. **Figure** Cem Yardımcı.

integrating the Trombe Wall and sunspace into the design (Yürekli and Yürekli 2000).

5.1.4. Building for Touristic Purposes

Rising interest in environmentalism and awareness of global ecological problems affect the tourism sector in Turkey, too. Culture and nature tourism, in other words ecotourism, is a popular concept replacing classical tourism based on package programs at luxurious seaside hotels. According to the principles of ecotourism, tourism facilities should be planned with the conservation of the local characteristics of the site in mind. This approach to tourism inevitably cites the preservation of natural and built environments, especially in small vernacular settlements, as well as the maintenance of ecological, social and cultural values. It aims at asking tourists to become conscious about the unique characteristics of a region and to support their preservation.

The buildings for ecological tourism reflect a wide range of design approaches depending on the type of tourism facilities and the local characteristics of the land. Some embody distillation of the local cultural values, native traditional construction techniques, and material probity by consciously sensitive and respectful commentary which meets the contemporary needs and regional taste with the extant topography, materials and workmanship, as in Turgut Cansever's Demir Holiday Village in Bodrum, Muğla, (Al-Radi and Moore 1992; Bozdoğan 1997; Togay 2002) (Figure 5.24). Furthermore, the village houses, at the same time pensions, of the 'Living Earth' Project by Atilla Sevilmiş in Faralya, Muğla, have reinterpreted the vernacular way of constructing and sensitive choice of building material—e.g. no cement—for creating an ecological, healthy, self-sufficient village while embedding the buildings within a wholly pastoral environment far from any settlement (Durmuş Arsan 2002a; "Yaşayan Toprak" 1998) (Figure 5.25). The Durudeniz Holiday Village-Underground Houses in Hisarönü, Fethiye, Muğla, 2001, by Semih Eryıldız is also a case in point: most of the houses are embedded into the slopy land of the virgin forest facing to the Aegean Sea (Irklı Eryıldız and Eryıldız 2001a) (Figure 5.26). The architect is conscious of the necessity carefully to blend the housing units with the topography and natural landscape and to minimize the striking effect of human-made formations. That is why the roofs of underground houses are, for example,

Title of the Project:
Demir Holiday Village
Location: Bodrum, Muğla
Completed: 1987 and ongoing
Architects: Architects: Turgut Cansever, Emine Ögün, Mehmet Ögün, and Feyza Cansever
Client: Tuyako A.Ş., Istanbul

Figure 5.24 Articulation of local qualities through innovative and sensitive design and construction supports the cultural sustainability of the region as seen in Demir Holiday Village in Bodrum, Muğla. **Photography** Cemal Emden, 1992.

Title of the Project:
'Living Earth' Project-Village Houses
Location: Faralya, Fethiye, Muğla **Completed:** 2000 and ongoing
Coordinator: Atilla Sevilmiş
Architect: Ahmet Kizen

Figure 5.25 Village houses of the 'Living Earth' Project in Fethiye, Muğla, Turkey, designed as accommodation units in communal, ecologic and healthy living environment. **Photography** Zeynep Durmuş Arsan, 2000.

Title of the Project:
Durudeniz Holiday Village-Underground Houses
Location: Hisarönü, Fethiye, Muğla
Completed: 2001 (stopped)
Architect: Semih Eryıldız

Figure 5.26 Earth roof of underground houses in Durudeniz Holiday Village, Muğla, Turkey. **Photography** Zeynep Durmuş Arsan, 2002.

utilized as gardens, i.e. as “edible landscape” (Eryıldız 2003a, p.87). However, the project already contains a paradox due to its location: the habitat destruction in the forest ecosystem caused by this complex does not quite coalesce with the discourse of sustainability, especially with the ecological dimension of sustainability. Today the Durudeniz Underground Houses are abandoned, even though the construction of the buildings was almost completed. The project has had to face massive criticism and official obstruction since the site is located in both a First Degree Natural Conservation Area—*I. Derece Doğal SİT Alanı*—and the Fethiye-Ölüdeniz-Kıdrak Nature Park.

Others put emphasis on demonstrating the sustainable life of a village by arranging for visitors to live in the renovated buildings for at least three months, as in the Ma Vallée—*Vadim*: Alternative Village Tourism and Facilities Center in Karaburun, Izmir 2001 (D’hont Erem and Erem 2001; “Ma Vallée” 2002). Club Natura Oliva Hotel of Melike and Florian Koch in Aydın (“Club Natura Oliva” 2003) offers a gentle, mediating ambience close to Bafa Lake allowing meeting with nature in a spiritual manner. The Pastoral Valley Project in Fethiye, Muğla, by Ahmet Kizen, since 1999, also plans to build a group of pensions where the visitors may employ themselves in ecological agricultural facilities and participate in the daily work (Durmuş Arsan 2002a). The re-use of old traditional timber houses and living with local inhabitants make up another alternative approach which can be observed in the Karadeniz region. And lastly, a holiday may also be spent in a beautiful natural environment, yet in a totally artificial ‘village’ atmosphere, in the form or a package program in Naturland Eco Park & Resort Hotels in Kemer, Antalya (“Naturland” n.d.).

Most ecological tourism facilities consider the traditional building technologies of the region in terms of location, settlement pattern, street-building relations, building form, materials, connection details and some cultural properties. On the contrary, the others, very few in number, present imaginary built environments such as at the Naturland Eco Park and Resort Hotels, Antalya which do not belong to the context of the region. Popular tourism approaches give rise to imitations that are inconsiderate of architectural syntax and disrespectful of vernacular pattern. The eclectic design approach to traditional architecture and natural environment also produces completely kitschy examples (Figure 5.27).

Title of the Project:
Naturland Eco Park and Resort Hotels
Location: Çamyuva, Kemer, Antalya
Completed: 1998
Client: Cemil Çakmaklı
Architect: Nedim Dikmen
Interior Design: Ali Erten

Figure 5.27 Growing tree-columns of Forest Hotel in Naturland complex, Antalya, Turkey. **Photography** Zeynep Durmuş Arsan, 2000.

The idea of ecological tourism in Turkey presents an opportunity that can guarantee the continuity of traditional building patterns, sustainability of local life and economic cycles in small-scale vernacular settlements, if well-treated by sensitive and intelligent hands, experts, and inhabitants. A local sustainabilityproject, i.e. an eco-tourism program of Winpeace (Peace Initiative of Women from Turkey and Greece), newly started in July 2003 in Karaburun, Izmir, for example, defined a target group, women from the several villages of Karaburun, to facilitate the home-pensioning in their houses, in order to contribute to their livelihood and thus, the rural sustainability of the region ("Kadınlar, EGE'nin İki Kıyısını Birleştiriyor" 2003). First of all, these kinds of projects enable the visitors to be introduced to the local cultures explicitly. This causes the inhabitants to possess their living environment, while they carry out the economic sustainability of the settlement. Therefore, ecotourism in Turkey should obtain more encouragement because of its role in sustaining the rural built environment, but at the same time, be carefully monitored in order not to cause cultural deterioration.

5.1.5. Public Buildings

Sustainable discourse echoed through a few low-energy, energy-efficient, less-polluting, environmentally friendly, self-sufficient and/or intelligent public buildings in Turkey. The frontier building, Murat Reis Cultural Center and Passive Ventilated Public WC of the Murat Reis Mosque in the Hatay district, for example, are located in the dense urban fabric of Izmir, open to prevailing winds from the West, especially the *imbat* wind in summers (Okutucu 2002). This passively heated and cooled low-energy building relies on the ambient energy sources, particularly the solar and wind energies. The two-storeyed cultural center has a conference hall (414 seats) on the first floor and a reading room in a small library (210 seats) on the second. In the design of the building, the solar energy for passive heating was utilized by using the Trombe Wall on both floors of the south façade and the green house with dense planting on the second floor near the same façade (Figure 5.28). For passive cooling, the ventilation chimneys set in the double-walled surrounding core of the building, the windscoop—wind-catcher—on the roof and the horizontal channels on the ground level were used (Peker and Durmuş 1999a).

Title of the Project:
Murat Reis Cultural Center and Passive Ventilated Public WC of Murat Reis Mosque
Location: Hatay, Izmir
Completed: 1991
Client: Murat Reis Culture Association
Architect: Fikret Okutucu

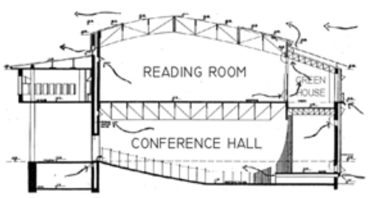


Figure 5.28 Circulation of air heated by Trombe Walls and the green house at the west façade, and sucked by ventilation chimneys at the east façade (winter case) in Murat Reis Cultural Center, Izmir, Turkey. **Photography** Zeynep Durmuş Arsan, 1999. **Figure** Fikret Okutucu.

The combination of passive and active systems to supply the energy demand becomes an obligatory design strategy, especially if a building is located in vacant, virgin or extreme geographies. The Turkcell Transmitter Station

Building in Ikizada Island, Bodrum, Muğla (Irklı Eryıldız and Eryıldız 2001a), where there is no electricity, for instance, expresses a wise solution to supply energy demand by photovoltaics and wind tribunes. The functionally angled large plane of solar panels characterize the building, and the hidden small stone room in the backyard of this plane offer a calm space for mechanical equipment (Figure 5.29).

Title of the Project: Turkcell Transmitter Station Building
Location: Ikizada Island, Bodrum, Muğla **Completed:** 2000
Client: Turkcell
Architects: Demet Irklı Eryıldız and Semih Eryıldız

Figure 5.29 Building self-sufficient in electrical energy on Ikizada Island, Muğla, Turkey. **Photography** Semih Eryıldız.

Many buildings for commercial purposes specifically celebrate the precepts of ecological design as the initial design concept: Değirmen Farm and Restaurant complex in Kuşadası, Aydın and the Saklıköy Country Club in Polonezköy, Istanbul are examples. The Saklıköy Country Club, for instance, has a simple, yet clear architectural expression of adobe bricks re-interpreting the old load bearing construction technique in the hotel building ("Saklıköy Country Club" 2002). What is more important here is the image of the complex combining many commercial functions, including the restaurant, the adobe hotel with 20 beds, the seminar and course rooms for ecological living and organic agriculture, and the horse training and care center with the healthy, ecological, traditional, and modest built environment ("Saklıköy" 1998).

The Solar Valley Project ("Güneş Vadisi" 2003) by the Group of Anatolian Sun—*Anadolu Güneşi*—from Ankara, also termed the Solar Society ("Anadolu Güneşi" 2003), is a recent proposal unique with its concern for social sustainability and local development. Its intention is to enable the realization of academic research and intellectual debates on sustainability and solar energy in architecture. Indeed, the project is planned as an education, scientific research and application complex which aims at proving the local sustainability of Balaban

Valley in Ankara, the rehabilitation of economic and cultural context in the villages of the region, the conservation of Balaban Valley and the efficient and non-polluting use of scarce resources. The Solar Valley Project is composed of seven complementary projects, viz. the Balaban Valley, the data bank and measurement center, research on the biological diversity of the region, the bio-diesel production, the biogas production, the ecological research center, the exploration and sustainable use of ground water resources. Similar to the intent of the proposal in Ankara, 4E—Energy+Ecology+Education+ Economy—Building proposal for Sabancı University in Istanbul, initiated by Ateş Uğurel from ARES, Inc.—Advanced Renewable Energy Systems—is the demonstration project of environmentally friendly technologies utilizing renewable energy forms, e.g. wind, solar, hidro and biomass ("Projects: 4e" 2003) (Figure 5.30). Besides, the building functions as a model house prioritizing passive solar design, natural lighting, water treatment, purification of rain water into potable water, energy and resource saving, ecological furniture and textile products, and recycling techniques ("Sabancı Üniversitesi'nde Ekolojik Merkez" 2002).

Title of the Project:
4E (Energy+ Ecology+ Education+Economy) Building Proposal
Location: Sabancı University, Istanbul
Client: Sabancı University
Coordinator: ARES Inc. (Advanced Renewable Energy Systems), Ateş Uğurel

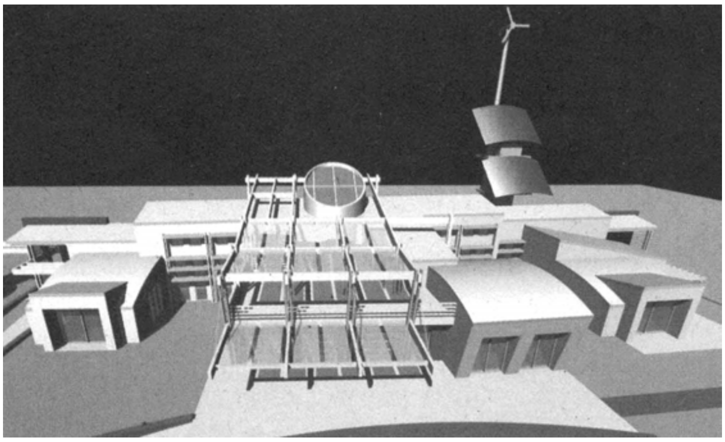


Figure 5.30 Pioneering ecological center project in Sabancı University as model for further sustainable projects in Istanbul, Turkey. **Figure** unnotified.

The ecological approaches to high-rise buildings may be discussed within a limited platform through such proposals as Özdilek Hotel and Shopping Center Proposal in Izmir, and the Greater Municipality of Istanbul, and the Turkish Ministry of Environment Service Building Designs in Ankara. In the first project, the preliminary design prepared by Ça-Ba Design, added a green concept to this high-rise building situated in a large even green field at Inciralti, Izmir. The architect, Çelik Erengezgin, integrated a natural ventilation system for meeting both the functional requirements and the aesthetic needs by designing a ventilation core at the center of the building while visualizing the tower with spirally stepped green platforms (Figure 5.31). Yet this ecological concept was rejected by the client of the Hotel complex (Erengezgin 2002b). Besides, the latter two samples, the Greater Municipality of Istanbul (Figure 5.32) and Turkish Ministry of Environment (Figure 5.33), actually convey a revolutionary, untried design strategy for the governmental buildings through two different architectural competitions. By the design approach, the architects Demet Irklı Eryıldız and Semih Eryıldız intend to attract governmental bodies' as well as other colleagues' attention to sustainable design. They explain the reason of the conceptual background of this attitude as specific to the project of Ministry of Environment: "A building such as that of a Ministry of Environment, which must serve as model and symbol, is compelled to implement planning and design that target radically diminished energy consumption, and it must do so infinitely more effectively than the thousands of similar projects the world over" (Eryıldız 2003a, p. 88). Truly, both proposals prioritize southern exposure, the greening of the interior with a wise water strategy, photovoltaics as energy supplier and as a ready-reserve, the integration of passive heating and cooling energy systems through combining the inner courtyard and the sunspace, the preference of building material for energy efficiency, and so on (Irklı Eryıldız and Eryıldız 2001b).

In the junction of high-rise building and the concept of sustainability, it is also essential to evaluate the critical position of intelligent buildings in the sustainable architectural practice of Turkey. The qualitative and quantitative improvement in the building sector of Turkey in terms of design, construction, monitoring and maintenance of buildings, and the change in user profile and business demand enabled the erection of limited number of intelligent buildings in Turkey. Indeed, most cases of intelligent buildings are business complexes, or mixed developments including business, residence and shopping functions. They propose an independent, self-reliant atmosphere within the city center by providing maximum comfort and offering livable, elaborated, healthy working and living environments. In this context, the Metrocity Millenium Residence and Business Center, Sabancı Center, Türkiye İş Bankası Headquarters complex, and Sabah Media Plaza are cases in point: these buildings have specialized building management systems using productions of digital technology. The systems are

Title of the Project: Özdilek Hotel and Shopping Center Design
Location: Inciraltı, Izmir
Client: Özdilek Shopping Centers and Textile Inc.
Architect: Ça-Ba Tasarım, Bursa (Çelik Erengezgin)

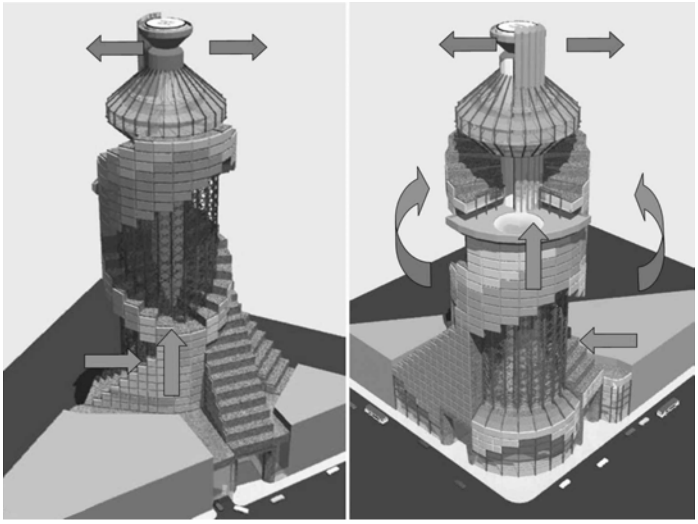


Figure 5.31 Ecological high-rise building proposal for Özdilek Hotel and Shopping Center in Inciralti, Izmir, Turkey. **Figure** Çelik Erengezgin.

Title of the Project: Greater Municipality of Istanbul Service Building Design
Location: Istanbul
Client: Greater Municipality of Istanbul
Architects: Demet Irklı Eryıldız, Semih Eryıldız

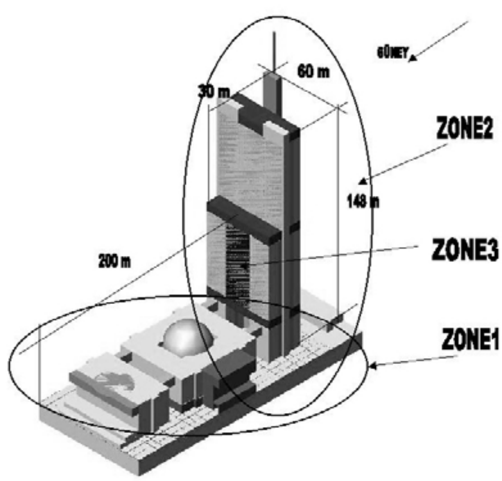


Figure 5.32 Axonometric view of Greater Municipality of Istanbul Service Building, Istanbul, Turkey, indicating distinct energy strategies of three zones of building. **Figure** Demet Irklı Eryıldız and Semih Eryıldız.

Title of the Project: Turkish Ministry of Environment Service Building Design
Location: Ankara
Design: 2001
Architect: Semih Eryıldız, Demet Irklı Eryıldız; (Competition Award Winner Project, February 2001)

Figure 5.33 Model of Turkish Ministry of Environment Service Building Project in Ankara, Turkey. **Model** Semih Eryıldız and Demet Irklı Eryıldız, 2001.

designed peculiarly to those buildings so as to facilitate the realization of various functions of a building and to provide utmost inner comfort. The heating, cooling, ventilation, security, fire protection and communication systems of the buildings are managed from the one control center. For example, Metrocity Millenium Residence and Business Center, 2000, in 4. Levent, Istanbul, by Doğan Tekeli, attracts attention with its automation systems such as fire precaution sensors, security cameras, alarm and ventilation systems, as well as the quality of materials used, so as to create user-friendly and well-equipped spaces (Zağpus 2002) (Figure 5.34). The Sabancı Office Complex in Istanbul, 1993, by Haluk Tümay and Ayhan Böke, moreover, has an energy distribution system which permits flexible office organization, and a computer-controlled maintenance and repair system that considers economy in energy use (Figure 5.35). The Türkiye İş Bankası Headquarters complex 2000, in 4. Levent, Istanbul, by Doğan Tekeli and Sami Sisa, applies complex strategies for wise-use of energy in any equipments of the automation system (Kınıklı 2001) (Figure 5.36). Lastly, Sabah Media Plaza in Mecidiyeköy, Istanbul, is a long four-storey horizontal building housing the offices and printing facilities for the Sabah Newspaper. The architect, Mehmet Konuralp, considers logical functionality, flexibility, comfortability and health issues in the office design by well-treated daylighting and noise control strategy, silicone filtered façade elements, minimizing voice, heat and water permeability, and the social center for the use of the building's occupants (Konuralp 1992).

In fact, in these buildings, the image of intelligent building is identified with the intelligent construction techniques and intelligent equipments; in other words, with the furnishing of the operational systems of the building with the latest technologies. Tönük points out that, "according to a conviction current today particularly in Turkey, what lends a building its 'intelligence' is the use of computerized systems" (2003b, p. 81). It would be indeed erroneous to claim that the systems that render a building intelligent readily insure its coherence with ecological principles. The intelligent buildings discussed in the framework of the present dissertation consist of superior, evolved products of ecologically oriented architecture that are geared toward the upgraded standards of building toward sustainable developmental polices (Tönük 2001). On the other hand, these buildings cannot with certainty be identified as particularly successful examples of sustainable building practice in Turkey. In fact, they symbolize the

Title of the Project: Metrocity Millenium Residence and Business Center; **Location:** 4. Levent, Istanbul
Completed: 2000
Architectural Project: Doğan Tekeli & Sami Sisa
Interior Design: Antony Belluschi Architects LTD.
Contractor: Gümüşsuyu-Bisaş Partnership & Yüksel Construction Inv.
Contractor Firm: Metrosite Construction Consultant Service Company; **Structural Engineer:** Balkar Engineering

Figure 5.34 View of Metrocity Millenium Residence and Business Center, Istanbul, Turkey. **Photography** Anıl Köksal.

Title of the Project: Sabancı Center
Location: 4. Levent, Istanbul
Completed: 1993
Client: Hacı Ömer Sabancı Holding A.Ş.
Contractor: Koray Group of Companies
Architect: Haluk Tümay & Ayhan Böke
Structural Engineer: KHP König, Heunisch und Partner
Interior Design: Swanke Hayden Connell Architects N.Y.

Figure 5.35 View of Sabancı Towers, Istanbul, Turkey. **Photography** Faruk Koçak.

Title of the Project: Türkiye İş Bankası Headquarters Complex
Location: 4. Levent, Istanbul
Completed: 2000
Client: Türkiye İş Bankası
Preliminary Design: Doğan Tekeli & Sami Sisa
Construction Project: Swanke Hayden Connell International, USA
Interior Design: The Hillier Group, USA

Figure 5.36 View of Türkiye İş Bankası Towers, Istanbul, Turkey. **Photography** Burç Acar.

of the homo-centric attitude prioritizing creative comfort, health and luxury as the topmost target while using non-recycled materials that are products of high-embodied energy consumption, are disrespectful of the principle of optimum use of scarce resources, disregard environmental assessment issues and ecosystem damage which the buildings themselves cause, are impervious to the peculiar climatic conditions of the site, lack an energy policy based on renewables and energy-efficiency, fail to combine the natural conditioning systems with artificial heating, cooling and ventilation systems, and lack sustainable water and waste management strategies.

5.2. Sustainable Architecture in Turkey by Governmental Enterprise

The role of formal bodies in sustainable architecture in Turkey is more in the way of funding opportunities for the development of experimental energy-conscious buildings, even though they are limited in number. These examples are designed and constructed by public institutions, especially by the universities and research centers of varied governmental organizations. In this section, we shall look at those projects which, as projects already, were initiated by governmental enterprise. As we have seen in the preceding section, quite a few of the sustainable projects initiated by communities are, in Turkey, not only co-funded by government but also supported by sharing information and know-how. Examples include the Solar House and Science Park in the UN Tent City in Izmit and the Straw-Bale Building in Kırıkkale.

5.2.1. Solar Buildings

The energy crisis of the early 1970s in Turkey directed much research toward renewable energy sources and their utilization in buildings. Since the most abundant energy renewal form in Turkey is solar energy, the experiments concentrated mostly on the latter's utilization. Thus experimental solar houses have been built in various locations of Turkey since 1974. The renewed interest caused by the environmental crisis of the last decade enlarged the scope of research on clean and renewable energy sources and their use in energy-conscious buildings. Such buildings are designed to apply both passive and active ways of heating, cooling and ventilation and to minimize energy consumption and costs. These experimental solar applications can retrospectively be listed as follows:

1. Middle East Technical University Solar House in 1975-1976, Ankara, by the design team including academicians from the Department of Architecture and Department of Physics (Demirbilek et al. 1997a; Demirbilek and Irklı Eryıldız 1999; Ecevit and Demirbilek 1994) (Figure 5.37)

2. Marmaris MTA (Mineral Research and Exploration Center of Turkey) Solar Energy Laboratory in 1977, Muğla, and Marmaris MTA Chemistry Laboratory by MTA Solar and Wind Energy Research Center in the same campus (Demirbilek and Irklı Eryıldız 1999; Sönmez 1982)

3. Ege University Solar Energy Institute in 1978, Izmir, consultant Gürbüz Atagündüz (Atagündüz 1989; Demirbilek and Irklı Eryıldız 1999; "Ege University" n.d.; "Solar Energy" 2003; Peker and Durmuş 1999b) (Figure 5.38)

4. Çukurova University Solar House in 1981, Adana, by the Department of Physics (Altun 1982; Altun 1985; Demirbilek and Irklı Eryıldız 1999) (Figure 5.39)

5. Ankara Solar House in 1993, Yenimahalle, Ankara, by Melih Tan (Demirbilek and Irklı Eryıldız 1999; Tan 1993a; Tan 1994a; Tan 1994b; Tan 1997) (Figure 5.40)

6. Erciyes University Solar House in 1996, Kayseri, system design by Necdet Altuntop (Altuntop 1996; Altuntop and Demiral 1998; Demirbilek and Irklı Eryıldız 1999), and Erciyes University 80th Year Atatürk Sports Hall in 2000, Kayseri, system design by Necdet Altuntop and Yusuf Tekin (Tekin and Altuntop 2001) (Figures 5.41; 5.42)

7. Hacettepe University Solar House and Solar Garden in 2003, Ankara, by Yeni ve Temiz Enerji Uygulama ve Araştıma Merkezi (YETAM) ("Hacettepe Üniversitesi" 2003; İnan 2003) (Figure 5.43)

8. Photovoltaic Applications on the Roof of Turkish House Restaurant and Library Building in Muğla University in 2002-2003 by Research and Application Center of Clean Energy Resources of the same university (Bayrak 2003)

Aside from these buildings located in university campus areas, there is also the Scientific and Technical Research Council of Turkey (TÜBİTAK) Solar House proposal, which was designed by Aydın Boysan in 1978, with solar collectors and a winter garden facing the South (Tönük 2001). This single storey, one-family house intended for construction on TÜBİTAK's own campus was conceived as an experimental residence with research and testing facilities

Title of the Project: Middle East Technical University (METU) Solar House
Location: METU, Ankara
Completed: 1976
Design Team: Academicians from the Department of Architecture and Department of Physics, METU
Builders (partly): The students in the second class of Department of Architecture, METU

Figure 5.37 Middle East Technical University Solar House in Ankara, Turkey, as a hybrid system comprising a greenhouse as the passive element and warm air circulation by a fan through the sloped air collector as the active element. **Photography** Zeynep Durmuş Arsan, 2001.

Title of the Project: Ege University (EU) Solar Energy Institute
Location: EU, Bornova, Izmir
Completed: 1978
Consultant: Gürbüz Atagündüz

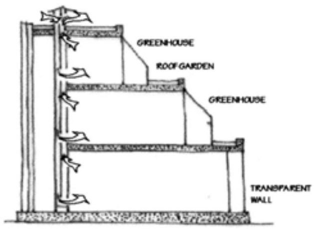


Figure 5.38 South-facing, detached building blocks stepped to form 'V' shape in the plan and receding greenhouses allowing maximum gain of solar energy in Ege University Solar Energy Institute, Izmir Turkey. **Photography** Zeynep Durmuş Arsan, 1999. **Figure** Nur Demirbilek and Demet Irklı Eryıldız.

Title of the Project: Çukurova University (ÇU) Solar House
Location: ÇU, Adana
Completed: 1981
System Design: ÇU, Department of Physics (Ziya Gökalp Altun)

Figure 5.39 Two Trombe Wall applications on the south façade indicating the main entrance of Çukurova University Solar House, Adana, Turkey. **Photography** Emin Onur Yavuz, 2002.

Title of the Project: Ankara Solar House
Location: Yenimahalle, Ankara
Completed: 1993
Client: Greater Ankara Municipality BELKO Group of Companies
System Design: Melih Tan
Occupier: Energy Saving Information Center, Greater Ankara Municipality, BELKO Group of Companies

Figure 5.40 Demonstration building in Ankara, Turkey, for opposite sunspaces and passive solar air heating system developed by Melih Tan. **Photography** Zeynep Durmuş Arsan, 2000.

Title of the Project: Erciyes University Solar House
Location: Erciyes University, Kayseri
Completed: 1996
Occupied: Erciyes University, Department of Mechanical Engineering, Energy Conversion and Application Centre
System Design: Necdet Altuntop

Figure 5.41 Solar system based on vertical, roof forced-air collectors determine the form of Erciyes University Solar House, Kayseri, Turkey. **Photography** Zeynep Durmuş Arsan, 2001.

Title of the Project: Erciyes University 80th Year Atatürk Sports Hall
Location: Erciyes University, Kayseri
Completed: 2000
System Designers: Necdet Altuntop, Yusuf Tekin

Figure 5.42 Renovation project of sports hall in Erciyes University, Kayseri, Turkey: addition of active solar heating system based on sloped-wall forced-air collectors on the southern façade of the building. **Photography** Zeynep Durmuş Arsan, 2001.

Title of the Project: Hacettepe University Solar House **Location:** Hacettepe University Beytepe Campus Area, Ankara **Completed:** 2003 **System Design:** Hacettepe University, Department of Physics Engineering, Prof. Dr. Demir İnan **Occupier:** H.Ü. Yeni ve Temiz Enerji Uygulama ve Araştıma Merkezi (YETAM)	

Figure 5.43 Hacettepe University Solar House in Ankara, Turkey, utilizing photovoltaic panels that supply the electrical energy demand of the building. Linear fresnel lenses focus solar energy and convert it into the heat which is stored for winter use in the bedrock under the building. **Photography** unnotified.

incorporated. It could not be realized, however, owing to economic restraints. Finally, the number and distribution of experimental buildings in Turkey indicate that the encouragement of research on energy-conscious buildings is insufficient. Despite very numerous attempts at projects that end up realized or unrealized, like the central governmental boards, local governmental bodies and universities do not have specific, long-term, and consistent policies to plan and support sustainable building.

Remarkably, the TÜBİTAK National Observatory Guest House is situated on completely uncultivated land far from any settlement at the top of Bakırlıtepe Mountain (2465 m.) in Saklıkent, Antalya (Akoğlu 1999; Demirbilek 1997b; Şahmalı et al. 1998; "TUBITAK National Observatory" 2003). The Observatory Complex is used both in winter and summer (Figure 5.44). Especially the Guest House reflects the strong impact of climate at this altitude: the walls are constructed of local stone functioning as a thermal mass; the orientation and shape of the building is organized so as to utilize solar energy for passive heating in winter and at night year-round. As a result, the building is designed in harmony with local climatic conditions using construction materials mainly available on site. BELKO Solar Building in Güvercinlik, Ankara (Tan 1997), furthermore, was constructed in 1993 as an administration building of BELKO, which was established by the Greater Municipality of Ankara to improve the air quality in the city of Ankara (Figure 5.45). The building is situated in the coal stock and

Title of the Project: TÜBİTAK National Observatory Guest House
Location: Bakırlıtepe (2465 m.), Antalya
Completed: 1997
Client: TÜBİTAK
Design Team: GÜNARDA Enerji ve Yapı Araştırma ve Danışma A.Ş., Ankara (A. Erkan Şahmalı); F. Nur Demirbilek and Mehlika İnanıcı (METU, Department of Architecture)

Figure 5.44 South-facing stone building in Bakırlıtepe, Antalya, proving the applicability of passive systems in extreme geographic and climatic conditions. **Photography** Kadri Uygar Candemir, 2000.

Title of the Project: BELKO Solar Building: Administration Building of BELKO Coal Store
Location: Güvercinlik, Ankara
Completed: 1993
Client: Greater Ankara Municipality BELKO Group of Companies
System Design: Melih Tan
Occupier: BELKO Coal Store and Distribution Unit

Figure 5.45 Sunspace enclosing all façades of BELKO Solar Building in Ankara, Turkey. **Photography** Zeynep Durmuş Arsan, 2000.

distribution area. Therefore, the two-storeyed building is covered with sunspaces on all façades to provide both passive solar energy gain and protection from the coal dust so as to maintain clean offices. The BELKO solar building uses an 'opposite sunspaces passive solar air heating system', which was put to use also in the Ankara Solar House, applied in the northern and southern sunspaces. Here the system was applied to the eastern and western sunspaces. The simple working principle is explained as,

> [a]n opposite sunspaces passive solar heating system has been developed to provide passive solar heating in multistory buildings. The system envisages the natural transfer of the solar energy gained in the

southern sunspace of an apartment to the northern glazed space through air ducts placed in the ceiling and floor (Tan 1997, p. 127).

The designer of this system, Melih Tan, stresses that this innovative system could be repeated in the new apartment buildings of Ankara to minimize the heating load of each respective flat (1993b). However, this rational idea did not become realized and the interest of the Greater Municipality of Ankara decreased because of the change in the sympathy of the local governmental bodies after local elections (Durmuş Arsan 2000).

In fact, even if most of the experimental energy-conscious buildings in Turkey are valuable on account of their pioneering design solutions, they are open to discussion in terms of their architectural quality. Because teams composed of engineers, excluding architects, designed some of these buildings, they have poor representation of spatial quality and lack *Zeitgeist*. Moreover, the building material and construction system are generally limited to the reinforced concrete skeleton system which is the most prevalent building construction method in Turkey and, with this choice, the buildings are far from expressing any ecological point of view except for their emphasis on energy. As a consequence, it is difficult to evaluate architecturally these various buildings constructed by research groups.

5.2.2. The Village-Towns: *Köykent*

The *köykent* (village-town) Project, on the other hand, is a kind of rural development scheme focusing on the provision of rural sustainability and is co-ordinated by the Ministry of Housing and Public Works. It is a large-scale development project to produce programs for alternative rural living environments, projecting the sustainability of rural life within the perspective of a better life. Projects are based on a network of self-sustaining villages, which have agricultural economic systems in different rural regions of Turkey.

The idea of the village-town was first elaborated systematically as a project in the early 1970s by Cumhuriyet Halk Partisi (The People's Republican Party) as the means of the economic development of entire rural Anatolia. Already at its inception, the project conceived of local economic empowerment along with reform of the land-ownership system, development of commercial and trade co-operatives marketing local produce and other products, educational facilities, professional training, utilization of resources, and building. Gülçubuk points out that, “the village-town implementation was foreseen, in the 1977 program of the People’s Republican Party, as the prime scheme for rural development nation-wide” (2002, p. 13). As prime-minister heading the party, Bülent Ecevit determined, Gülçubuk adds, “that the model be initiated in Mesudiye” (2002, p. 14).

The *köykent* was planned as a “precaution scheme” against the large-scale migration from rural to urban areas in Turkey (Gülçubuk 2001, p. 10). To halt the emigration to cities, caused by the insufficient supply of services and the lack of job opportunities in rural regions, was, and remains, the first aim of this project. Secondly, the project encourages the return of emigrants, the displaced villagers, to their rural homes in which inhabitants will have better occupations, educational chances, completed infrastructure and improved living conditions than on the fringes of cities, and can resume their livelihoods. Therefore, the settlements are constructed both for the villagers of the rural regions and the potentially returning migrants currently living in worse conditions in the cities. They provide opportunities for the continuity of economic growth and the sustainability of current social life as opposed to the deterioration of cultural values seen in the urban areas (Ekinci 2001).

The program anticipates combining the potential of a group of adjacent villages by forming mutual co-operations for the development process. At the same time, it facilitates broadening public services throughout the rural areas of Turkey. The proposed scheme is based on the “assembl[y of] a number of villages around a specific, more central settlement (a town or a village) to produce and provide more efficient public services. Out of this central settlement, services such as postal delivery, health, primary and secondary education will be provided” (“National Report” 2002, n.p.).

At present, a pilot project continues in Mesudiye, Ordu, supported by a loan from the World Bank fund for rural development projects (“Köykent Görücüye Çıktı” 2002). Gülçubuk (2002) explains that nine villages of the Mesudiye district co-ordinated their resources, human and otherwise, to constitute a confederation, sharing infrastructure, water network, social and cultural centers, and roads. The local government fulfiled the public requirements, e.g. the school, hospital, and small workshop or factory, in one of the districts. The villagers of Mesudiye have supported and sustained the program from the beginning.

In point of fact, the *köykent* project advocates an ideal for the self-sustainability of rural settlements. Contrary to this basic theme, however, it undervalues the ecological point of view within both social structure and built environment. The project does not notice ecologically sound alternatives to planning and construction of a settlement. As regards affordable housing, the new buildings are constructed as a skeleton system with reinforcement instead of traditional construction techniques. The production of energy and the use of renewable energy sources are still not considered. The recycling of organic wastes on a community level is also ignored. The architectural proposals in this project, therefore, cannot be regarded as wholly sustainable buildings.

Actually, it is contradictory that the governmental boards sustain the idea of rural development by the *köykent* project, as they have no formal national policy based on sustainable ruralization. Even if this project serves to decrease migration, there is still the obvious fact that city life exerts a gravitational force in terms of sources of income, and thus the urban migration continues as usual. Up to now, it has proved insufficient as an alternative solution to the paradox created by the occupation of rural areas by urban citizens, while the population growth in the cities originates from rural immigration. Even though the development program of the *köykent* project intends to ensure the sustainability of rural settlements, the policies for architectural concerns proposed do not cohere with the sustainable viewpoint. Thus the project clearly needs to be reconsidered in terms of not only the social, ecological, and economic dimensions of sustainability and the conditions of Turkey, but also, of course, the architectural.

5.3. Evaluation

The approach pursued in this chapter—namely, examining the practice of sustainable architecture in Turkey along the axis of the private enterprise-government enterprise polarity—has offered a number of evidential clues that will enable an approach to the material in terms of the two crucial questions established previously: what to sustain? and how to sustain? This evaluation will briefly discuss the rather ‘special’ place of sustainable architecture in Turkey. Specifically, the role of governmental bodies in Turkey in the creation of sustainable building accumulation has been quite insufficient, being far removed from any position we might identify as leading, ‘vanguarding’ and encouraging.

This fact places the Turkish government far afield in a comparison with those of most northern, even quite a few southern countries. Particularly with respect to the number of sustainable projects supported, one may readily conclude that the goal of sustainability occupies no place whatsoever among the developmental strategies, prioritized goals, agenda for environmental protection, and policies for urban development of the Turkish state. Instead, we have found that individual efforts come to the fore quantitatively (Table 5.1). These, however, are small-scale projects devoted to specific, even narrow functions.

When evaluating the place given to sustainability in building activities in Turkey, the fundamental criterion for clarifying the state of affairs ought to be 'need'. In other words, in order to decipher what various sustainable projects in fact try to sustain, this chapter first of all tried to understand Turkey's needs. For example, Turkey is a country located at the crossroads of various earthquake zones and has always had to cope with circumstances arising thence. It is therefore adamant that any building project take this factor into utmost consideration. This consideration is for Turkey a 'need'. But it was only with the 1999 Gölcük earthquake that the sustainability of human life came to be recognized as a criterion for building activities, and thus it gave rise to the first instances of sustainable buildings in earthquake regions. Thus the span of examples offered here are significant in demonstrating which needs have propelled which planes of building activity in the country. The examples lay bare which needs are prioritized and, as significantly, to what areas of life the discourse of sustainability is perceived to respond. On the said basis, the examples of sustainable projects in Turkey may be tabulated as in Table 5.2.

On the other hand, when we examine the span of this national panorama, we may also observe the needs which are ignored against the background of Turkey's current economic, social, cultural, and ecological circumstances. Only a few of these projects are concerned with the physical deterioration of current settlements, issues arising from the urbanization of rural areas, social transformations or disruptions, problems of migration, scarcity of affordable housing, environmental degradation, pollution, and so on. In this context, one may argue that most sustainable practices in Turkey occur on a plane dissociated from the rampant problems stemming from the above and derive most immediately from a desire for speedy industrialization and acquisition of economic affluence.

Table 5.1 Classification of sustainable building practices in Turkey according to their clients: private enterprise and government enterprise

Sustainable Architecture in Turkey by Private Enterprise

- 4E—Energy+Ecology+Education+Economy—Building, Istanbul
- Ahmet Kizen House, Muğla
- Alkent 2000 Recreational Town, Istanbul
- Ankara Güneş-Köyü, Ankara
- Aqua Manors Smart Homes, Istanbul
- Beriköy Housing Project, Adapazarı
- Bora Topluoğlu House, Sakarya
- Club Natura Oliva Hotel, Aydın
- Competition Project of Turkish Ministry of Environment, Service Building, Ankara
- Değirmen Farm and Restaurant Complex, Aydın
- Demir Holiday Village, Muğla
- Detached Eco-House Design
- Durudeniz Holiday Village-Underground Houses, Muğla
- Durusu Park Houses, Istanbul
- Eco-House Design for Competition
- Eco-Tourism Program in Karaburun, Izmir
- Eko Foça-Foça Ecological Village, Izmir
- Energy Conscious Dwelling Design for the Climatic Conditions of Ankara
- Erol Toprak House, Muğla
- Flora Digital Project, Istanbul
- Greater Municipality of Istanbul Service Building, Istanbul
- Green Valley Housing Cooperative, Afyon
- Harman Balaban Eco-Village Project, Ankara
- Hocamköy Eco-Village Project, Kırıkkale
- İmece Houses, Adapazarı
- Kargı Log Houses
- Kırlık Village Project, Muğla
- ‘Living Earth’ Project-Village Houses, Muğla
- Ma Vallée—*Vadim*: Alternative Village Tourism and Facilities Centre, Izmir
- Metrocity Millenium Residence and Business Center, Istanbul
- Muammer Karakaş Residence, Ankara
- Murat Reis Cultural Center and Passive Ventilated Public WC of the Murat Reis Mosque, İzmir
- Nail Çakırhan Residence, Muğla
- Naturland Eco Park and Resort Hotels, Antalya
- Nesrin and Osman Tok House, Konya
- Özdilek Hotel and Shopping Center Design, Izmir
- Pastoral Valley Project
- Sabah Media Plaza, Istanbul
- Sabancı Center, Istanbul
- Saklıköy Country Club, Istanbul
- Serhat Akbay House, Izmir
- Solar House and Science Park in the United Nations Tent City, Izmit
- Solar House, Izmir
- Solar Housing Estate Proposal for Kayseri
- Solar Valley Project Proposal, Ankara
- Straw-Bale Building, Kırıkkale
- Sun-Rock—*Güneşkaya*—Solar House Design, Kayseri
- Sustainable Housing Design for the Victims of Izmit Earthquake, Izmit
- Tepekent Experimental Ecological Village Design, Istanbul
- Turkcell Transmitter Station Building, Muğla
- Türkiye İş Bankası Headquarters Complex, Istanbul
- Two Houses in Bodrum, Muğla

Sustainable Architecture in Turkey by Governmental Enterprise

- Ankara Solar House, Ankara
- BELKO Solar Building, Ankara
- Çukurova University Solar House, Adana
- Ege University Solar Energy Institute, Izmir
- Erciyes University 80th Year Atatürk Sports Hall, Kayseri
- Erciyes University Solar House, Kayseri
- Hacettepe University Solar House, Ankara
- Köykent Project, Various Locations of Turkey
- Marmaris MTA Chemistry Laboratory, Muğla
- Marmaris MTA Solar Energy Laboratory, Muğla
- Middle East Technical University Solar House, Ankara
- Muğla University, Photovoltaic Application on the Roof of Turkish House Restaurant and Library Building, Muğla
- TÜBİTAK National Observatory Guest House, Antalya
- TÜBİTAK Solar House Design

Table 5.2 Classification of sustainable building projects—both building and design—in Turkey according to their respond on Turkey's needs

Eco-Villages

- Ankara Güneş-Köyü, Ankara
- Eko Foça-Foça Ecological Village, Izmir
- Harman Balaban Eco-Village Project, Ankara
- Hocamköy Eco-Village Project, Kırıkkale

Private Houses and Housing Groups

- Ahmet Kizen House, Muğla
- Alkent 2000 Recreational Town, Istanbul
- Aqua Manors Smart Homes, Istanbul
- Bora Topluoğlu House, Sakarya
- Detached Eco-House Design
- Durusu Park Houses, Istanbul
- Eco-House Design for Competition
- Energy Conscious Dwelling Design for the Climatic Conditions of Ankara
- Erol Toprak House, Muğla
- Flora Digital Project, Istanbul
- Kargı Log Houses
- Kırlık Village Project, Muğla
- Muammer Karakaş Residence, Ankara
- Nail Çakırhan Residence, Muğla
- Nesrin and Osman Tok House, Konya
- Serhat Akbay House, Izmir
- Solar House, Izmir
- Solar Housing Estate Proposal for Kayseri
- Sun-Rock—*Güneşkaya*—Solar House Design, Kayseri
- Tepekent Experimental Ecological Village Design, Istanbul
- Green Valley Housing Cooperative, Afyon
- Two Houses in Bodrum, Muğla

Buildings for Earthquake Regions

- Beriköy Housing Project, Adapazarı
- İmece Houses, Adapazarı
- Solar House and Science Park in the United Nations Tent City, Izmit
- Straw-Bale Building, Kırıkkale
- Sustainable Housing Design for the Victims of Izmit Earthquake, Izmit

Buildings for Touristic Purposes

- Club Natura Oliva Hotel, Aydın
- Demir Holiday Village, Muğla
- Durudeniz Holiday Village-Underground Houses, Muğla
- Eco-Tourism Program, Izmir
- 'Living Earth' Project-Village Houses, Muğla
- Ma Vallée—*Vadim*: Alternative Village Tourism and Facilities Centre, Izmir
- Naturland Eco Park and Resort Hotels, Antalya
- Pastoral Valley Project

Public Buildings

- 4E—Energy+Ecology+Education+Economy—Building, Istanbul
- Competition Project of Turkish Ministry of Environment, Service Building, Ankara
- Değirmen Farm and Restaurant Complex, Aydın
- Greater Municipality of Istanbul Service Building, Istanbul
- Metrocity Millenium Residence and Business Center, Istanbul
- Murat Reis Cultural Center and Passive Ventilated Public WC of the Murat Reis Mosque, İzmir
- Özdilek Hotel and Shopping Center Design, Izmir
- Sabah Media Plaza, Istanbul
- Sabancı Center, Istanbul
- Saklıköy Country Club, Istanbul
- Solar Valley Project Proposal, Ankara
- Turkcell Transmitter Station Building, Muğla
- Türkiye İş Bankası Headquarters Complex, Istanbul

Solar Buildings

- Ankara Solar House, Ankara
- BELKO Solar Building, Ankara
- Çukurova University Solar House, Adana
- Ege University Solar Energy Institute, Izmir
- Erciyes University 80th Year Atatürk Sports Hall, Kayseri
- Erciyes University Solar House, Kayseri
- Hacettepe University Solar House, Ankara
- Marmaris MTA Chemistry Laboratory, Muğla
- Marmaris MTA Solar Energy Laboratory, Muğla
- Middle East Technical University Solar House, Ankara
- Muğla University, Photovoltaic Application on the Roof of Turkish House Restaurant and Library Building, Muğla
- TÜBİTAK National Observatory Guest House, Antalya
- TÜBİTAK Solar House Design

Village-Towns: *Köykent*

- Nine Villages of the Mesudiye District, Ordu

These practices may be described as sterile projects that do not respond to the question of the meaning of sustainable practicing in Turkey. Once the respective location of the so-called sustainable buildings are taken into consideration, moreover, most specimen are seen to avoid the issues described above and are built in sterile environments. People dissatisfied with the urban life of big cities, for example, tend to constitute private or communal living domains on the edge of cities, which display rural or semi-rural characteristics. What attracts them to such sites are the natural beauty and the virginal, healthy ecosystem. For this reason, the majority of sustainable building samples in Turkey are projects located in rural regions or on the periphery of urban areas. Moreover, the solar houses, which constitute the overwhelming majority of sustainable practices, are units constructed at universities for purposes of scientific research and are thus far removed from any 'real-life' deployment (Table 5.3).

It is difficult to assess the examples discussed in the present chapter with respect to which aspects of the concept of sustainability—social, ecological, spiritual, aesthetic or economic—have been implemented in the design strategy. This mainly owes to the fact that most of the examples are buildings whose initial design problem is not sustainability, yet the key concepts for sustainable design are adhered to, albeit unconsciously and unintentionally. Only a very few of these examples constitute applications in which the sustainable viewpoint is the main starting point for the project. A closer look at which aspects and criteria derive directly—and intentionally—from a notion of sustainability, moreover, will find that even fewer display signs of a holistic view of the criteria. Güneşkaya, the Hocamköy Eco-village, the Pastoral Valley are the projects that may be said with certainty to implement a holistic approach, including a view of sustainability as a project for social transformation. These projects aim at actualization within local reality.

It may be concluded that the precepts posed by the concept of sustainability have not been scrutinized or comprehended properly. This statement may be comprehended by looking at how the examples respond to the question of how to sustain. The first point to be made with respect to the coalescence of the Turkish instances with the framework constructed in the preceding chapter, consisting of regionalism, building technology, project initiators and participatory agenda, is that most of the buildings take up sustainability as mere technique

Table 5.3 Classification of sustainable building projects—only the constructed ones—in Turkey according to their location as urban areas, rural or semi-rural areas, and the university campus areas

Sustainable Building Projects in the Urban Areas

- Ankara-Ankara Solar House
- Ankara-BELKO Solar Building
- Istanbul-Metrocity Millenium Residence and Business Center
- Istanbul-Sabancı Center
- Istanbul-Türkiye İş Bankası Headquarters Complex
- Izmir-Murat Reis Cultural Center and Passive Ventilated Public WC of the Murat Reis Mosque
- Izmit-Solar House and Science Park in the United Nations Tent City
- Konya-Nesrin and Osman Tok House

Sustainable Building Projects in the Rural or Semi-Rural Areas

- Afyon-Green Valley Housing Cooperative
- Ankara-Güneş Köy-Ankara Sun Village
- Ankara-Muammer Karakaş Residence
- Antalya-Naturland Eco Park & Resort Hotels
- Antalya-TÜBİTAK National Observatory Guest House
- Aydın-Club Natura Oliva Hotel
- Aydın-Değirmen Farm and Restaurant Complex
- İmece Houses, Adapazarı
- Istanbul-Alkent 2000 Recreational Town
- Istanbul-Durusu Park Houses
- Istanbul-Sabah-Media Plaza
- Istanbul-Saklıköy Country Club
- Izmir-Eko Foça: Foça Ecological Village
- Izmir-Ma Vallée—Vadim—Alternative Village Tourism and Facilities Centre
- Izmir-Serhat Akbay House
- Izmir-Solar House
- Izmit-İmece Houses
- Kırıkkale- Hocamköy Eco-Village Project
- Kırıkkale-Straw Bale Building
- Muğla-'Living Earth' Project: Village Houses
- Muğla-Ahmet Kizen House
- Muğla-Demir Holiday Village
- Muğla-Durudeniz Holiday Village-Underground Houses
- Muğla-Erol Toprak House
- Muğla-Kırlık Village Project
- Muğla-Marmaris MTA Chemistry Laboratory
- Muğla-Marmaris MTA Solar Energy Laboratory
- Muğla-Nail Çakırhan Residence
- Muğla-Pastoral Valley Project
- Muğla-Two Houses in Bodrum
- Ordu- *Köykent* Project
- Sakarya-Bora Topluoğlu House
- Turkcell Transmitter Station Building, Muğla

Sustainable Building Projects in the University Campus Areas

- Adana-Çukurova University Solar House
- Ankara-Hacettepe University Solar House
- Ankara-Middle East Technical University Solar House
- Izmir-Ege University Solar Energy Institute
- Kayseri- Erciyes University 80th Year Atatürk Sports Hall
- Kayseri-Erciyes University Solar House
- Muğla-Muğla University, Photovoltaic Application on the Roof of Türk Evi Restaurant and Library Building

while failing to take into consideration the real agenda of the discourse of sustainability. The meaning of sustainable building is here tantamount to the use of technologically sophisticated systems geared toward the quantitative reduction of energy consumption as seen in the Flora Digital Project to ornament the building interior or exterior with 'green' elements as experienced in Tepekent Experimental Ecological Village Design, Özdilek Hotel and Shopping Center Design, attend to landscaping such as in Alkent 2000 Recreational Town and Aqua Manors in Istanbul, attend to the naturally vulnerable ecosystem as seen in Durudeniz Underground houses and the use of natural material, e.g. timber, without considering its locality as in the Kırlık houses.

Sustainability sometimes becomes equated with use of automated and other high technology systems and materials: it is imagined that the latest example of a tall, impressive modern-day building is, by definition, sustainable. In fact it is a controversial subject that the erection of 'prestige buildings' at centers of financial activity, such as Istanbul, is as frequent as the buildings constructed with local materials and craftsmanship in small traditional settlements. Some buildings are imitations representing the discourse of sustainability imported from the North such as Metrocity Millenium Residence and Business Center, Sabancı Center, Türkiye İş Bankası Headquarters, and Sabah Media Plaza. They are intelligent buildings minimizing energy consumption and providing maximum comfort conditions by using special automation systems, and within these qualities they can be enumerated as sustainable. However, in Turkey, the number of intelligent applications is already limited, and the image of the 'intelligent' does not correspond to that of those ecologically designed abroad, which were constructed through the upgraded building standards adopted to the national sustainable development policies. It is wrong to accept the image of these smart buildings as suitable sustainable building practice for Turkey. They tend to treat the concept of sustainability, by definition, morphologically.

On the other side, small-scale, modest buildings such as the Erol Toprak House, two Bodrum houses, village houses of the Living Earth Project, and Demir Holiday Village at which we have looked above and are authentic ones signifying a contextualist approach based on local sustainability. The designers or architects of these buildings in Turkey are aware of tendencies that are already sustainable in the local building culture. Buildings realized by NGOs are relatively few in number (Table 5.4). Moreover, those realized by international partnerships are fewer in number than those realized by national NGOs only. The concept of user participation does not figure in the projects. Participation of dwellers on any far-reaching social scale is insufficient with the exception of the fact that dwellers construct their houses themselves. User participation in the construction phase is observable in the eco-village projects such as seen in Hocamköy Eco-Village Project, Straw Bale Building in Kırıkkale, the private houses of Bora Topluoğlu, Victor Ananias, and Nail Çakırhan, and larger scale housing projects in earthquake regions such as Beriköy and the İmece Houses.

To conclude, the limited number of sustainable buildings constitutes samples to present better solutions and design tools for new buildings in Turkey. Because sustainable buildings in Turkey all express the uniqueness of the Turkish case.

5.4. Suggestions for the Development of Sustainable Building Activity in Turkey

Turkey has many levels of difficulty in establishing sustainable building practice, while there are also a number of promising initiatives and projects. The country faces massive problems in sustaining the economy, as well as with the unplanned growth of cities. However, from the existing practices in sustainable architecture, it can be understood that it is not just a lack of funding that is the major block; it is the overall lack of awareness, including of the architects, that is the real problem.

It is obvious that only a few projects so far have been encouraged or directed by formal bodies; and there is an urgent need for active governmental involvement in establishing a sustainable human environment. The role of official bodies in establishing environmental policies for the building sector may be itemized as follows:

1. Government needs to place more emphasis on economic instruments and information tools to improve energy efficiency.
2. Government needs to pay special attention to developing instruments for existing buildings with significant energy-saving potential.
3. Government needs to lead the way through studies on environmental labeling of buildings or building materials.

Table 5.4 The list of sustainable architectural practices in Turkey initiated by a NGO and its various partnerships

National NGOs:	**Title of the Project:**
▪ Murat Reis Culture Association	Murat Reis Cultural Center and Passive Ventilated Public WC, Izmir
▪ Balaban Housing Cooperative	Harman Balaban Eco-Village Project, Ankara
▪ ÇEKÜL Foundation	Sustainable Housing Design for the Victims of Gölcük Earthquake, Izmit
▪ Eko Foça Ecological Living Group	Eko Foça-Foça Ecological Village, Izmir
▪ Group of Anatolian Sun	Ankara Güneş-Köyü, Ankara
▪ Group of Anatolian Sun	Solar Valley Project, Ankara
▪ Hocamköy Ecological Life Cooperative	Hocamköy Eco-Village Project, Kırıkkale

NGO-International Organization Partnerships:	**Title of the Project:**
▪ Habitat for Humanity International and ÇEKÜL Foundation	Beriköy Housing Project, Adapazarı
▪ Hollanda Gelderland State Council and Volunteers of Solidarity, Izmit	İmece Houses, Adapazarı
▪ Winpeace-Peace Initiative of Women from Turkey and Greece and Evmir Culture Foundation	Eco-Tourism Program in Karaburun, Izmir

NGO, International Organization, Private Enterprise, and/or University Partnerships	**Title of the Project:**
▪ Clean Energy Foundation, Turkey; DUNASOLAR Photovoltaics, Hungary; KALDERA DAĞSAN Solar A.Ş., Konya, Turkey, and Hacettepe University, Physics Engineering Department	Solar House and Science Park in the UN Tent City, Izmit
▪ Harman Anatolian Society for Ecology, Turkey; Eco-Village Network (GEN) and Gazi University, Department of Architecture	Straw-Bale Building, Kırıkkale

4. Government needs to monitor the actual performance of buildings so that the related official authorities can understand the precise effect of policy instruments and receive guidance for future improvements.

5. Government needs to understand that no single instrument, e.g. the emphasis only given to thermal comfort, will solve the problems and they need to take a holistic approach by integrating various instruments to create an effective sustainable building policy package.

The other aspect is the building codes which have not yet been rewritten according to sustainable principles. The only available regulation, viz. heat insulation, is not applied in buildings properly because of the incapability of supervision and lack of a control mechanism by local governmental boards.

Furthermore, current design and planning practices in Turkey work against sustainability and fall short in terms of quality. Norms in the building industry for long-term durability, thermal comfort, indoor air quality and access to daylight, for instance, must be improved upon. Planning requirements and building designs ignore the complex interrelationships between the built environment and the natural world, especially in the subjects of waste, water, energy, material and land use. The current planning requirements and legislative aspects do not obligate anyone to restore harmful results of decisions that influence land use.

In point of fact, the current legislation in Turkey allows the development of sustainable planning and building practices. Since 1985, the by-law has already permitted planning activities unique to the local context and specific for a place.[7] Yet the main problem rises from the absence or insufficiency in the number of architects or planners who make efforts to realize sustainable building and planning practices in Turkey. For this reason, it is wrong to relate the ineffective state of sustainable architectural discourse in Turkey merely to the deficiency of building codes, norms and regulations, and to disregard the lack of awareness and sensitivity of designers to sustainable concerns.

Supposing the continuation of this state of the art, various strategies for new sustainable solutions in Turkey should be determined. Further studies should concentrate more on the following aspects:

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[7] See item 2 in *3030 Sayılı Kanun Kapsamı Dışında Kalan Belediyeler Tip İmar Yönetmeliği -RG [Official Gazette], 02.11.1985 - 18916 [Type By-Law Regulation for the Municipalities left out the law by the number of 3030]-RG [Official Gazette], 02.11.1985 - 18916 (1985).* Ankara: Başbakanlık Mevzuatı Geliştirme ve Yayın Genel Müdürlüğü Yayınları.

1. The extra attention paid to urban sustainability issues in Turkey: there is a limited number of operations for sustainable urbanization in both urban design and city planning scales. Especially there is no attempt for housing problems of urban settlements, as well as of the rural ones, whose major question is to integrate new housing possibilities into existing patterns toward the continuity and betterment of the ongoing way of life and its built environment. To this end, sustainable regeneration and rehabilitation studies on urban form, i.e. urban upgrading, should be promoted. Moreover, importance should be given to new housing projects in the cities to stop the spread of private housing in rural areas and to minimize the ecological footprints in both the agricultural and natural landscapes. In order to overcome the trend for escaping from cities, the co-housing or low-rise ecological housing groups, in the city center should be developed so that one may desire and prefer to live in. In this context, the interest groups from different segments of a society, especially the governmental bodies, local authorities and academicians in universities, have an essential role in the sustainable building activities to become widespread.[8]

2. More importance given to rural sustainability: there is a limited number of projects for rural sustainability in small towns in Turkey. Sustainable building projects in rural areas should be supported in terms of stopping the large-scale immigration through urban settlements. Since the concept of sustainability involves forming a sustainable way of life by assuring not only the economic but also social, cultural, ecological, spiritual dimensions, the revaluation of existing buildings and the supervision of new architectural practices will satisfy the rural people and enliven the living environment. As mentioned in the *Proposal for Support Progamme for Eco-Habitats as Living Examples of Agenda 21 Planning*, the strategy may be two-fold:

> (a) to maintain and re-establish the sustainability of existing rural communities, including job creation. This will slow down, but not stop, urbanisation

[8] In fact, there is a national initiative, namely Ecoarchitecture Platform—*Ekomimarlık Platformu*—led by the academics and architects. This is a civic initiative aiming at the spread and realization of ecological design and sustainable development principles among not only the architectural practices but also various sectors, including development policies, governance, educational activities, and so on. Up to now, the platform met three times in Bursa, Izmir and Ankara. Furthermore, it is worth mentioning that the current Turkish eco-villagers and people of eco-village initiatives convene with the EKILAT (Communication Network of Eco-Villages in Turkey)—*Ekoköyler İletişim Ağı*—meetings annually to discuss the existing problems of eco-villages, developments and to develop common activities.

> (b) to create models for establishing low cost, locally constructed, affordable housing in sustainable eco-villages on the peripheries of the mega-cities in order to better absorb the influx of people (*The Earth Is Our Habitat* 1996, n.p.).

3. Development of a critical view for the widespread trend in sustainable architecture of Turkey: the most common approach seen in sustainable examples in Turkey is to build new ecological private houses. The inhabitants of these houses migrate from cities to rural areas and, then, cause the spread of urban form. The damage to natural ecosystem should always be considered.

4. The respect for the continuity of vernacular sustainable settlement: the lack of importance given to conservation of current vernacular sustainable values constitutes the greatest problem for local sustainability of settlements in Turkey. The integration of new buildings, functions and spaces into the old should be carefully considered. The owners and craftsmen should reconsider the traditional life cycle and building technologies of the region in terms of building form, location, settlement pattern, street-building relations, building materials, connection details and some cultural properties.

5. The encouragement of use of local materials: there is a rising interest in the traditional craftsmanship and construction techniques within the use of local materials such as timber, stone, mud brick and brick in sustainable buildings of Turkey. The use of local materials and the continuity of traditional construction techniques should be the precept for the new sustainable buildings.

6. The use of local and renewable energy sources in sustainable buildings: there is insufficient endeavor for the use of renewable energy sources in both architectural design and building industry of Turkey. Due to a favorable geographic location, Turkey can take advantage of solar energy. The production of energy and the use of renewable energy sources, however, are not still considered properly. Especially the use of local energy sources produced independently on site should be an essential subject in terms of the self-sustainability of settlements. The experiments in both passive and active ways of heating, cooling and ventilation should be encouraged by the universities and non-governmental organizations. Minimization of energy consumption and costs in building may awaken public interest in the subject.

7. The lack of a sustainable building industry in Turkey: the building industry is still not taking up the concept of sustainability as part of mainstream

business. Besides, there is no governmental council to help move the Turkish building industry toward more sustainable practices. Active governmental encouragement is needed. Its support is important to the inclusion of possible measures to encourage the industry to close the loop of product cycles and take ecological dimensions into consideration during product design.

8. At the same time, it is clear that the building traditions in most rural or semi-rural parts of Turkey, even now, are more environmentally friendly and sustainable than today's more modern alternatives. Local building materials and craftsmanship have been used, resulting in almost no transportation costs or energy being required. However, these traditional building methods are today becoming lost, as they no longer meet the required image for the twenty-first century. This is indeed a great problem, as it also means losing regional cultures and a whole way of life. Alternatively, the traditional building methods in Turkey need to be more standardized and mechanized, as without this, these sustainable practices, even in rural areas, are impossible.

CHAPTER 6
DESIGN PROCESS PROPOSAL

6.1. Definition of the Problem

Against the background of international formations in sustainable architecture in the context of the latter's history, theory, and practice, Chapter 5 has focused on the dynamics and potential of realization of sustainable building in Turkey. To attach this quest to a single, one-sided definition of sustainable architecture under the hegemony of the 'developed' northern countries, we have argued, simply means to overlook the potentials of a more comprehensive, global strategy for approaching local sustainability. It is no longer evident that the pursuit of sustainable design is a multi-partite endeavor of both the northern and southern countries, as seen in Chapter 4 (Du Plessis 2001). Therefore, the strategy here is to turn to careful consideration of the special qualities of a site so as to achieve sustainable architecture at the local level.

It should be noted, moreover, that the idea of a sustainable locality is multifaceted, and only feasible if broader development plans and programs for regional or national sustainability are ensured. In the case of strategic sustainable planning, it is reasonable to position any building for sustainability in a more comprehensive framework. Here the essential mission of sustainable architecture becomes to empower the ongoing program. When there are no distinctive strategies or programs prepared in national, regional or settlement scale, the sustainable building project should pioneer the constitution of these strategies as in the case study this dissertation envisions for Seyrek, Izmir, Turkey.

When designing and constructing an architectural project aiming at sustainability in Seyrek, it is crucial to develop a vision for local sustainability specific to that case and to define concrete strategies for this vision. This vision will in turn enable decision-making regarding the extent to which the goal of sustainability may be implemented under the given circumstances. These are the sensitive aspects which may subject the project of designing a housing development in Seyrek to compromise. Since Turkey is a country in the process of industrialization and Seyrek is a settlement strongly affected by this process, the vision of this dissertation may be summarized as the search for 'optimum' sustainable solutions. This vision indeed points out a fundamental stance for the integration and implementation of sustainable development objectives in various cases in Turkey. According to this vision of sustainability, the preliminary strategy is the consideration of accessibility, i.e. the determination of accessible sustainable targets which are enough to be sustainable. This means that the project to be prepared ought to accept, from the start, that it will be the better one among a series of bad options; it must adopt a humble approach that knows not to emulate the elaborate, mature, precise, well-designed and well-constructed sustainable building examples, and is aware of the difficulties it will have to shoulder. The 'feasibility' of the project in Seyrek, the 'applicability' of the project targets, and the possibility that in the last analysis it may after all be deemed a 'successful' sustainable development project above all is contingent upon adopting such humble approach from the start.

The approach thus described also happens to reflect this author's own conception of sustainability and constitutes the clear expression of her thinking on making sustainable sense of architecture. Parallel to the problems stemming from the industrialization process in Turkey, there are already numerous developments in Seyrek and the surrounding area, which are quite in contradiction with the concept of sustainable development. This dissertation does not privilege the stance that might ignore or reject these developments. On the contrary, it deals with these incidents as the starting point of the design; it accepts the inevitability of these practices. Thus it avoids the pursuit of a sterile project in a sphere fraught with problems. The point to which this dissertation intends to draw ultimate attention is the fact that an approach that sustains awareness that extant errors present a set of determinants that compel one to pursue the best among a series of bad options is itself a sustainable approach. This vision of sustainability indicates a reflexive critical stance toward the field of the project.

In this context, many case-specific factors such as the architectural tradition of Seyrek and preferences in the building technology, the social structure, tendencies in the source of income, significance of agricultural activities, the spread of the city, Izmir, the pollution and the polluters, loss of biodiversity, expanding industrial zones—all determine the specific vision of sustainable development that may be conceived for housing design in Seyrek. In that sense, when identifying the sustainable peculiarities of the project, one ought to avoid the use of clichéd impressions of sustainability such as energy-efficient, climatically responsive, environmentally friendly. Instead it is better to delineate a set of sustainable notions in reference to the case area such as the efficient use of water toward the problem of dropping ground water level, two-storeyed, load bearing buildings for minimizing the risk caused by earthquakes, or site organization regarding the settlement pattern of Seyrek against present planning decisions. So as to comprehend this vision, one may first seek the answer to the question, 'what qualities will a project have that aims at sustainability and is not to be designed in Seyrek?' One then may compare the two responses.

To avoid making sterile projects, there are two inter-connected concerns that follow from this vision and that must be briefly clarified within the scope of designing a sustainable housing development in Seyrek. The first of these is the correct identification of the design problem posed by the housing development—in other words, making clear the exact definition of the design problem in Seyrek. Second is the development of the design tools along a specific process. While the first of these involves determining the needs deriving from the context of local sustainability in Seyrek, i.e. what to sustain in Seyrek, the second involves the nature of the process of design and construction to be pursued, i.e. how to sustain in Seyrek.

The production of concrete policies and designs for local sustainability is characterized by variable methods and techniques. Selman (1996, p. 57) divides the methods for devising local sustainability roughly into two, namely "decision-support," which relate mainly to scientific data and trends, and "process-aiding," which refer to partnership, awareness, and participation. The first group of methods addresses more scientific, rational, managerial and quantitative schemes, while the others are primarily concerned with facilitating citizen involvement in the debates and decisions. Additionally, the former gives more formal expression to vague concepts, provides firm information about the problems and uses this information as the basis for deriving policy options. The latter, on the other hand, embrace creating visions, resolving conflicts and building consensus. They envision enabling lay people to participate in the process along with the help of specialists. Selman exemplifies some techniques for local sustainability, such decision-support methods as "state of environment reports, internal audits of environmental performance, […] and environmental assessment" and such process-aiding methods as "means of engaging public participation and debate, creation of networks and partnerships for environmental action and focus groups" (1996, p. 58).

These adaptable techniques for local sustainability have also inspired many to develop particular design and construction strategies which facilitate the integration of the sustainable field of data into the discipline of architecture. In line with the two methods, the resulting design attitude may be based on a comparatively top-down approach utilizing the expert decision-support techniques, or it can adopt a bottom-up approach in the predesign stages in an attempt at envisioning and consensus-building. In most cases, both of these overlap to a considerable extent; it is likely that the selection of strategies is subject to adjustment and refinement of economic, social, cultural, ecological, spiritual and aesthetic peculiarities of the case.

To carry out a sustainable architectural project entails conducting ultimate descriptions of the method, along with the design and construction stages, one which is sufficiently flexible to adapt to local circumstances. If it is to succeed in approaching the goal of local sustainability, to cope with various existing or foreseeable problems, pressures and immediate needs, and to manage a wider scope of data, the sustainable design practice needs a particular guideline identifying the essential question: how to sustain (Mendler and Odell 2000).

This guideline should not only describe the design process, but also ensure the correct definition of the design problem by keeping in view the other critical question, what to sustain. It deals with the accuracy of the definition of the problem, more particularly, with accurate determination of the scope of the project and the perception, conception and classification of context-specific question(s) in the project site (Mendler and Odell 2000).

It is essential, therefore, to identify the capacity framework of the case area, since a serious capacity investigation signifies and frames the role of sustainable architecture for which primary problems need to be addressed. The capacity of building stock and infrastructure, capacity of natural resources and wildlife habitats, capacity in relation to social impact or traffic, for example, inform us about the limits of acceptable change and the threshold of an area to sustain a particular activity or level of use. In terms of a sustainable architectural activity, careful analysis of the case area will identify the capacity of the project area, its capabilities and potentials, strengths and weaknesses. In a capacity framework study for a sustainable architectural project, one can benefit from one extant analysis technique, namely the SWOT analysis based on the "examination of strengths, weaknesses, opportunities and threats faced by the operator [designer]" for that particular case area (Selman 1996, p. 74).

It should be noted that the capacities and thresholds are then translated into context-specific, primary targets and objectives of a project, and the correct identification of them leads to the success of a sustainable building project regardless of whether or not it causes acceptable, appropriate change.

In conclusion, the attempt to accomplish sustainable architecture in Turkey should respect both a well-defined scope and capacity framework study, and a particular design scheme for the sustainable end product. The case-specific sustainable targets, the possible design solutions and the steps required for these solutions, should be presented in a logical sequence.

This study thus puts forward a design process proposal related to two certain problems in realizing sustainable architecture in Seyrek, Turkey: one is the definition of the design problem, and the other is the application of the particular design scheme. In the preparation of this proposal, the basic reference consists of the lessons taken from not only the potentials and successes, but also the failings and faults of sustainable architectural practices in Turkey and abroad, presented in the previous chapters.

6.2. Determination of What to Sustain and How to Sustain

The following proposal sets a vision and course of action for the integration and implementation of sustainable development objectives in the architectural discipline, and thus suggests specific actions, targets, and investigations. It will describe how the project will monitor steps in terms of designing a sustainable architectural project.

This systematic approach does not imply a rigid process. The number of parameters can vary in line with the locality, yet in such a way that the sequence between the phases remains constant. The proposal requires a remedy to these four concerns:

1. summarize key ecological, social, spiritual, aesthetic and economic issues relevant to the project objectives and specify the project development outcome(s);

2. describe which key stakeholders will participate in the project;

3. describe how consultations with professionals, collaboration with NGOs, CBOs, private sector representatives and the inhabitants will be involved in the project;

4. describe the institutional arrangements which will be provided to ensure the achievement of sustainable development outcome(s).

The design process proposal is divided into three phases:

1. Phase of goal-setting: This is the goal-setting phase for the delivery process of sustainable design. The stage including the determination of the project's preliminary goals, limitations and priorities posed by the case area establishes a strong foundation so that the project may be successful in the implementation phase. In a broader sense, this stage identifies the environmental, financial and social goals specific to the case, while itemizing the unique factors that will direct or instruct the preliminary goals, the primary targets, unavoidable tasks, and at the same time, the subsequent programming stage.

This stage has a broader scope in the design process than in the conventional designs. Because the attainment of sustainable built environment demands more inclusive preparation phase, this phase is composed of four phases, namely collecting the team, defining preliminary goals, identifying limitations, and lastly, specifying the goals and clarifying the priorities and inevitable tasks.

In terms of *collecting the team*, this is the configuration phase of the design team. Sustainable design process requires a collaborative effort and multidisciplinary relationships covering diverse fields of interest and experts from the basic sciences. The design team is identified for the objective of the project and the qualities of the case area, yet the possible composition of members can be formed by adjustable combinations of the architect, planner, landscape architect, civil, mechanical, environmental and energy engineer, biologist, sociologist, economist, and artist (Mendler and Odell 2000). Here the architects lead the design activities; they assist the users in clarifying their design objectives and requirements and in facilitating the design programming process.

The specialty consultants, moreover, can supplement the team, and expedite the development process of design. They may differ according to the project and the expertise within the core team. Specialists in earthquake design, for example, may supplement the knowledge of more conventional civil engineers in the design team. Similarly, consultants familiar with the local land and development costs or financing options can assist in defining realistic financial expectations early in the process.

Ideally, it is better to be able to put together an entire team of individuals already experienced and committed to sustainable design. When this is not possible, one may resort to constituting a design team made up of individuals and firms exhibiting commitment to improve design toward sustainability (Mendler and Odell 2000). A positive attitude toward creating a new and innovative project is important, as is the willingness to persist through obstacles faced in the design and construction processes. For example, in the design process of Sun and Wind Co-housing group, the design team acted as both the collaborator of different consultants about the energy, finance, ecological, and waste treatment issues and the facilitator communicating with the residents, understanding user needs, and integrating them into the design (McCamant and Durrett 1994). The larger scale sustainable buildings such as Norman Foster and Partners' Commerzbank Office Tower or Micheal Hopkins and Partners' New Parliamentary Building, on the other hand, need more professional teams including ones more specialized in energy, lighting, ventilation, civil engineering, waste elimination, and so on (Herzog 1998).

In the case of this integrated design process, in order that all team members may capture the benefits of multiplicity, there is a need for an organizational structure enabling them to work effectively and simultaneously rather than separately. Here, an efficient organizational structure and work method are needed. One approach is to divide the design team into sub work groups, responsible for different areas and particular stages of design. For instance, the architects, engineers and/or interior designers work together on the building design, while the environmental engineer and biologist develop a biological waste treatment unit. An organizing group coordinating work groups, directing meetings with the users, and facilitating decision-making is also useful. The organizing group should understand the mutual expectations of both the design team and the users, and its own role as a negotiator.

In terms of *defining preliminary goals*, this is the initial determination phase of broadly based spectrum of goals concerning the sustainable development of the case area, in other words the declaration of the project's manifesto. The preliminary goals delineate the challenge to the design team by holding up an image of what success would look like. It should be noted that there is probably an ensemble of sustainability objectives that will be produced, reproduced, and specified along with the capacity framework study in the next step. Here the design team's role is to develop and distill the most worthwhile goals which will then be translated into the principal targets throughout the limitation phase. The possible goals may be classified in terms of two different points of view:

1. within the interdisciplinary scope of sustainable development,
2. within the scope of the discipline of architecture.

The first category of goals evidently represents a broad range of varied but interrelated objectives for the economic, social, ecological, cultural, aesthetic and spiritual dimensions of sustainability. The second category deals with architectural goals defined specifically for the sustainability of built environment. These may be grouped into six main areas of study: site organization, building(s), building material and technology, management concerns, energy system, and tectonic and tactile language of the built environment.

It is further notable that there are many tasks that a sustainable architectural project should fulfil simultaneously. Any project for sustainable development, for example, seeks to create sustainable communities which can be satisfied by the combination of social targets with the economic, cultural and environmental capacity of the study area. The definition of preliminary goals demands input from separate branches of expertise such as sociology, economy, environmental engineering, and biology. The definition of proper and unique tasks, therefore, demands carefully examined goals and multidisciplinary work.

In terms of *identifying limitations*, this is the analysis phase, i.e. capacity investigation part, in which the project area is carefully scrutinized. In the capacity framework study of a particular case area, the SWOT analysis technique can be an effective way to view the project area in terms of twofold analyses: the strengths and weaknesses of the case area, the opportunities and threats for the success of the sustainable architectural project. In point of fact, the SWOT allows for the peculiarities of the case and, thereby, for defining realistically attainable targets and making achievable projects appropriate to the case area (Selman 1996). Especially useful for finding optimum sustainable design solutions, this approach enables the group to focus on the strengths of a project case, minimizing weaknesses and taking the greatest possible advantage of available opportunities (Manktelow 2003). This phase may be divided into three steps:

1. the scrutinization of strength and weaknesses of the case area,

2. the identification of opportunities and threats,

3. the presentation of possible scenarios for local sustainability of the region and the case area.

The first step concisely illuminates the data required for realizing a sustainable architectural project. More precisely, this is the accumulation of guiding inputs aimed at the design. Here the crucial point is the scope of analysis study. An architectural project for sustainable development additionally necessitates comprehensive site survey studies not only in the settlement but also in the regional scale, since one can position any attempt at building for sustainability as part of a broader based regional or national sustainability policy. Besides, to make larger scale surveys enables the clarification of more complementary goals which will be defined at the next stage. As a result, each project should not merely pertain to a local network but also to the regional one; the study area of the project should of course not be limited to the settlement and the case area, but cover a particular region, implying a sphere of influence. Thus, the first step is divided into four sub-phases, each addressing different yet complementary fields of information: Identification of potentials of the site, determination of user needs, investigation of legal arrangements, and search for financial capabilities.

The first sub-phase, in other words the 'site investigation', draws up the physical and social characteristics of the study area, including three different facets, as also itemized in Appendix F, viz. firstly the analysis of the site in macro and secondly micro scale, and thirdly the scrutiny of sustainable peculiarities in the site organization and in the buildings.

The scope of the second sub-phase can vary, but it should be based on the investigation of the user opinion of the existing building stock, and the determination of user expectations for the new building project. Here the extent and parameters of the research need to be separately described for each case; yet one common issue can be the investigation of the desire for a new building and its preferred qualities. One point is always considered: the integrated design approach recognizes not only the value of users' input, but also the professional experience of designers who understand the needs of people.

At the same time, the third sub-phase emphasizes the need to be in close contact with the local building and planning departments as well as the central governmental authorities. It is essential to inform those officials who had never before dealt with a project designed and developed for sustainability. This can help win the backing of key officials and departments which can be critical in getting planning approvals. Moreover, it is better to investigate the possible legal problems early in the process, arising from disagreement between the building regulations of Turkey and the proposed solutions of the project, otherwise the design team and consultant will have to apply for numerous variances, occasioning further delays or even halfway stops. Hence, this sub-phase underlines the unavoidable need to draw up an initial legal agreement, even if it must reflect the bureaucratic restrictions in Turkey.

Lastly, the fourth sub-phase poses the critical search for financial capabilities of the users and the possible outside fiscal aid which will dictate many aspects of the project, e.g. the design of the building, construction standards, and the affordability level of buildings. A sustainable building project requires the development of a particular financial strategy responding to the question: can the users afford all of this? Therefore, there is a crucial need to compare the incomes of users with the financial consequences of what will be designed. It is better to find ways to reduce cost in the early design stages. For example, one can research the users' willingness and capability to do part of the construction themselves—such as interior finishes, flooring and painting. Besides, the main concern can be to research various financial options for the occupants, depending on their ability to meet the expenses. As a result, the financial capabilities should be examined so that all participants can proceed with the architectural design in an accessible and cost-effective manner.

In scrutinizing the strengths and weaknesses of the case area, the method of gathering information is based on the literature and the site surveys in the case area. The literature survey may be based on many kinds of books, research reports of experts, essays, articles, and even newspaper news items. Once the written sources are limited, the study should focus more on the site survey, depending on personal interviews, observations, and documentation at the site. The interviews with civil and governmental authorities and the related private sector can help gather the data. The site surveys can also be based on personal observations and social surveys given to the inhabitants to determine user needs and to analyze physical characteristics of the site. Furthermore, field trips to experience different architectural solutions and to analyze the favorite building examples can be beneficial for the users. Visiting similar sustainable practices helps them understand the consequences of different designs and offers the occupants a common frame of reference for design discussion.

The second and third steps**,** namely identification of opportunities and threats, and presentation of the possible development scheme, are the evaluation parts of the capacity framework study which is founded on the distilled information accumulated in the previous step. The former presents an illuminating list—both in terms of pointing out what needs to be done, and in putting problems into perspective. The latter, cumulatively, reveals the projections for the future development of the study area and its periphery. What is needed here is to prepare an appropriate scheme composed of assumptions unique for the case area, regarding the changes in socio-economic structure, population, source of income, industrial and/or agricultural development and the built environment.

Finally, in terms of *specifying goals and clarifying priorities and inevitable tasks*, this is the last phase of all comprehensive studies proclaiming the major goals to establish primary targets and inevitable tasks. In this stage, the preliminary goals are re-evaluated and calibrated in reference to the capacity of the project area, its capabilities and potentials, strengths and weaknesses, so that one can develop a design program including the intended functions and their spaces at the next step. The priorities and tasks inevitably refer to other fields of expertise as well as architecture.

2. Programming: This is the determination stage of the design program describing how the priorities and inevitable tasks of the project will be addressed by means of particular functions, spaces, and measurements. This stage clearly defines what functions the buildings and the outdoor areas should accommodate.

In the early phases of programming, the possible checklist is prepared by the design team to define the design criteria of the project. Actually, the program can mature only by that user opinions are accounted for and re-assessed. The designers should respond to users' aspirations derived in the previous stage in an optimum level. The final program is, then, surely to be publicized. The resulting program outlines the functions and characteristics related to the sustainable building design, and thus clarifies the criteria on which design alternatives will be judged at the next stage.

3. Designing and construction: This is the designing phase encompassing an extensive course of action. It begins with the preparation of final design and construction documents, and continues until the construction of the building starts. In this part, the participatory process plays an integral part into arrive at a final decision for the site organization and building layout, and in the definition of construction strategy.

The user participation in the design process is an essential precept for designing a sustainable project; it is both a great asset and a limiting factor. Most of the users have little knowledge of financing, or of design and construction issues. Additionally, this is a huge task for a group of people who are inexperienced in both collective decision-making and the building industry. Therefore, the burden of the designing period should be carefully considered. Particular decision-making methods and techniques can be harnessed so as to resolve conflicts and build consensus. Here the designers' ability in the design team is highlighted to translate the pre-determined aspirations and the functions into the sustainable physical environment and reconcile different statements of users for an optimum design. "The notion of 'envisioning'—enabling laypeople, along with technicians and policy makers to anticipate environmental change and thereby contribute to its management—is inherently appealing, yet very difficult to realize" (Selman 1996, p. 77). Various approaches should, therefore, be devised to engage the laypeople in a purposeful dialogue with designers. Within this larger framework, this phase may be divided into six multi-partite steps:

1. Preparing preliminary designs
2. Cost estimation
3. Finalizing designs
4. Obtaining building permits
5. Selecting contractor
6. Defining construction strategy

The designing stage begins with the preparation of preliminary designs. This phase initially introduces the possible variations of design with pictorial representations, in other words schematic design proposal, and ends with the presentation of preliminary designs. The cost estimation studies may be an essential attempt to decide the revisions of design. The design can require trade-offs; few people can afford everything they wish for. In that case, the presentation meeting, explaining the designs and three-dimensional sketches, project models, building costs, and the possible payment plans may be organized to mark out the latest workable solutions. After the finalization of negotiations, the design documentation is completed. At this point, planning approvals and building permits must be obtained from the local authorities for both the design and construction. And lastly, the design period ends with the selection of a contractor, decision on the budget and preparation of the construction timeline. The planning of the construction process is also part of the sustainable design. User participation at this stage may constitute a significant strategy from the perspective of rendering the project both affordable and applicable in current as well as other building activity later.

CHAPTER 7
INTRODUCTION TO THE CASE AREA

The following two chapters are grounded on the implementation of the design process proposal developed in the preceding chapter, and draw their framework of values from the theoretico-historical chapters preceding the last. They are formulated in two complementary parts, indeed, so as to respect the two certain problems of accomplishing housing for sustainability: what to sustain and how to sustain in Seyrek? Chapter 7 examines only the first question, 'what to sustain' by the step-by-step simulation of phases. The aim of this chapter is to attain the careful definition of the design problem enabling optimization of goals within limitations instead of reaching for maximum performance for sustainability. The challenge in this chapter is to understand the potentials of the case area in the Seyrek settlement whereby the project will continue to move beyond current practices and find the optimum designs.

The observations and criteria of design used herewith directly derive from data obtained in the survey held among Seyrek residents over 17 days in August and September 2001. The curious reader may refer to Appendices D: Statistical Compilation of Survey Results and, F: Sheet of Site Investigation, below.

1. The design team: Designing such a housing project in Seyrek requires a collaborative effort and continuous team study. This is a crucial quest for attaining a framework study the positive capacity of which will inevitably lead to the certain definition of the design problem, correct identification of primary targets and priorities, and thus to the success of the acceptable, appropriate change. This integrated design approach for Seyrek advocates not only the architect, but also the planner, biologist, geologist, sociologist, and civil, environmental, energy, mechanical and agricultural engineers who would participate in the analysis and design processes. However, in such cases as this study, which currently has one researcher alone, what is needed practically is to collect data from the respective expert groups and obtain consultations so as to cope with the wider scope of the analytic process. In this context, before the study of the capacity framework starts, it is essential to set an appropriate configuration of the design team and to determine the scala of the required data identified for the objective of the project. The experts and the related information needed for the capacity framework study of the housing development project in Seyrek may be itemized as follows: *planner*: to notify about the current building regulations and land use decisions; to work on developing sustainable land use policies and premises for the coming decade; *biologist*: to warn about the vulnerable ecosystems and species needing urgent protection; *meteorologist*: to inform about the microclimatic conditions, more specifically wind directions and loads, distribution of rainfall for the seasons, the average of monthly heat and the number of sunny days; *geologist*: to report the seismic structure of the region and type of the ground; *environmental engineer*: to enlighten about the air, water, soil, noise, and odor pollutions in the region and the sources of pollution; *energy engineer*: to explain the possibilities of harnessing natural energy flows and ambient energy sources in the project; *mechanical engineer*: to consult on the heat gains and heat losses of the building materials, and the possibility of using ambient energy sources such as sun and wind; *agricultural engineer*: to inform about the agricultural production in Gediz Plain.

2. Preliminary goals: The study for the housing development project in Seyrek starts with the clarity of objective(s) and the declaration of intention as a sustainability manifesto. The task of determining initial, general, broad-spectrumed goals as one launches into the project constitutes the first brainstorm phase in which the frame of the series of solutions to be developed is drawn.

Indeed, there already are well tried universal and accepted sustainable design goals that may easily be accomplished within the framework of existing high technologies (Mendler and Odell 2000). For example, Mendler and Odell’s ten sustainable design goals are presented for use as a framework in preliminary discussions with the design team:

1. Select and develop sites to promote livable communities
2. Develop flexible designs to enhance building longevity
3. Use natural strategies to protect and restore water resources
4. Improve energy efficiency while ensuring thermal comfort
5. Reduce environmental impacts related to energy use
6. Promote occupant health and well-being in the indoor environment
7. Conserve water and consider water reuse systems
8. Use environmentally preferable building materials
9. Use appropriate plant material
10. Plan for recycling during construction, demolition, and occupancy (Mendler and Odell 2000, pp. 4-5).

In point of fact, these goals significantly improve the environmental performance of the buildings and the livability of communities while also lowering overall costs (Mendler and Odell 2000). However, these goals may be implemented quite directly in the northern countries with high budgets, the right kind of regulatory base, and with intentional communities. In that case, the main objective of the project is to fulfil the sustainability of life in the case area of Seyrek by creating an optimum sustainable built environment. Actually the project ought not be understood as an attempt to identify the dynamics for a sustainable development of the entire Seyrek settlement. Yet it serves for the *continuation, rehabilitation, integration* and *betterment* of the physical environment for the social, cultural, ecological, economic sustainability and aesthetic and spiritual wellbeing of Seyrek. The study envisages the following major objectives for the purpose of creating a sustainable built environment in Seyrek:

Continuation of the semi-rural character of buildings based on agricultural facilities;

Rehabilitation of the current way of life of local inhabitants by learning from the earlier self-sustainable and non-degradable life forms in Seyrek;

Integration of new, recently emergent building activities into the traditional settlement pattern for the benefit of inhabitants who have quitted agriculturally based livelihood;

Integration of newcomers in the living environment;

Betterment of physical conditions in Seyrek with respect to contemporary living standards.

In this wider scope of objectives, before the capacity framework study is initiated, the preliminary goals for the interdisciplinary scope of sustainable development are listed in detail in Table 7.1, and for the scope of the discipline of architecture, in Table 7.2.

One principle should be kept in mind: in attaining these wide-scoped targets, lifestyle change toward sustainability cannot be imposed, yet it may be encouraged by good design. Toward this end, the discipline of architecture and the architect must follow a case-specific design approach for each study. In view of the fact that of the countless sustainable architectural projects in the world each has its own unique design and construction problems, priorities and goals, the

Table 7.1 Preliminary goals for housing development project within the interdisciplinary scope of sustainable development

Preliminary goals for economic sustainability	*Preliminary goals for social, cultural, aesthetic and spiritual sustainability*	*Preliminary goals for ecological sustainability*
Balanced economic growth for the residents within the environmental capacity of the Gediz Plain Provision of opportunities for local employment: offer opportunities to provide most of inhabitants' needs through services and goods of those who are members of the same community Improvement of local economic potentials as a solution for local problems through detailed analysis of current potentials and the root causes of problems	Maximize the health, safety, and comfort of building users Enhance inter-community ties and commitment among the multicultural groups: seeking a varied residential composition with diverse incomes, interests and ages so that newcomers to Seyrek are not residentially and socially segregated Exert special effort to integrate the new residential development into the existing neighborhoods Evaluate the characteristics of the Seyrek settlement for cultural acceptance of the new buildings by understanding and deriving from the local culture, the needs and living habits of inhabitants, dwelling layouts, traditional building systems and materials	Consider resource management: use resources efficiently, including water, land, and materials Minimize interference with natural systems Maintain and restore biodiversity Enhance opportunities for the conservation of the ecosystem, habitat and species Increase residents' awareness of environmental issues toward conservation of the ecosystem in the case area

Table 7.2 Preliminary goals for the housing development project within the scope of architecture (continued below)

1. Site Planning	*2. Buildings*	*3. Building material and technology*
* Do not forget that dwellings are located on agricultural land. Thus, the design should use as little land as possible for habitation * Be sensitive in preserving agricultural land when designing recreational areas such as playground and sport fields * Enable part of the site for agricultural purposes of households, even if a small section * Use plants indigenous to Seyrek * Consider the settlement's density, building heights, and number of storeys * Consider the grouping of buildings whether together or dispersed * Consider the sun and wind directions in orientation of buildings * Consider the common activities and social interaction pattern of Seyrek, and evaluate the hierarchy of open spaces * Consider the pedestrian path system * Consider the pedestrian transitions between the case area and surrounding neighborhoods	* Consider minimum floor area so as to use as little agricultural land as possible and to minimize ground disturbance * Consciously respect user needs, their activities and functions in a building and lot * Consider possibility of change of building layout and enable further additions by the residents * Harness from core and expansion system * Consider the optimization of daylight, solar access and natural ventilation in determining the building form * Contemplate on the building form allowing maximum use of solar energy in winter, and protection from sun in summer * Maximize the health, safety and comfort of building users in both indoor and outdoor environments	* Pay attention to the use of local materials and the application of local construction techniques with which inhabitants are familiar and easy to implement * Use natural, renewable, recycled and, wherever possible, local building materials * Simplify building material and construction techniques to give work opportunities to citizens with less talent and knowledge

Table 7.2 Preliminary goals for the housing development project within the scope of architecture

4. Management concerns	*5. Energy system*	*6. Tectonic and tactile language of the built environment*
Water: * Minimize potable water demand * Stimulate households to use less water and detergents including less phosphorus * Accumulate and harness rain water *Waste:* * Consider the treatment of gray water for irrigation of landscape and vegetable garden * Consider composting system for organic waste *Economy in building cost:* * Consider voluntary labor of the resident for his/her own house * Consider resident-built option for the maintenance process of building * Regard local material and construction techniques and local labor * Reconsider the extant building types in terms of their process of standardization and install standardized components, e.g. cupboards, closets, kitchen fixtures * Use passive heating, cooling, lighting and ventilation systems	* Utilize renewable forms of energy * Prefer to use locally generated energy, based on the local renewable energy forms such as wind and solar * Consider energy conserving design: minimize energy demand and consumption through planning and design * Prefer passive techniques in energy system of dwellings rather than active ones	* Respect the aesthetic choices with traditional creatures of the inhabitants, and things from their life * Consider the local craftsmen experience, customs, norms and rules to attain collective cultural consciousness that has been gradually refined over time * Respect local craftsmanship, detailing, and the tectonics of the material together when communicating with the new materials and construction techniques * Aware the tactile value of the components in dwelling in terms of the intensity of light and darkness, warm, cold, aroma of the material, kinaesthetics of the body, and echoing resonance of the footfall

definition of the design problem and the clarity of goals for sustainability distinctive for the Seyrek project ought to be considered an important pre-stage. The next step, composed of three sub-phases, will introduce the required data about the case in Seyrek so that these goals would be revised by following particular stages and eventually the certain goals, priority sequence, and inevitable tasks for the case area would be presented.

7.1. Strengths and Weaknesses of the Case Area

7.1.1. Site Investigation

The case area: The case area for housing development is located in Seyrek, a semi-rural town in Gediz Plain, latitude 38˚ 30' N and longitude 26˚ 55' E, at a height of about 5.5 m above sea level, in the north of the province of Izmir. The houses will be built on agricultural land in a new housing development area at the southwest of the Seyrek settlement with very smooth view of agricultural lands and a vista of partly completed housing located on a hill to the west. The building block is surrounded by the Izmir-Seyrek-Maltepe Beltway to the west and a school development area to the north, and other housing development areas, which are in fact agricultural areas still in use in all aspects (Figures 7.1; 7.2). The case area presently serves as an agricultural field for cotton cultivation and there are no trees or buildings that physically limit the location and orientation of the buildings.

With frontages of 66 and 69 m and depths of 146 and 151 m, the case area, Block No. 133, is of near-rectangular form. It has a surface area of 9,642 m^2 and lies in east-westerly direction, 13˚ from west to north. It has an almost flat (0.5-1%), deep (more than 90 cm) alluvial soil layer suitable for irrigated agricultural activities. Yet because of the salty-alkali soil quality and insufficient drainage, soil capability is categorized as fourth degree soil type (Sayar 1993). The building block comprises 14 plots which were arranged in the 1997 application of Article 18 of By-law No. 3194 (Figure 7.3). The Article re-regulated land ownership pursuant of the development plan for Seyrek enacted in the same year. The size of plots varies from 572 m^2 to 757 m^2. 13 of the plots, which are but all except the smallest one, are occupied by one person (Durmuş Arsan 2003).

The Seyrek settlement: Seyrek is a semi-rural settlement in the north development axis of Izmir. It is situated in the middle parts of Gediz Plain, 8 km

Figure 7.1 Location of the case area and the Seyrek settlement: development plan of 1997

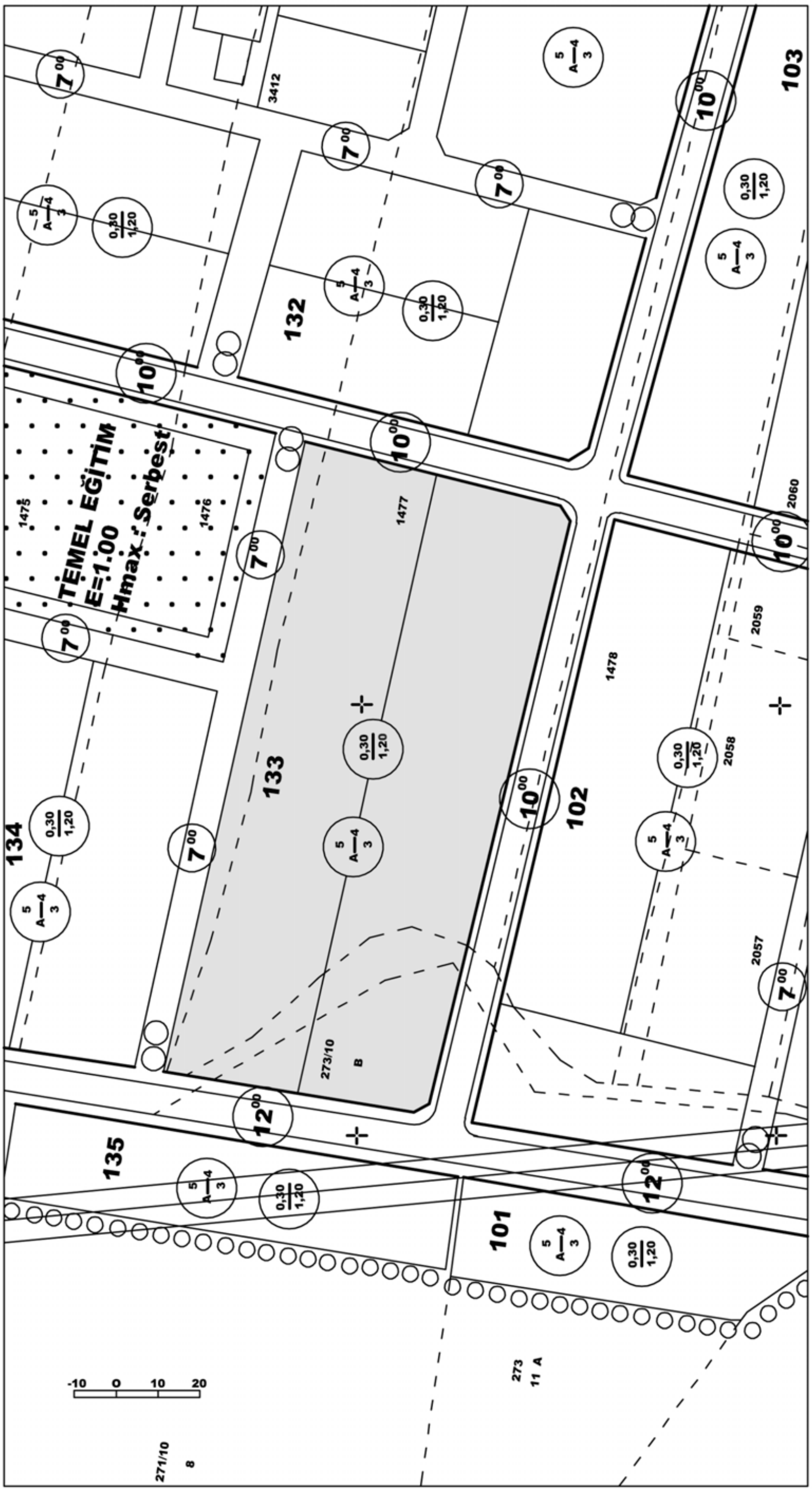


Figure 7.2 Chosen building block as the case area and the building regulations by the development plan of 1997

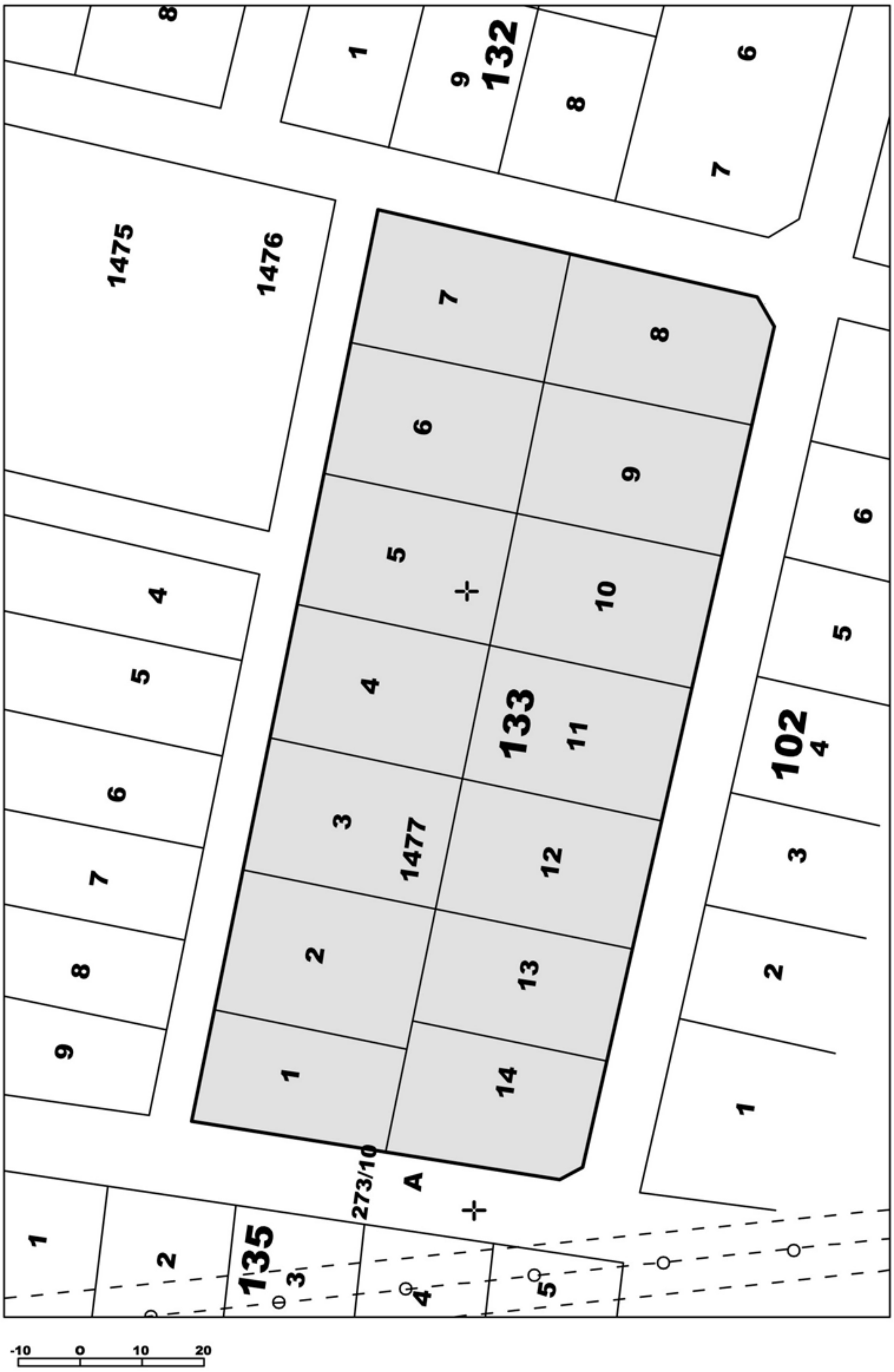


Figure 7.3 The case area—Block No. 133—and the organization of blocks pursuant 1997 implementation of Article 18 of By-law No. 3194

from the Çanakkale-Izmir Motorway, and 38 km to Konak, the city-center of Izmir. The town is one of the seven municipalities of the sub-district of Menemen in the district of Izmir. It borders on the center of Menemen in the north, the municipality of Maltepe in the west, the municipality of Ulukent in the east, and the municipality of Sasalı in the south. The location of the village places between the Günerli, Tuzçullu and Kesik settlements (Figure 7.4). Additionally, the center of Seyrek is surrounded by agricultural areas in all directions in addition to an irrigation canal to the east and the Izmir-Seyrek-Maltepe Motorway to the south and the west.

7.1.1.1. Analysis in Macro Scale

The Gediz Delta and the Gediz Plain: The Gediz Delta extends on the eastern shore of the seaway into Izmir Bay and on the north of the inner Gulf. It is an alluvial plain formed by sediments carried by the Gediz River. The total area of land indicated as Gediz Delta is around 40,000 hectare (ha), 20,400 ha of which is known as IBA (Important Bird Area)—*ÖKA (Önemli Kuş Alanı)*—(Kaplan et al. 1997). Gediz Plain, in fact, covers more area and further extends to the northeast, partly through the valley of Gediz River, which serves as the buffer zone of Gediz Delta. The plain is surrounded by the hills of Foça in the northwest, Dumanlı Mountain in the north, and Yamanlar Mountain in the east. Furthermore, the delta has two main hilly areas in the west. The first formation is comprised of three hills, all three formerly islands, viz. Poyraz Tepe, Orta Tepe and Üçtepeler, each of a height of less than 64 m above sea level. To the north of these hills, the second formation lies in the north-south direction. It is a hilly row and with 136 m, larger and higher than the three hills.

Actually the southeastern part of the Gediz Delta, the surrounding flood area of the obsolete bed of the Gediz River, namely the Çiğli Marshland, has been settled since the early 1980s. Today, this area includes the two densely urbanized districts of Bostanlı and Çiğli, and the Atatürk Heavy Industrial Zone (*AOSB*). The rest of the delta has sustained its semi-rural and natural character. Yet the wetland ecosystem has been fragmented by such various land uses as Çamaltı Salinas, agricultural lands and meadows, the villages, mass housing and secondary housing areas, the Atatürk Heavy Industrial Zone, the Menemen

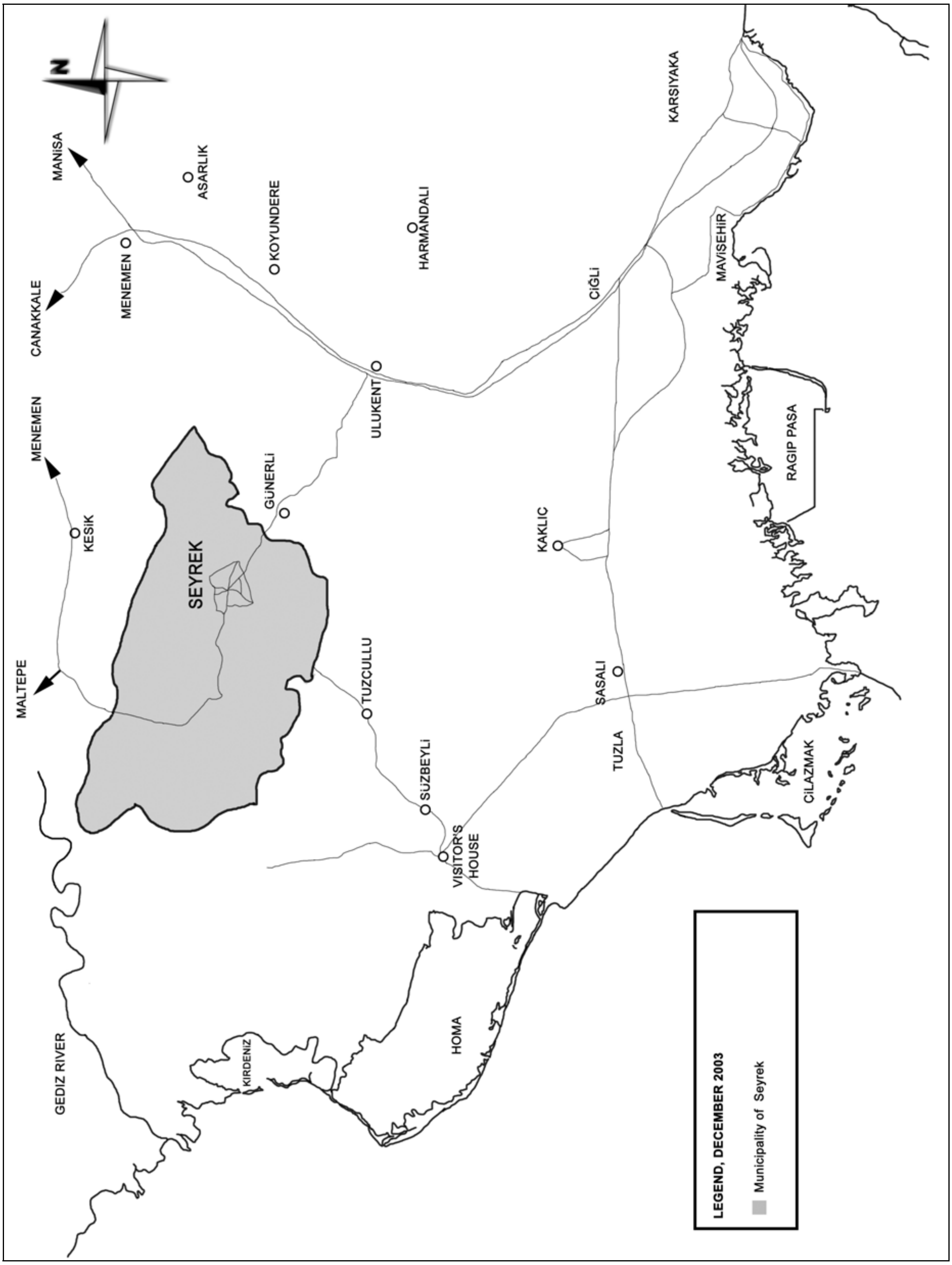


Figure 7.4 Location of the Municipality of Seyrek in Gediz Plain

Leather Industry Free Region, and other small-scale industrial areas, the military one and two airports, and the Greater Izmir Municipality Treatment Plant (Figure 7.5).

Within these various *land uses in the Gediz Delta,* Izmir Atatürk Heavy Industrial Zone comes to the fore with its location and the area it covers. The region is one of the largest industrial areas of Izmir covering 700 ha in the southeast of the Gediz Delta. It actively became in the industrial production in 1990 ("Avrupa Birliği" 1996; Karadaş 2001). In addition, Menemen Leather Industry Free Region covers 165 ha between the Municipalities of Seyrek and Maltepe in the northwest of the Gediz Delta ("Avrupa Birliği" 1996). It was first activated in 1998 with 7,500 employees ("Serbest Bölgeler" 2000).

There was a proposal for relocating the Izmir port to the southwestern shore of the Gediz Delta ("Çiğli-Tuzla Limanı" 1999). The plan envisaged the construction of an international dockyard and harbor complex. However, the proposal was cancelled after the environmental impact assessment studies for the wetland had been conducted.

The urbanization trend at the north of the Gediz Delta issues from the dense private housing cooperatives developed by Ege-Koop (the nongovernmental housing organization), the commercial and housing areas proposed by the Municipality of Seyrek, and the industrial areas of Menemen Leather Industry Free Region. The Villakent and Bahçekent houses of Ege-Koop lie on the border of the First Degree Natural Conservation Site and surround Sazlıgöl—a fresh water lake which is one of the most significant and vulnerable nodes of the wetland (Yavuz 2001). Semi-completed 2,234 houses envisage a population of 20,000 (Onmuş et al. 2002); in other words, one that is 21 times larger than the population of Seyrek in 2002. Furthermore, in 2000, the municipality of Seyrek has proposed new commercial and housing development areas to the north of these villas. The issued area is located next to the border of the First Degree Natural Conservation Site. Even though this endeavor was already halted by the Ministry of Public Works, the municipality seems to insist on it and has nevertheless continued to strive to change the borders of the conservation area such as these had been set by the Ministry of Culture (Durmuş Arsan 2003), and plans to articulate the trend of urban development by which Ege-Koop and the Industrial Free Region were initiated.

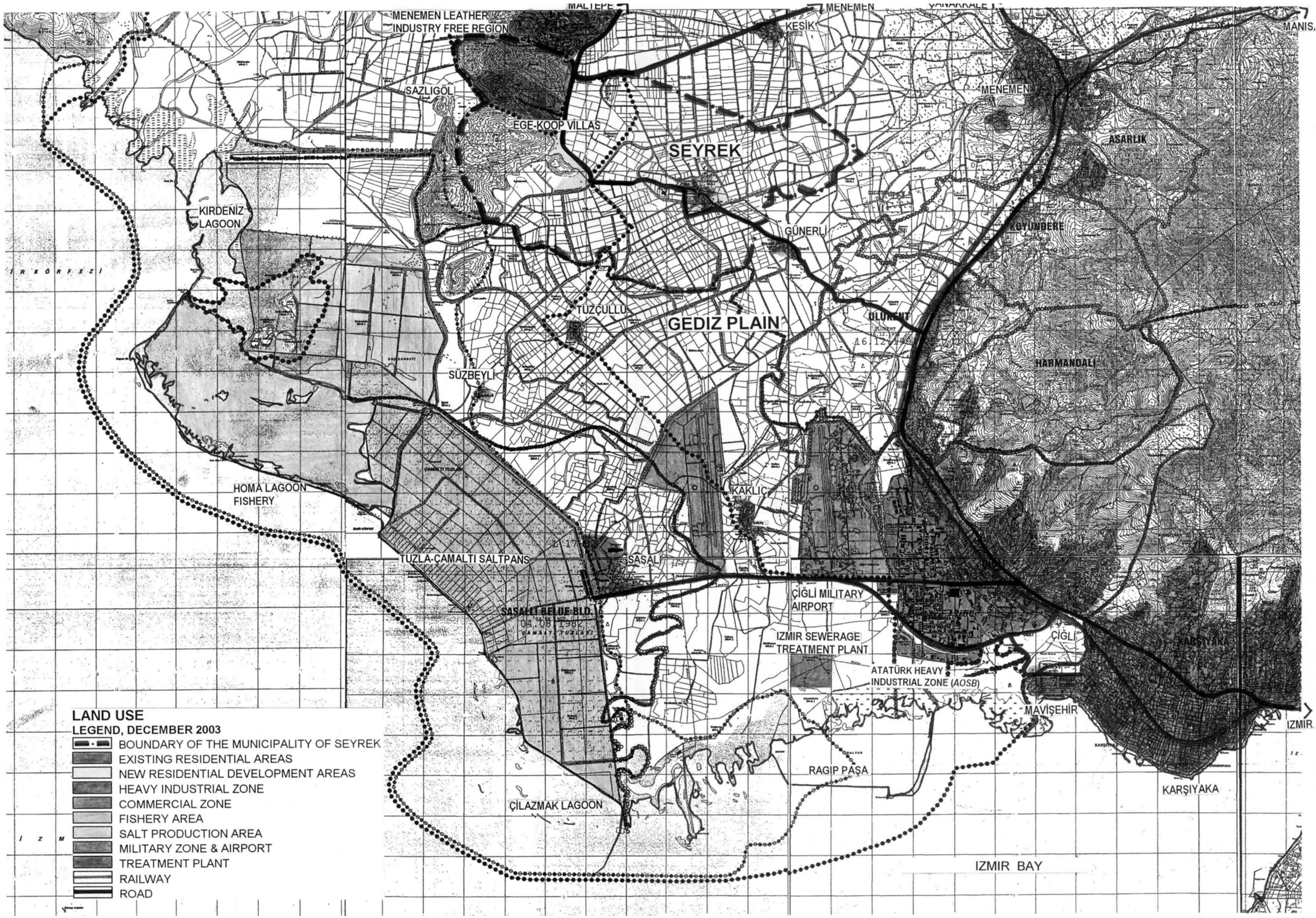


Figure 7.5 Extant land uses in the Gediz Delta

The Izmir-Cumaovası–Basmane-Aliağa Double-Line Railway and the Çanakkale–Izmir Motorway are two main transportation axes to the east part of the Gediz Delta. Besides, the Çiğli-Sasalı Motorway in the south and the Menemen-Maltepe Motorway in the north segregate the plain in east-west direction. Even if the location of the Seyrek settlement seems situated remotely in place to any main road axis, it is, in fact, situated on a diagonal axis between Izmir and Foça. This axis, namely the Izmir-Seyrek-Maltepe Beltway, is currently active because it comprises the shortest way to the Menemen Leather Industry Free Zone. In addition, this is the main road connecting the villas of Ege-Koop to Izmir. Therefore the settlement is placed on a strategic node between two urban gravity centers, Izmir and Foça. It shows the tendency gradually to become a central node on the way of dense urban activities.

Ecological cycle: The ecological value of the Gediz Delta originates from the various types of wetlands such as coastal brackish and saline lagoons; alluvial islands; swamps; coastal freshwater lagoons; seasonal brackish marshes; intertidal mud, sand or salt flats; marine subtidal aquatic beds; sand, shingle or pebble shores; estuarine waters; saltpans; and a range of habitat such as dry grasslands, arable lands, woodlands and the makis—wild, bushy land of the Mediterranean climate—that the Delta includes altogether ("A Directory of Wetlands" 2003).

The Gediz Delta is a wetland, which is one criterion for the designation of an international IBA (Important Bird Area). The delta houses more than 25 bird species including several globally threatened species such as the Dalmatian Pelican (*Pelecanus crispus*), Lesser Kestrel (*Falco naumanni*), Pygmy Cormorant (*Phalacrocorax pygmeus*), and the Red-breasted Goose (*Branta ruficollis*) (*Gediz Deltası'nın Kuşları*, forthcoming 2004; Yarar and Magnin 1997). 14,900 ha of the total area is proclaimed as Ramsar site (Heath and Evans 2000):[1] the seashore between the Greater Izmir Municipality Treatment Plant in the southern Gediz and the visitor center of the Ministry of Forestry on the western part of the delta including the Çamaltı Salinas was included in the list of Ramsar sites of the world, No. Turkey 7TR009, in April 1998. Even if this 'Convention on Wetlands' had no international power of sanction, it highlighted the worldwide qualities of a wetland with its vulnerable sub-ecosystems, and the important reproduction,

[1] The Convention on Wetlands, signed in Ramsar, Iran, in 1971, is an intergovernmental treaty which provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources ("The Ramsar" 2003).

nutrition, wintering and sheltering habitats for birds. The convention also conveyed the importance of a wetland for biodiversity conservation, and for the well-being of human communities. Thus it provided a scientific base underlining the essentialness of conservation of the wetland and attracted the attention of local and central authorities leading them to take land-use decisions.

In terms of *wetland habitat*, Gediz Delta has four lagoons with muddy islands, respectively the Ragıppaşa, Çilazmak, Homa and Kırdeniz lagoons. These are ecologically rich in nutrients so as to offer an ideal breeding and feeding habitat for waterfowls and fishes. Besides the lagoons, the delta has two types of marshy habitats, namely freshwater and salt marshes, enabling the growth, spread, feeding and breeding of the species of both flora and fauna. However, all marshlands in the delta have come under human intervention since swamps and mudflats in Turkey are viewed not as centers of biological diversity but as harmful grounds to be treated and even rendered usable as building ground. For example, the freshwater marshland to the east of the Kırdeniz lagoon was indeed the larger reed bed area. Yet it was partly dried by human intervention in terms of the present freshwater regime that causes an effective drought in summers. Agricultural and husbandry activities and hunting pose further human centered problems in the marshland. Sazlıgöl, the freshwater lake, offers unique habitat threatened by secondary housing activities. The other marsh, Çiğli Marshland, was an important breeding area specifically for migrating birds with its several freshwater pools and seasonal brackish and saline marshes (Eken 1997a; 1997b). However, it is already urbanized and annihilated. Furthermore, the Gediz Delta has the wide salt marshes. These unique, extensive, less disturbed and less damaged areas expand through southern Gediz, between the district of Bostanlı and Çilazmak Lagoon, and also partly to the east of the Kırdeniz Lagoon. This divergence among fresh and salty water regimes determines as well vegetation areas of fauna and flora in the coastal zone.

Since the region has been facing human intervention for a long time, Öner and Buğday (1999) suggest that the flora may be classified in two groups: natural flora and culture plantation. Öner and Buğday put forward that, "in terms of the geography of flora, the Gediz Delta belongs to the Eastern Mediterranean Fito-Geography (1999, p. 107)." The natural vegetation in the delta has evolved resistance to drought and salt, e.g. halophytic plants prevail in the saltpans and are adapted to high temperatures and high level of sunshine. "Floral studies have revealed 206 species of flora from 60 families" ("A Directory of Wetlands" 2003, n.p.). The scattered pattern of red pine tress (*pinus brutia*) on Yamanlar and Dumanlı Mountains at an altitude of 600–700 m, and on Foça hills at an altitude of 200 m, the combination of widespread maki formations with red pine vegetation, and the bare, damaged, rocky, graveled grassy areas—the latter owing to human-caused deterioration—encircle Gediz plain. The land for cultural plantation, moreover, covers a larger area allocated only for the agricultural activities of the flat plain because of its suitable climatic and soil conditions. The cultivated area is used for either dry and irrigated agriculture or olive farming (Öner and Buğday 1999). The delta also inhabits more than 700 types of plants, and 11 of them are the endemic types ("Sulak Alanların Yönetimi Projesi" 1999).

The importance of the Gediz Delta in terms of *fauna* is of course first of all that it bears ornithological value. The wetland ecosystem, characterizing half the land, the hilly areas and agricultural fields in the buffer zone of the wetland houses 80,000 birds in the wintering season, of which 240 species have been determined up to now (*Gediz Deltası'nın Kuşları*, forthcoming 2004). Some of the species are under international protection by virtue of the Bern Convention of 1979—The Convention of the Wildlife and Habitats of Europe—underwritten by Turkey in 1994 (Kalelioğlu and Özkan 2000). Because the delta is situated on the north-south migration route, it is a significant nesting and feeding habitat for large numbers of waterbirds during the migration period. Moreover, the Gediz Delta provides nutritious, partly safe and large wintering and staging areas for migratory birds with proper climatic conditions.

The most detailed research, devoted to the investigation of birds breeding in the Gediz Delta, analyzing the number of birds, the size of respective populations and breeding areas, the location of living habitats and the factors threatening the habitats was conducted in May and June 2002 and covered an area of 30,500 ha of the delta. The analysis was conducted by the Ege Bird Watching Society (EKGT), aided by The Ministry of Forestry, The General Directorate of National Parks, and The Izmir Chamber of Environmental Engineers. The results of the study signify that there are 94 species coded by this study, 47 of them certainly breeding, 21 of them probably breeding, and 27 of them possibly breeding (EKGT 2001-2002). According to European Threat Status, there are 5 species among the breeding birds that are defined as endangered, 17 of them are vulnerable, 2 are rare, 20 species are declining, and 2 of them are localized. The delta is also very important for other fauna, from numerous insect species to jackal and wild boar ("A Directory of Wetlands" 2003).

Hydrology: While water carries vital importance for sustaining the delta, the hydrological formation of Gediz Plain is fraught with the excessive water consumption that interrupts the ground and surface water regimes. The waters of the Gediz River are of vital importance to agriculture in the region. However, large irrigation works interfere with the water regime of the delta negatively. The high water demand of the leather industry in the Menemen Leather Free Region, moreover, influences the freshwater regime and the hydrological balance of the plain. Besides, the excessive use of local freshwater sources through the industrial production in the AOSB, as well as the already disrupted natural water cycle of the Gediz Delta, caused the floods in winter of 2001-2002 and the sinks in the ground up to 2 to 3 m in the industrial area ("Ege'deki Yağışın Yol Açtığı Zarar" 2001).

Use of local water sources: The General Directorate of State Hydraulic Works (DSI) started the project, Lower Gediz Irrigation Project—*Aşağı Gediz Sulama Projesi*—prioritizing the irrigation of 23,000 ha of Gediz Plain. The objective of the project was, and continues to be, to improve the quality of soil by regular irrigation and to enlarge the agricultural land. For these purposes, many irrigation and dehumidification canals have been constructed. However, the natural water regime has been negatively affected (Elbir 1998): the drought in the freshwater reed bed area in the east of Kırdeniz Lagoon is a case in point: "The RAMA Life Water Project, which ran between 1993 and 1995, involved building a channel to ensure water supply to the marshes" ("A Directory of Wetlands" 2003).

Macro and microclimate of the site:[2] Located in a half-humid plain with 16.8°C annual average temperature and about 1319 heating degree-days—*derecegün*—, 18°C base temperature, Seyrek has 7.8°C minimum average temperature in January and -7.6°C minimum temperature in 1964. The average

[2] The climatic data cited here is the average of the last 48 years between 1954 and 2001. The accurate data about the climatic conditions of Seyrek is specifically gathered from the closest meteorological station in the General Directorate of Rural Services Menemen Research Center, situated in bird's-eye view 7.5 km to the northwest of Seyrek.

temperature of the heating season is 11.8˚C.[3] Sunny days are frequent, even in winters. Summer average temperature reaches the highest value in July: the average temperature for July is 26.9˚C. Maximum temperature of the summer season was 44.3˚C in August 1958 (Table 7.3). The high summer temperatures also require cooling with 913 cooling-degree days, and 18˚C base temperature.[4]

Humidity is an essential problem in all seasons: the average relative humidity is generally high and close to the top level of comfort conditions especially at November's 62.6%, and December's 65.9%, when cloudiness increases (Table 7.3). When the temperature increases, relative humidity decreases and reaches its lowest ratio in July with 46%.

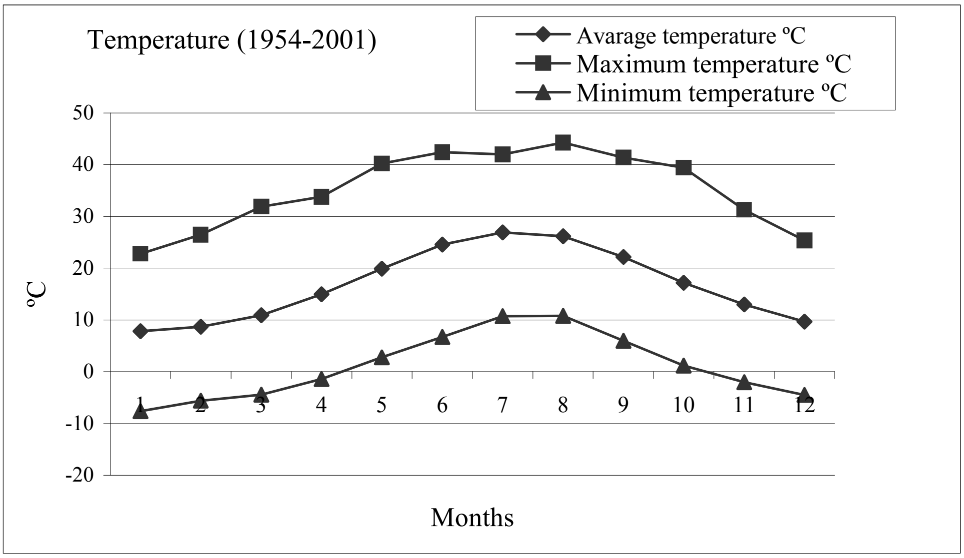
The direction of origin of the most frequently recurring wind is the east (E). The eastern wind, removing humidity, blows in Seyrek with the frequency of 92% except in June when northwesterly (NW) winds predominate. The flat topography and the location in the plain influence the wind speed: the annual average wind speed with 2.9 m/second is higher than the other regions of Izmir, which is e.g., for Çiğli 2.8 m/second, for Bornova 1.5 m/second and Güzelyalı 2.7 m/second (Kılınç 1996) (Table 7.3). For instance, the average wind speed for Seyrek ranges between 2.3 m/second in September and October and 3.8 m/second in January while in Çiğli the range is between 2.4 m/second in January and 3.2 m/second in July (Kılınç 1996). The highest speed occurs in the afternoon when the temperature is highest while the lower speed occurs during the night and the early morning.

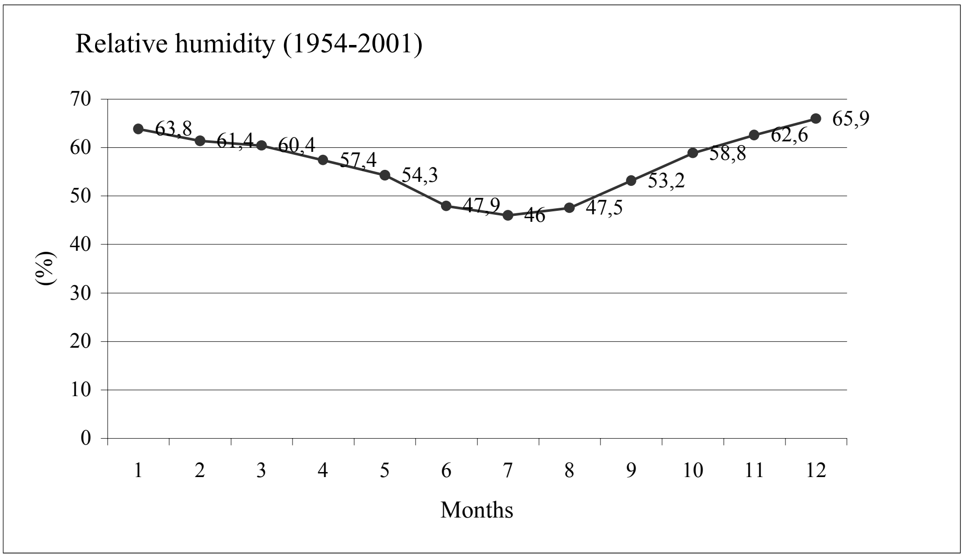
The eastern wind causes unprotective, unfavorable weather conditions in winter owing especially to the strong cold winds, which often drive in rain. Rainfall is distributed higher in the autumn and winter months, especially in November when, with 112 mm, the highest precipitation occurs. Annual precipitation is 539.9 mm (Table 7.4). The period between May and September brings favorable sunlight duration, which signifies clear days bringing more than seven hours of sunshine per day. The net radiation reaching the Earth's surface in

[3] The heating degree-days (HDDs) are calculated to determine whether heating is required. When 18˚C is accepted as the base temperature, monthly average temperatures below 18˚C indicate that there is a need for heating in particular months. In Seyrek, the heating season, therefore, begins in October and ends in April, lasting seven months.

[4] The cooling degree-days (CDDs) are calculated to determine whether cooling is required. When 18˚C is accepted as the base temperature, monthly average temperatures above 18˚C indicate that there is a need for cooling in particular months. In Seyrek, the cooling season, therefore, begins in May and ends in September, lasting five months.

Table 7.3 Macro and microclimate of the site





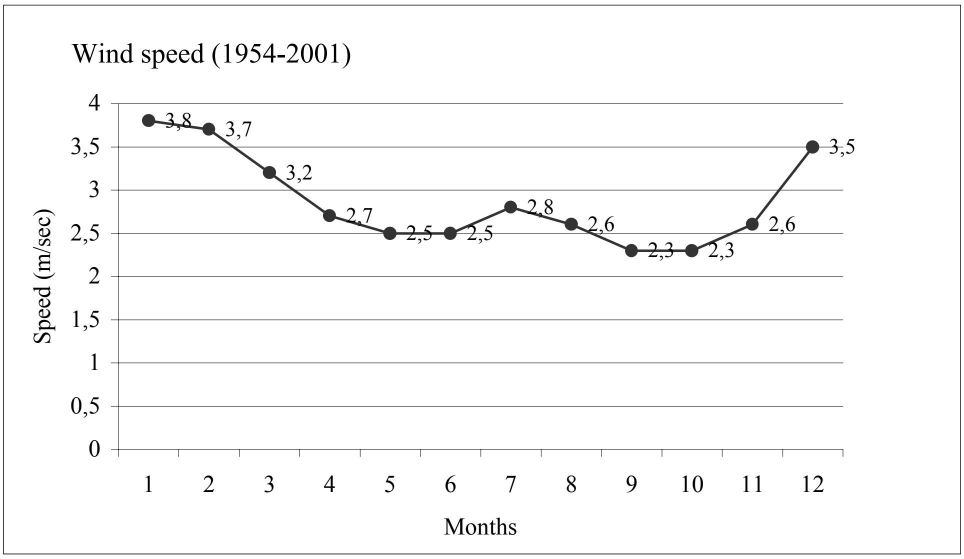
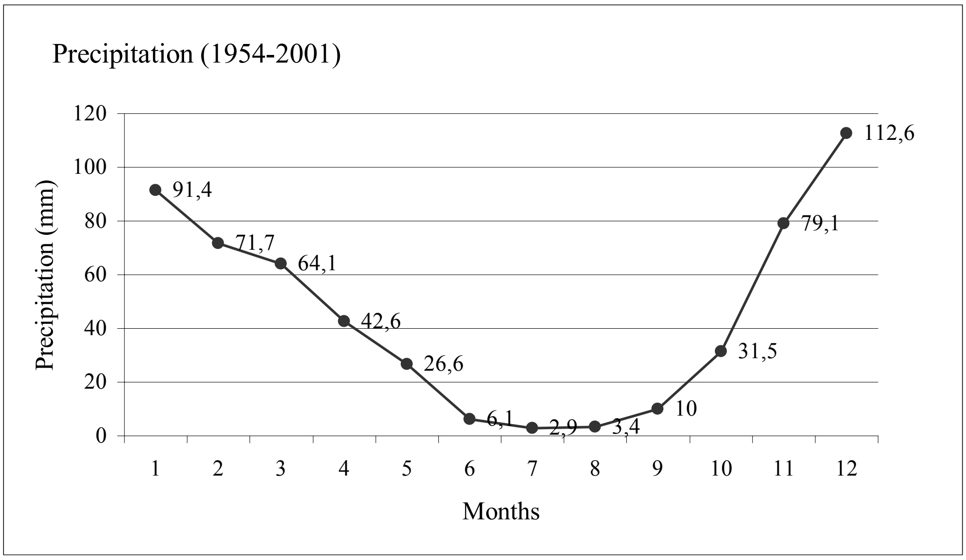


Table 7.4 Monthly precipitation average 1954-2001



all months is more than 150 cal/cm^2 per day and reaches top levels in June. This ratio rises between May and October to over 400 cal/cm^2. If the solar angle values of Izmir are considered, the highest angle occurs in June at nearly 75° and the lowest one is in January, around 28° (Peker 1998).

It is reasonable to conclude regarding the climatic data of Seyrek that it is relatively temperate, placing the region within the mild Mediterranean zone. The summers are very hot with slower wind speed while the winters are felt cold because of high levels of humidity. Springs and autumns provide moderate comfort conditions, yet for a short duration. As a result, even though Seyrek has 16.8°C of annual average temperature that seems to call for heating rather than for cooling, the provision of comfort conditions in summers by cooling ought to be also a central concern.

Seismic structure: The Seyrek settlement is located in a region of potentially severe seismic activity. For instance, in 1970, an earthquake shook the town of Gediz where the Gediz River springs, and the town and surrounding villages were almost completely destroyed (“Gediz’de Deprem” n.d).

Pollution: The main polluter of Gediz Plain is the Gediz River supplying the fields of the north (“Gediz Havzası” 2001). By the time the river reaches the plain, it has already been polluted by both untreated domestic wastewater of the variously sized settlements along the river basin and the industrial wastewater of the Uşak and Kemalpaşa Industrial Zones, the leather industry in Salihli, industrial undertakings in Turgutlu and Menemen, and the Menemen Leather

Industry Free Zone. According to the water analyses for heavy metal rates, the limit for copper was exceeded 300 times, the limits of cadmium 4 times, and of barium and nickel 1.5 times in October 2001 (İşgenç 2002). The chemical pollution rate of the Gediz River threatens the healthy existence of all living entities, including the local inhabitants and the population of Izmir, since the hazardous elements spread through the food chain. The problem of pollution in the Gediz River requires the kind of larger scale planning study termed Basin Planning. The studies of the Gediz Basin Conservation Union in Manisa, in this context, have proved unsatisfactory up to now. Together with the agricultural activities that have been growing by means of the irrigation works, pollution from agriculture has also increased by the intensive use of pesticides in cotton cultivation. Furthermore, Izmir Atatürk Heavy Industrial Zone has brought the problems of waste treatment and air pollution by the industrial production and the dense vehicular traffic. Moreover, the Greater Izmir Municipality, Izmir Sewerage Treatment Plant started to work full capacity in 2001. The observations of a local NGO on bird watching indicate massive death of fish and artemia, a small shallow sea organism, along the seashore close to the water discharge of the treatment unit (Onmuş et al. 2002). Moreover, anaerobic water—pertaining to the absence of oxygen in the water—from the salines is thought to cause sea pollution ("A Directory of Wetlands 2003).

7.1.1.2. Analysis in Micro Scale

Settlement and street pattern: The settlement pattern of the village may be defined briefly with recourse to its major streets spreading from the town center in the west, east, north, south, and southeast directions. The densely residential pattern among these routes is separated organically by the smaller streets and paths. Actually Seyrek has two squares: the main square—on the village square: *köy meydanı*—which is the junction node of all major streets, has almost all such public activity centers as grocery store, coffee house, mosque, butcher, a social center for the hunters' association, agencies of political parties, office of the district—*mahalle*—headman—the *muhtar*. This is the initial landmark of the settlement where public ceremonies and celebrations are held. The colossal and striking building of the Seyrek Municipality, located at the southeast entrance of the village, may be considered the other landmark of the small settlement. The second square closer to the former, has a small park, a grocery store, and a primary school (Figure 7.6). The densely used streets, e.g. Kaynaklar, Kavaklı, Izmir, Doğu, Vatan and 115 constitute the wider streets of the settlement on which the main vehicular traffic flows. The settlement has the three districts—*mahalle*—namely the Cumhuriyet, Atatürk, and Inönü, logically separated by the streets of Doğu, Kavaklı, and Vatan (Figure 7.7).

The settlement is comprised of 302 houses.[5] Atatürk Mahallesi among these is the most densely populated, with 109 homes and 363 persons. The denser residential areas of the settlement are positioned around the center of the settlement. The density of the settlement pattern is lower on the periphery with the dwellings placed amid large fields, orchards and vineyards.

Data obtained from the social analysis indicates that a dwelling unit, *hane*, in the Seyrek settlement generally consists of one family: the ones which have two families per unit make up around 8% of the dwellings in Seyrek. According to the records of the Seyrek Health Centre for June 2002, the size of household is quite low: 3.1 persons per family. The social survey specifies that there are at most four units located in the same plot, and one third of the surveyed plots include the additional one or more units.

Demographic characteristics: The population of the Seyrek settlement was 952 in 2001, and 950 in 2002, nearly 50% of whom were male (Table 7.5).[6] The age of cohort between 20 and 64 constitute 60% of the population living in Seyrek. This indicates that the settlement has a population capable of prime work. In addition, the younger generation with 22% constitutes a larger group than the group above age 64. Even if the population of Seyrek seems to stay constant, the total population living in the boundaries of the municipality is decreasing considerably. It has been doing so especially since 1990 (Table 7.6). On the other hand, according to the accounts of population count in 1997, the annual rate of increase in the population of the district of Menemen is 37.57% ("1997 Genel Nüfus" 1999). On this basis it may be inferred that the Municipality of Seyrek is undergoing a steep population decrease, and the demographic form in the middle of the plain has been changing noticeably.

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[5] Information about the population and number of dwellings is based on the annually renewed records of the Seyrek Health Center for June 2002.

[6] The population mentioned here is for the village center. The surrounding settlements within the boundaries of the Seyrek Municipality are excluded.

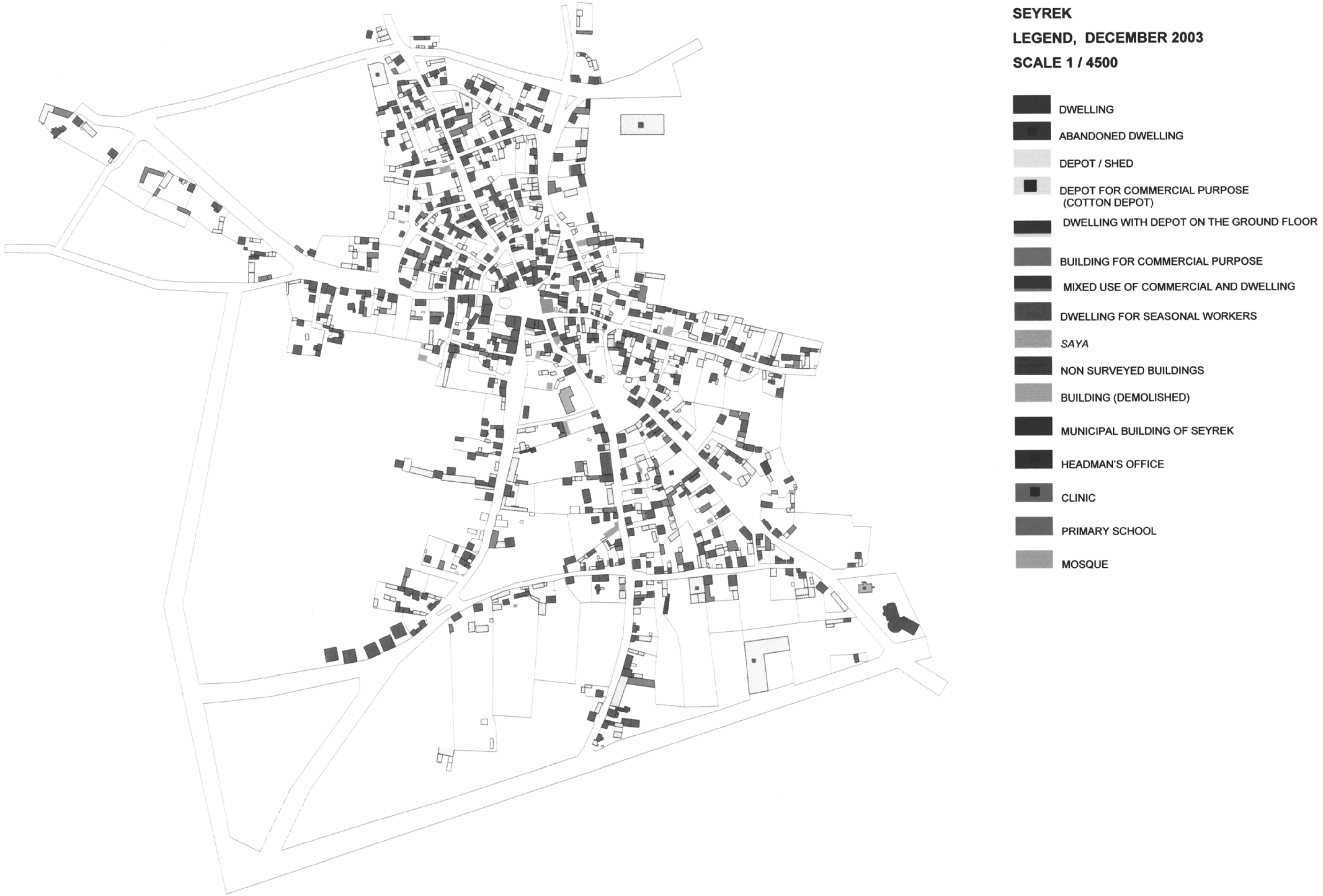
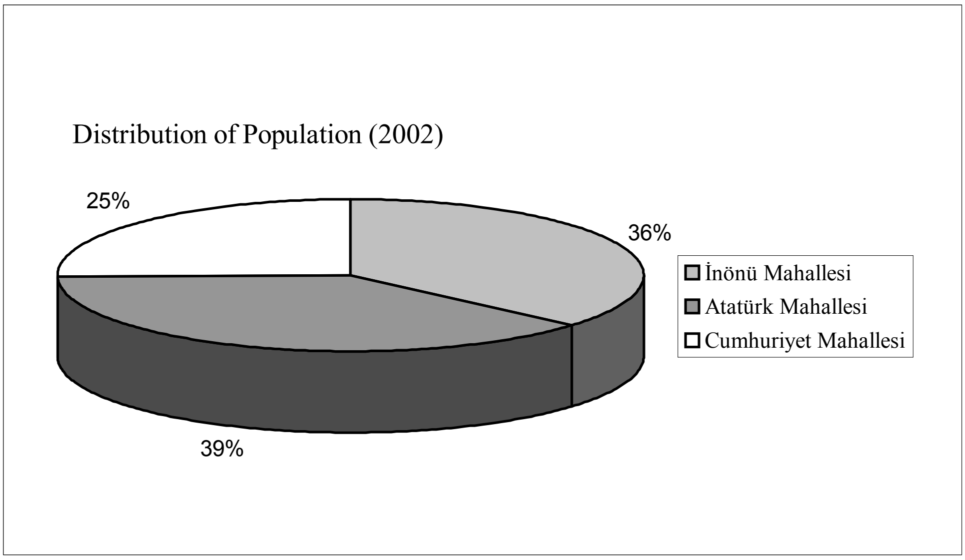
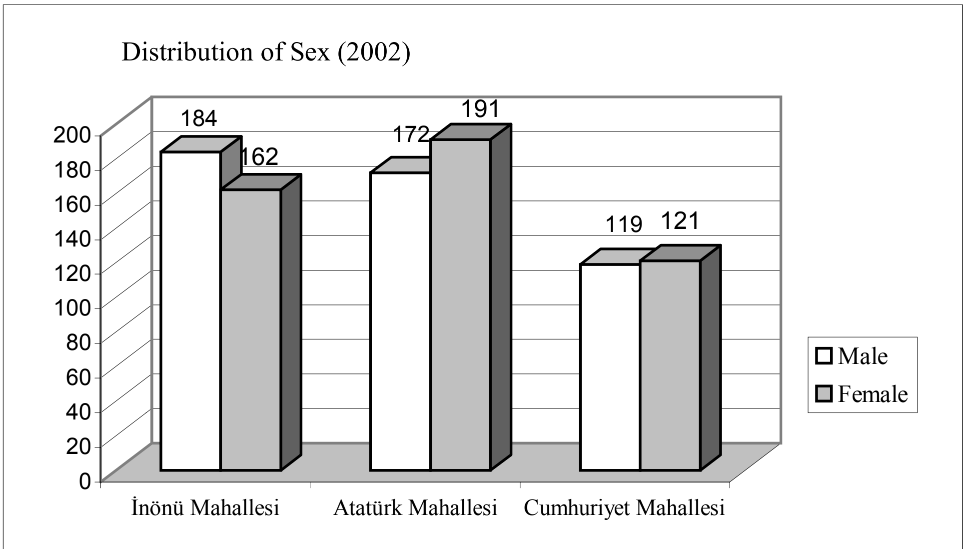


Figure 7.6 Current land use in the Seyrek settlement

Figure 7.7 Location of districts—*mahalle*—in the Seyrek settlement

Table 7.5 Distribution of population, sex and household size by district (*mahalle*)





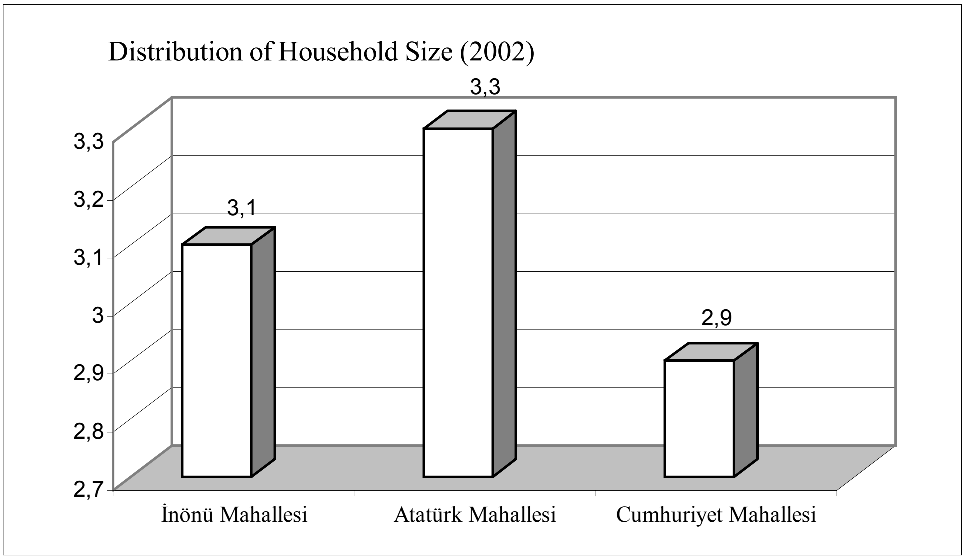
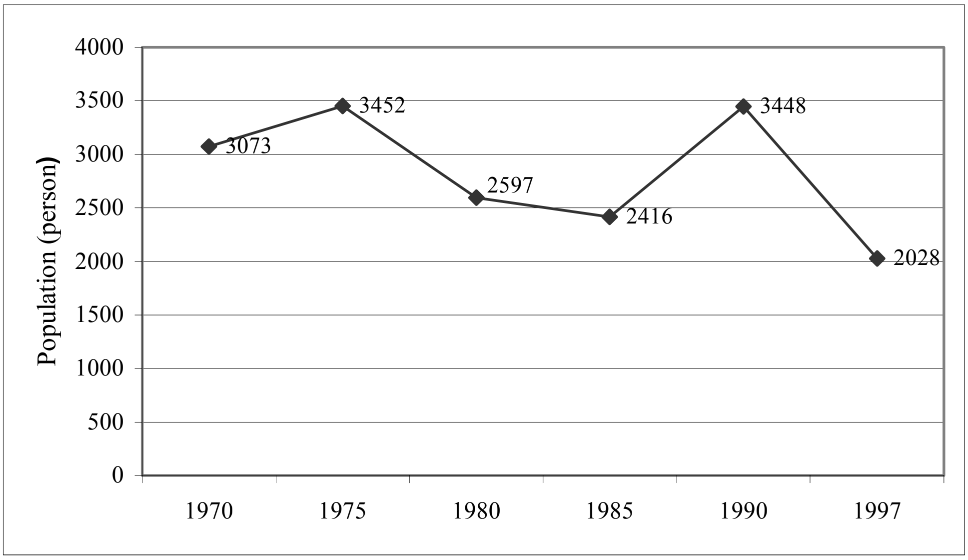


Table 7.6 Population change in the Municipality of Seyrek 1970-1997*



* The census values are the *de facto* population, i.e. population present in place on the day of counting

The existing village physically demonstrates the characteristics of a rural settlement depending upon its agriculture based economy and the scattered pattern of dwellings. Its economy is based on the production and trade of agricultural products such as cotton, wheat, corn, melon, watermelon, milk, and yoghurt. The social analysis informs that more than half of the inhabitants who have a job outside agriculture are self-employed, while more than 1/3 of those surveyed (and responded to the relevant question) are either on periodic pay-rolls or on *per diem* wages. The inhabitants of Seyrek are more producers than employers. There is limited private enterprise, and it is mainly engaged in the dairy business.

The key sector for Seyrek is agriculture. Social and public services and trade comprise the secondary ones. Almost two thirds of the householders depend on land cultivation for their livelihood while only one fourth of them are employed by animal breeding. The social survey clarifies that animal breeding for milk production is generally held in the plot of the dwelling. The larger sized enterprises concerning stockbreeding, including both cattle and sheep, are mostly located along the circumference of the village. There is also cotton cultivation in the rear gardens of dwellings in the peripheries. The larger cotton fields are scattered in Gediz Plain. Some inhabitants who are unable to engage in agricultural activity themselves because of a lack of hands in the family or because they are old, ill, or face economic problems, contract share-farming, splitting the tenure of their field with another farmer in order to harness half of the income of the crop. Besides, some of the older farmers have regular pension through Bağ-Kur (The Individual Retirement Plan of The Ministry of Labour and Social Security). According to the limited data about the income of the inhabitants, the middle-income families of Seyrek earn around 200 million Lira per month. The residents earning less than 200 million Lira constitute 46% of the population living in Seyrek, while 37% have larger monthly income.

The information obtained from the social analysis indicates that nearly 70% of the inhabitants own a motor or mechanical transport vehicle. Ownership of the tractor ranks first: more than one of two families have a tractor. Cars, motorcycles, bicycles and minibuses are other vehicles owned. In terms of preference for transportation, most of the residents prefer use of the collectively hired cab—*dolmuş*—run by the municipality than their own vehicle.

Almost all residents attach importance to the domestic preparation of seasonal foods such as tomato paste, pickle, *erişte* (a kind of home-made *pasta*), olives, jam, and canned and dried foods, so that they cost less, are healthier, and taste better. This is the traditional activity of women in Seyrek which can be sustained. The interviews point out that the women find the activity necessary for the economy of the family. Actually the sustenance of this tradition demonstrates a notion that is the sustainability of the food chain in the agriculturally based lifestyle. In terms of the use of fertilizer in the fields, the majority of inhabitants who are familiar with agriculture use the artificial fertilizers—locally termed *şeker gübresi* ('sugar fertilizer'). They also vow, with no hesitation whatsoever, by the necessity of the development of pesticides to multiply the yield instead of utilizing natural predators. Some of the inhabitants complain about the low availability rate of natural fertilizers in the immediate region even though they prefer them.

Current layout of social interactions in the Seyrek settlement: The social structure of the semi-rural village may be analyzed firstly in two groups as the permanent inhabitants and the temporary ones. The former is defined as the local inhabitants of Seyrek in continuous residence. The latter is comprised of local inhabitants living there intermittently and seasonal workers who are in residence in the harvest period alone. The vast majority of the local inhabitants are in continuous residence, while the elderly and single ones go to live with their relatives in particular months, specifically in winter. In fact, almost all residents have accommodating close relatives outside Seyrek, particularly in spheres to Seyrek nearest such as—in order of predominance—Menemen center, Çiğli, and Şemikler of Karşıyaka.

The other local inhabitants stay seasonally, or even daily, between spring and autumn so as to be employed in the agricultural sector, especially in the planting, growing and harvesting of cotton. These inhabitants already own houses, mostly apartment flats, in the Menemen district or within the boundaries of the Greater Municipality of Izmir. All these signify that there has been emigration from Seyrek to the closer urban residential areas of Izmir. Yet the relations with the village have not completely disappeared. As a result, some dwellings may be either abandoned for long periods or even demolished.

Moreover, the seasonal workers, the *tayfa* ('hands'), come from the rural areas of Anatolia, particularly Afyon, Mardin, Diyarbakır, and Balıkesir for job opportunities. People from Balıkesir are locally called as *Çetmi* or *Çebni*. Since they come with their families, including wife, children, and parents, the social life of the settlement is seasonally refreshed. From September to early November, the village comes alive and experiences its most dynamic period: the children continue working in the fields even after they start school. This is the season when economic activity in the village is re-vitalized. Besides, the settlement includes two private high schools, Özel Ekin and Özel Türk, which supplement the economic and to some extent social interactions of the settlement.

Observations indicate that the settlement aside from these external dynamics keeps its calm and peaceful character in winter, and the introverted social structure is still based on the semi-rural social life. The social analysis signifies that the social structure of the Seyrek settlement has homogenous character, consisting mainly of the local inhabitants. More than half of the people who are not born in Seyrek came there by marriage, few of them relocated for job opportunities. Among 309 households, there is only one household that moved from Izmir for permanent stay in Seyrek. Interviews convey that families prefer living in Seyrek because of the rural life close to the city, Izmir. Yet they complain that the settlement is too quiet, introverted, and does not facilitate social interaction between local inhabitants and the newcomers.

The information derived from the social analysis signifies that the inhabitants emphasize particular issues—as lacking and causing dissatisfaction in their life and settlement. The primary concern is the lack of job opportunities: many residents who complain about the insufficiency of income from agricultural activities highlight the absence of factories, workshops, and small businesses in Seyrek. The female inhabitants' most important complaint concerns the absence of a multi-purpose village hall for entertainment. Many of them criticize the dependency on Menemen for, say, wedding ceremonies and other ritual gatherings. They moreover wish for small sized family cafés or 'tea houses'—*çay bahçesi*—in the settlement, believing that such would make for more social interaction especially for women. More than half of the inhabitants point at the need for shopping facilities. Some of them underline the lack of a market site—*pazar yeri*—to supply daily foods. Others hope for an increase in the number of shopping places including the large supermarkets in Seyrek that will appear along with the development of the dense residential district of Ege-Koop. The issues of dissatisfaction concern the urban services of the Seyrek Municipality, particularly the absence of park areas for children, the dirtiness of streets, insufficiency of health services, lack of educational quality, and the problem with the sewer system in Seyrek. Complaints about the sewer system arise from the incapability of drain flows on the flat plain that causes floods and bad odors. Nevertheless, in comparison to the past, Seyrek inhabitants underline increased contentment with municipal services, and the advantages of having become a municipality.

When **inhabitants' opinion for environmental concerns** is considered, it may be stated that there is sensitivity to environmental problems in Seyrek and the periphery. The social analysis and interviews indicate that the residents firstly mark the pollution in the street caused by the *tayfa*, cattle breeding, and the general inattentiveness of Seyrek denizens. The insufficiency in municipal cleaning services and the incapacity of the sewer system are the other important factors underlying this problem. Local inhabitants secondly complain about a regional environmental issue, the bad odor. Almost all complaints mention the intolerable odor originating from scorched leather waste in the Menemen Leather Industry Free Zone. Some very few of them are equally disturbed by the odor produced in cattle breeding, the polluted water of Gediz River, the Harmandalı Solid Waste Disposal Area, and the closer chicken farms. Even though few in number, some residents are aware of the pollution in Gediz Plain, especially the air pollution by the Aliağa Demirçelik Factory, the Aliğa Refinery, and the Menemen Leather Industry Free Zone. Among those employed in agricultural activities, some are aware of the water pollution due to the industrial waste pouring into the Gediz River, and the soil pollution due to pesticides and irrigation by the Gediz River. The pouring of domestic sewers into the irrigation canals is also among emphasized issues.

7.1.1.3. Building Features

In terms of the *general layout of dwellings on the neighborhood scale*, there are varying combinations of dwellings differing according to the location of dwelling either in the settlement center or in the periphery, the size and form of the building plot, the size and needs of inhabitants, and so on. Yet it is quite possible to group them into two in keeping with the situation of houses on different plots in relation to one another: those clustered houses in smaller sized organic plots which are usually allocated in the denser pattern of the settlement core, and the detached masses in the large orchards and/or fields which are often located in the periphery of the settlement. In the denser parts of the village, the net residential density is more than 43 dwellings and 133 person/ha. Here the plot sizes of clustered dwellings decrease down to 150-200 m^2. Through the peripheries, some of the dwellings are situated in larger sized plots, at least 450-500 m^2, and average 700-800 m^2, surrounded by high garden walls. The net residential density is around 21 dwellings and 65 person/ha. The plots at the peripheries are generally more than 1000 m^2; many dwellings are located within a larger agricultural field. Thus in these, the density is the lowest. The following items present the lay-out of the overall arrangement of dwelling in relation to its plot.

House clusters: Some groups of houses form compact clusters in the denser districts of the settlement (Figure 7.8). Houses in attached form come together allowing for maximum utilization of land. Therefore the limited size of open area calls for efficient organization.

The simple prisms of different users combine organically and constitute a cluster. Each complex forms a body in varying sizes, heights and compositions according to the location of the cluster in the settlement pattern; the pattern

Figure 7.8 Several examples indicating clustered settlement pattern of Seyrek

follows the needs of the householders, their neighborhood relations, the size of the plots, the sequence of construction, and so on, along a street or off the street. The clusters are composed of two or more houses, frequently separated by high garden walls, except in the cases where dwellings of families of relatives have come together to form a cluster. The formation of each dwelling manifests the nature of neighborhood relations in the Seyrek settlement. Dwellings within a house cluster are respectful of adjacent buildings, and the interfaces and joints of the dwellings are carefully formed. The organization of the inner layout of dwellings, the number of storeys, the openings, the location of service spaces in the garden, and the material, type and height of the garden wall signify the introverted character of community life that maintains the privacy of family and daily life inside the boundaries of the plot, and is more than anything else oriented toward the inner space for its inhabitants.

In terms of *dwelling-building lot relations*, the two major configurations for building organization in the plot come equally to the fore; namely, the dwelling as boundary to the street, and the dwelling off the street:

Dwelling as boundary to the street: Some of houses define the street with their façades: these display several variations (Figure 7.9). The dwellings shaping the circulation routes at denser districts mostly constitute the house clusters while the others in the peripheries are separated by large open areas such as cotton fields or orchards in the backyard. Some of them are bounded to the street by their long or short façades. The other type is located at the corner of the plot where a house defines the street with two façades. The last type of dwelling defines a side of the plot by its long or short façade.

Dwelling off the street: Some of the dwellings in the Seyrek settlement are located in indirect relation with the main circulation routes or paths (Figure 7.10). Daily life and livelihood based on agricultural activity are important factors leading the dwelling off the street. The maximum utilization of agricultural land, or easy access to the depot or shed are important concerns for inhabitants whose economy is based on agricultural production. For this reason, the dwellings may be located on the farthest corner or side of the plots and do not have direct relation to the street.

The houses off the street are located on building lots in three ways, yielding a three-fold typology: the first type of dwelling is in the middle of the

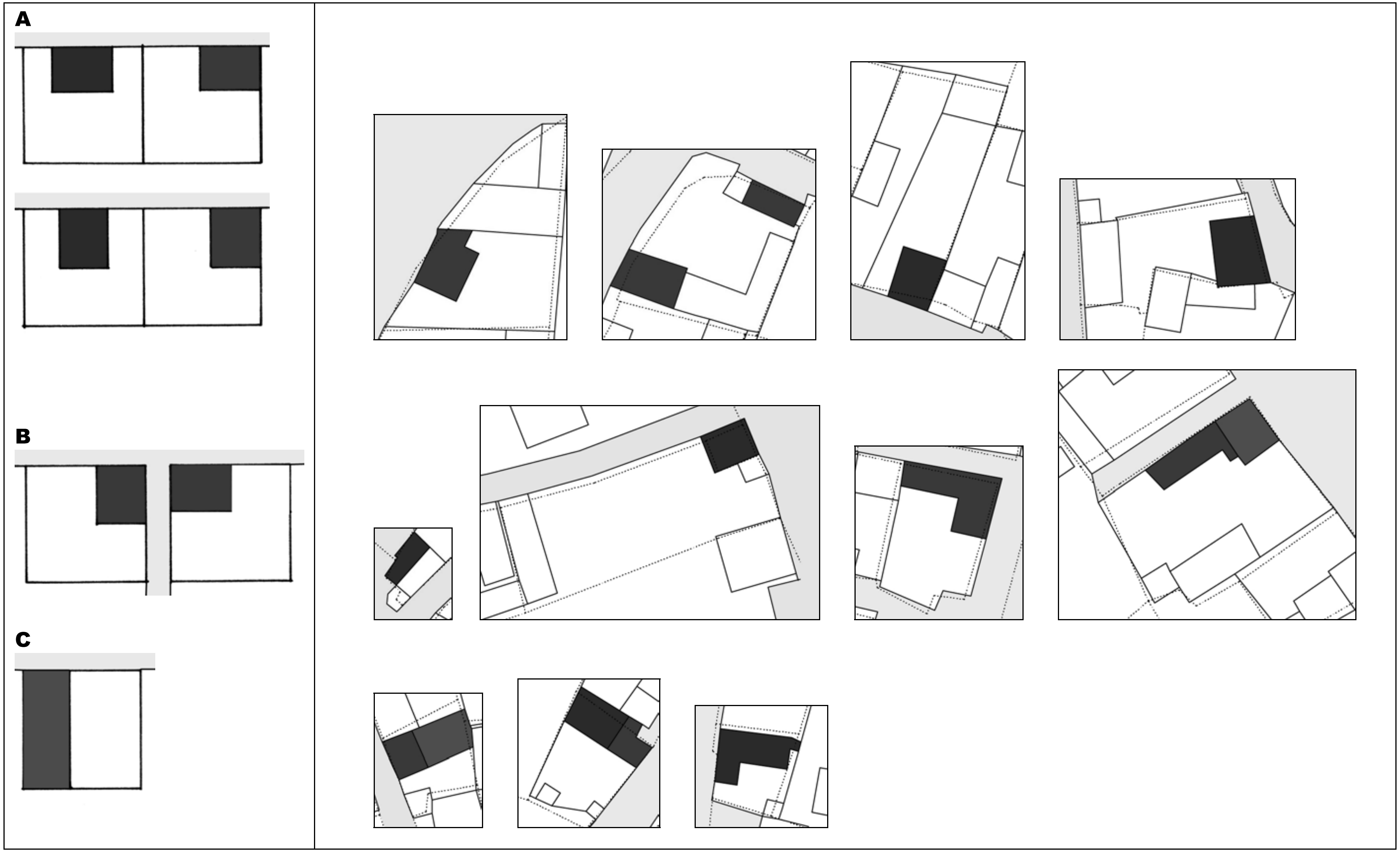


Figure 7.9 Location of dwellings as boundary to street

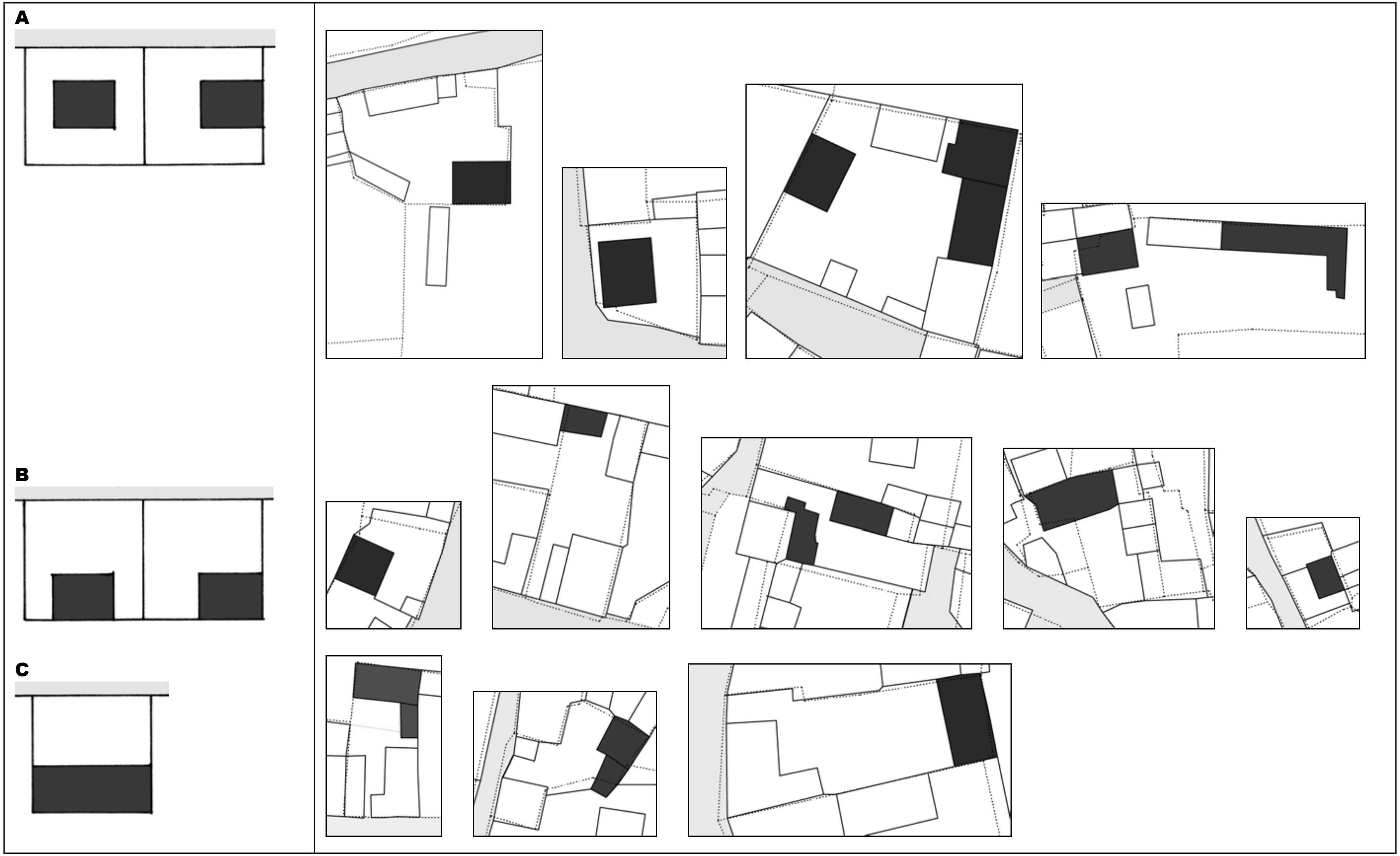


Figure 7.10 Location of dwellings off the street

plot either surrounded by an open area or on the lateral. In the second type, the dwellings located on the farthest side of the plot are either on the side or on the corner. The last type of dwelling defines an open area between the street and the building, i.e. itself.

Degrees of publicness: The public use of spaces and, at the same time, the "privatization of territory" (Asatekin 1994, p. 93) comprises the hierarchical relations of privacy-semi privacy-publicity. This is represented by the living area-service area-neutral area organizations in the dwellings of Seyrek.

The spatial reflection of public and private relations of inhabitants may be formulated in terms of the room-dwelling unit-garden/courtyard-street-neighborhood continuum. The dwelling unit, being the only 'private space', is the beginning point of this continuum. The outer space onto which the door opens or where the terrace in front of the dwelling is located, make up the 'semi-private realm' with typical characteristics of the neutral activity node in the boundaries of the dwelling unit. The open area such as the courtyard, or the semi-open park area—*saya*—garden, orchard or field, and service spaces such as depot, shed, and toilet facilities are 'semi-public spaces' linked to the 'public realm', namely the path, street and the rest of the Seyrek settlement. The common notion of all dwellings in Seyrek, regardless of whether they verge on the street or are located off the street, is that the continuum along which private space runs, i.e. the dwelling itself, never opens directly on the public street. Instead, it binds first the semi-public inner garden or courtyard.

Circulation realms: Since the agricultural production and husbandry are the main sources of income in Seyrek, the house has become a complementary, functionally inseparable part of the rural life. This functional obligation brings together specific spaces laid in a particular sequence. Here, the dwellings may be evaluated in terms of a system of circulation realms, or a sequence of spaces. The preparation of the core circulation map may serve the designer(s) in defining the dwelling unit with its plot physically as a whole. The dwelling of Seyrek may relate to the following five main spheres, respectively from major to minor (Figure 7.11):

1. the settlement and street
2. the building lot, open or semi open area—courtyard, garden, field, *saya*

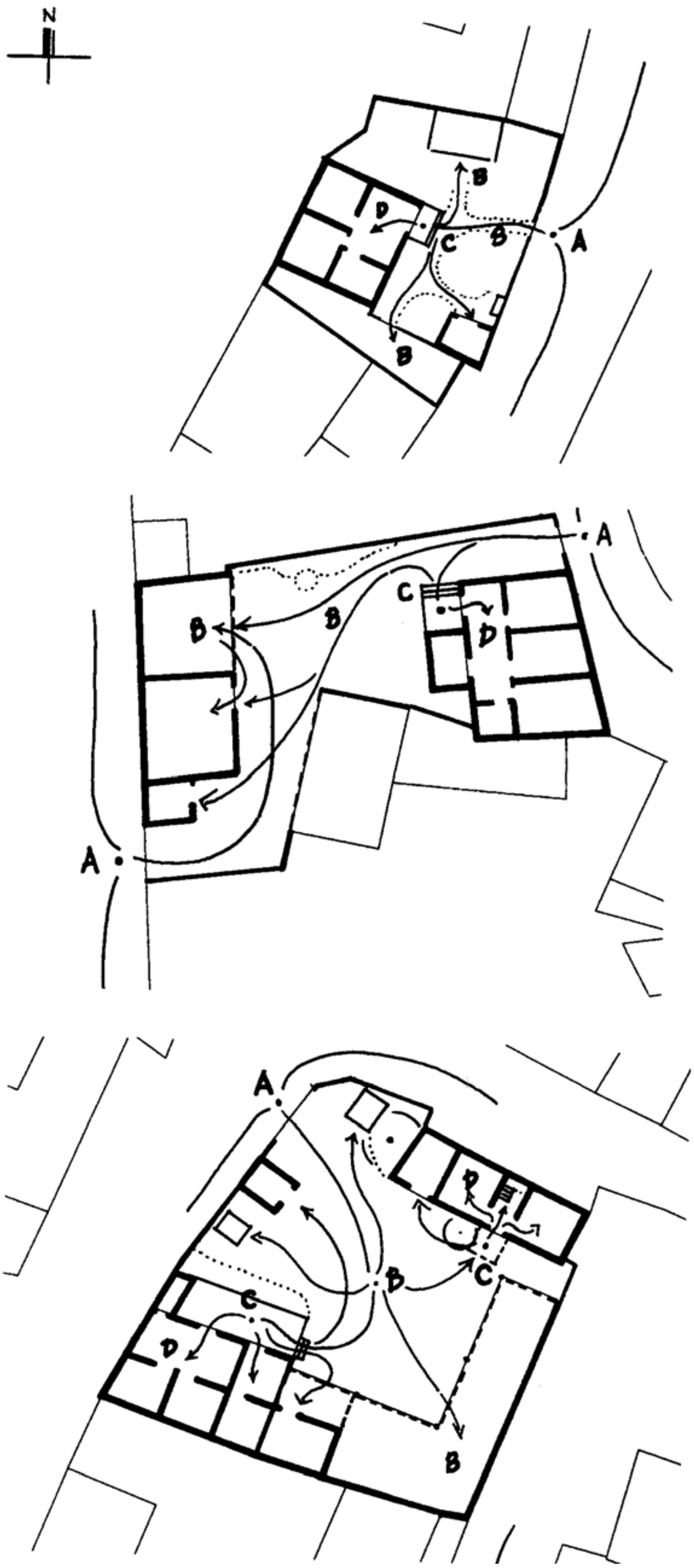


Figure 7.11 Circulation realms of dwellings in the Seyrek settlement

3. the closed area—depot, toilet, shed, poultry

4. the front of the dwelling, terrace

5. the dwelling unit

The first is the largest sphere with its scale, and supports the character of public space. The second realm is the semi-public open area where the daily works and/or economic activities pass through. This realm marks the first entrance to the whole system of private circulation realms, in other words to the territory of privacy. The separation between these two reveals itself mostly by the garden walls, trees, level of ground, or ground pavement. The service spaces, e.g. closed or semi-open depot(s), shed, poultry, toilet, and/or *saya* serve as a third realm functionally bound to the second and fourth realms, thus located close to the entrance to the property and far enough to the dwelling.

The entrance space to the dwelling has the role of a main distribution area to other realms. It marks a gateway between the inside and outside, and sometimes serves as a resting and/or gathering place. This central realm differentiates itself by a porch, the level of ground, and/or the ground texture.

The dwelling unit is the arrival point, the destination, where the circulation sequence comes to a close. It is the closed private space, the house. This unit, besides, has its own inner, smaller circulation realms according to different functions carried in the space.

Entrance to one's domain: In such an introverted society, entrances to the plots attach importance so as to set a foot in the transition between public and private realms (Figure 7.12). Almost all dwellings have the door to stop the free gait into the plot. In addition, the importance attached to the entrance sometimes becomes the indicator of the economic circumstances of inhabitants in Seyrek rather than a physical border to the private realm. For example, a dwelling has a door opening to a main street with a well-constructed, timber truss porch above even though it has no garden walls defining the rear and/or lateral sides of the field. Thus it is quite likely that the entrance gates in the main street façade are differentiated by color and a two-sided porch. The entrance of dwellings having a *saya*, a larger courtyard and/or a garden has double winged timber or sliding metal doors to permit the entrance of vehicles. These are mostly painted green or grey, and are not paneled or ornamented. The timber ones are vertically lathed. Besides

Figure 7.12 Examples of entrance to the plots of traditional dwellings. **Photography** Zeynep Durmuş Arsan, 2001.

the entrance gates, the transition may be realized by the difference in the material and texture of the ground pavement leading one to the center of the semi-private realm.

Cotton fields and semi-ruralness: The semi-rural settlement denotes itself by means of agricultural activities that still continue in and around Seyrek. The larger plots in the periphery are regularly cultivated for cotton production. In addition, the several vineyards, fig, almond, mulberry trees and vegetable gardens in the building plots provide for the daily needs of some inhabitants. One contradictory feature of Seyrek is that the land allocated for vegetable or orchard cultivation is fairly limited, and nearly disappearing, since the inhabitants of Seyrek have been depending on Menemen, the closest urban center, to meet any type of basic need. The use of large pieces of land for growing cotton and corn alone lead the families to prefer to buy instead of growing produce themselves. The interviews with the inhabitants of Seyrek clearly indicate that the latter are not willing to grow seasonal fruits and vegetables for their own needs since they find the commute to Menemen more convenient. In spite of the high capacity of the land to supply for needs, this rising dependency on an external center accelerates the transformation toward urbanization because of the sale of orchards and fields for construction of new buildings. All indicate that the food chain, one of the important cycles of a healthy ecosystem, has been broken in Seyrek, and the settlement has been losing in self-sufficiency (Figure 7.13).

Figure 7.13 Cotton fields in the periphery of the residential areas (left) and the view of the case area (right). **Photography** Zeynep Durmuş Arsan, 2002.

In terms of *the basic characteristics of a dwelling in building scale*, it is quite possible to arrive at a classification of the dwellings of Seyrek in line with the general layout of dwellings and their formation. The physical survey of Seyrek enables the inference that there are three fundamental units in the Seyrek settlement locally known as the *sakız*, *kulle* and *dolma* type houses. These fundamental types make up the simplest units, in other words the primitive types seen in the Seyrek settlement.

Fundamental types: The *sakız* type dwelling is a linear prismatic mass composed of three syntactical spaces: two main spaces, viz. the room and the kitchen with the semi-open or mostly enclosed space—*hayat*—in the center (Figures 7.14; 7.15; 7.16). This is a single- or two-storey adobe building with a flat, or more frequently, pitched roof. The *sakız* type of dwelling has a long, thin rectangular shape. It measures on the average 4.40 x 11.55 m, while the size of specific buildings shows variations of 4.00-4.80 x 8.85-12.20 m. Its ceiling height is around 2.5 m. The larger room is a multi-purpose space where various activities such as living, socializing, dining, cooking—on a stove in winters—storing and sleeping are held. The entrance space in the center, locally termed *hayat*, functions as a circulation hall connecting the rooms as well as for storing and bathing. The entrance to the bathroom is logically from the kitchen where the water is heated. The third space, which is the kitchen, may have a fireplace which is located in the corner. In terms of the circulation realms inside the building, the *hayat*, the bath and the kitchen constitute the service realms while the room serves as the living realm alone. This primitive unit constitutes the base for larger sized dwellings. Some of the building types in the Seyrek settlement are derived from this primary unit according to the varying requirements of inhabitants.

The *kulle* type of dwelling,—the term means 'tower house'—consists of a two-storeyed prismatic mass composed of two vertically placed syntactical spaces, the bedroom on the ground floor and the living room on the second floor, conjoined by a staircase (Figures 7.17; 7.18; 7.19). This type constitutes the highest dwelling in Seyrek made of adobe. This simple unit rises directly from the ground, and it is covered by a pitched roof. Its placement on the building lot varies according to location, yet generally is the dwelling placed at a boundary on the street along its longer façade. The *kulle* type of dwelling is of rectangular shape and on the average measures 4.70 x 7.00 m, while the size of specific

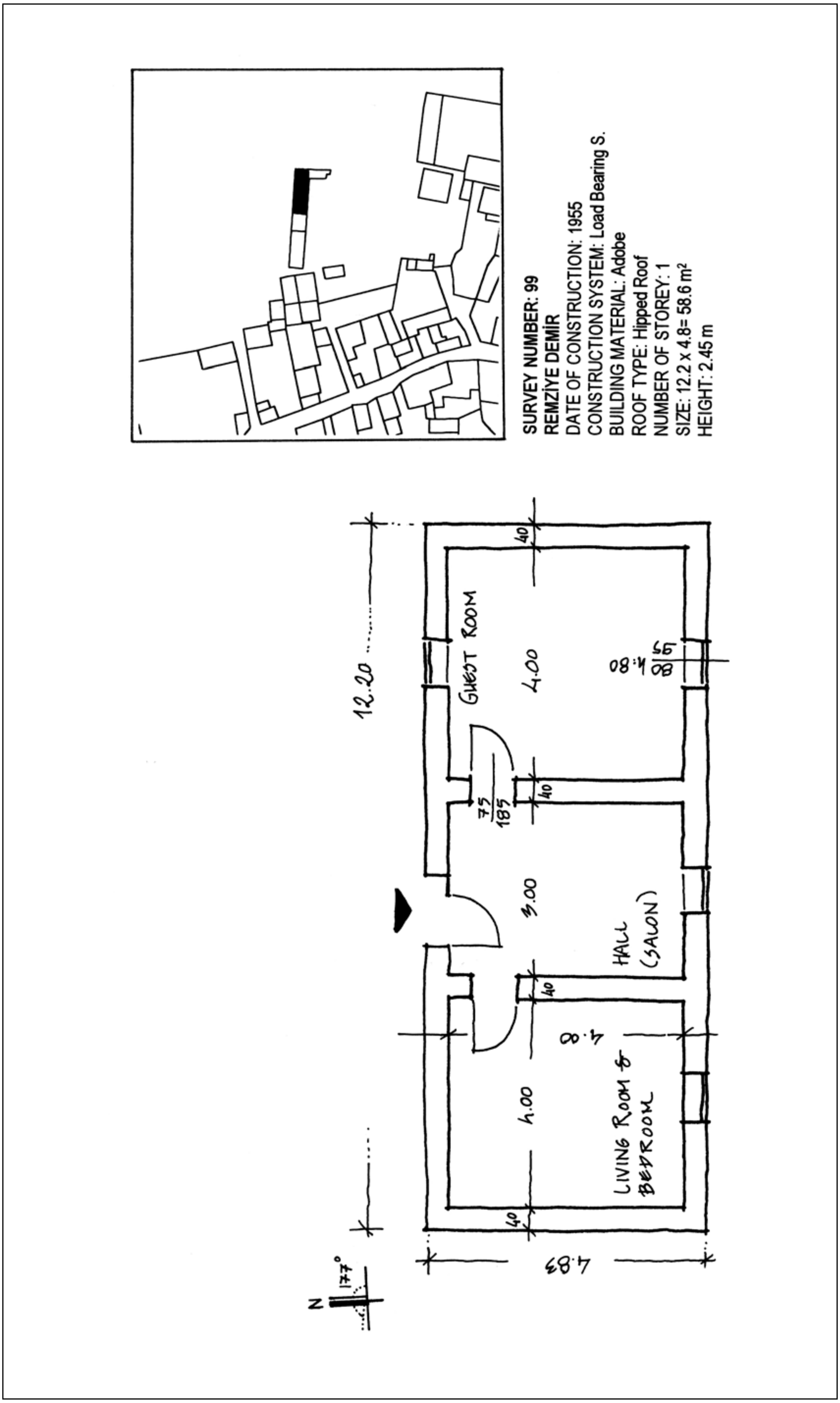


Figure 7.14 *Sakız* type dwelling: Remziye Demir House

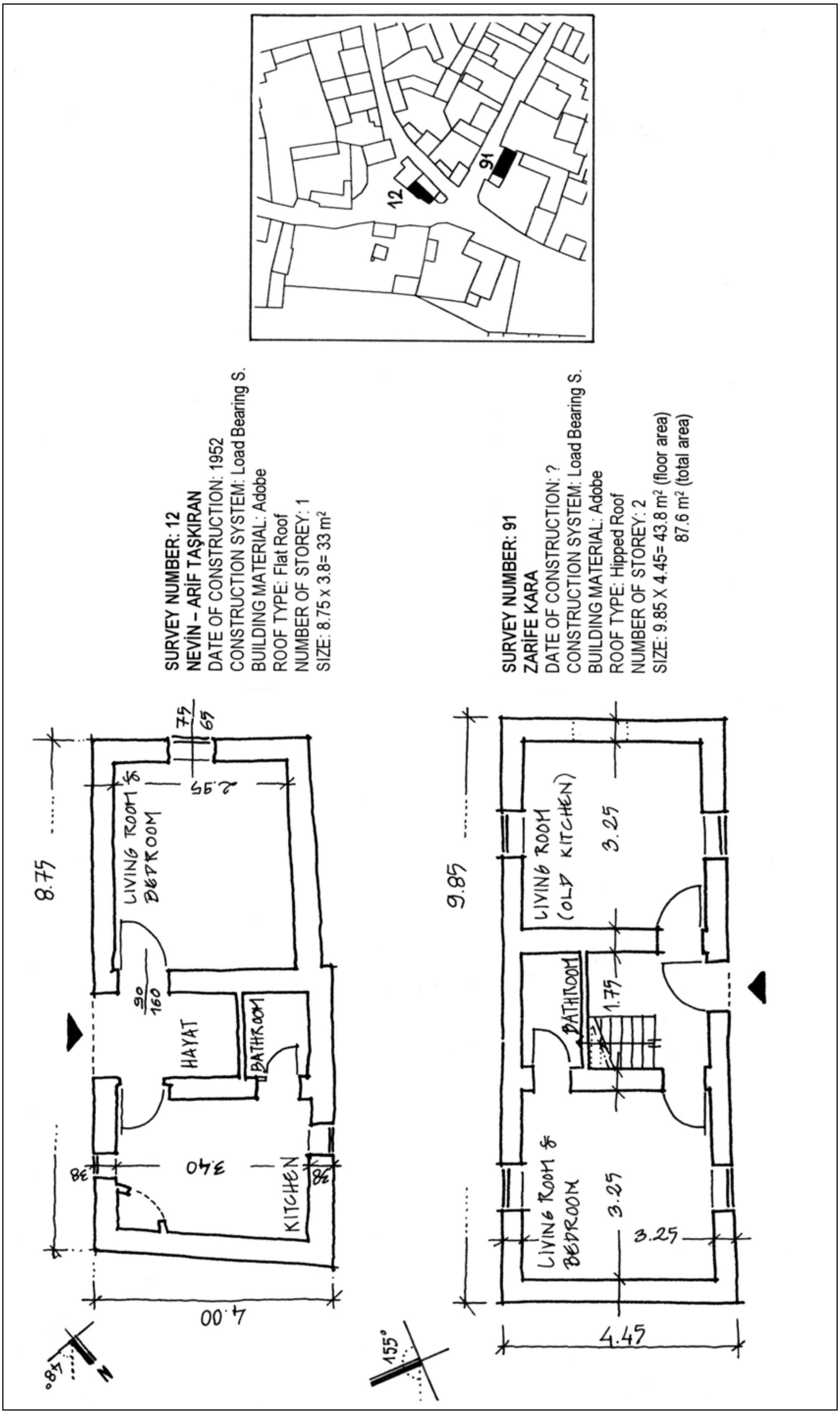


Figure 7.15 *Sakız* type dwellings: Nevin-Arif Taşkıran and Zarife Kara Houses

NEVİN – ARİF TAŞKIRAN HOUSE: SOUTH FAÇADE / S.N.: 12

ZARİFE KARA HOUSE: SOUTH FAÇADE / S.N.: 91

ZARİFE KARA HOUSE: NORTH FAÇADE / S.N.: 91

Figure 7.16 View of *Sakız* type dwelling. Photography Zeynep Durmuş Arsan, 2001.

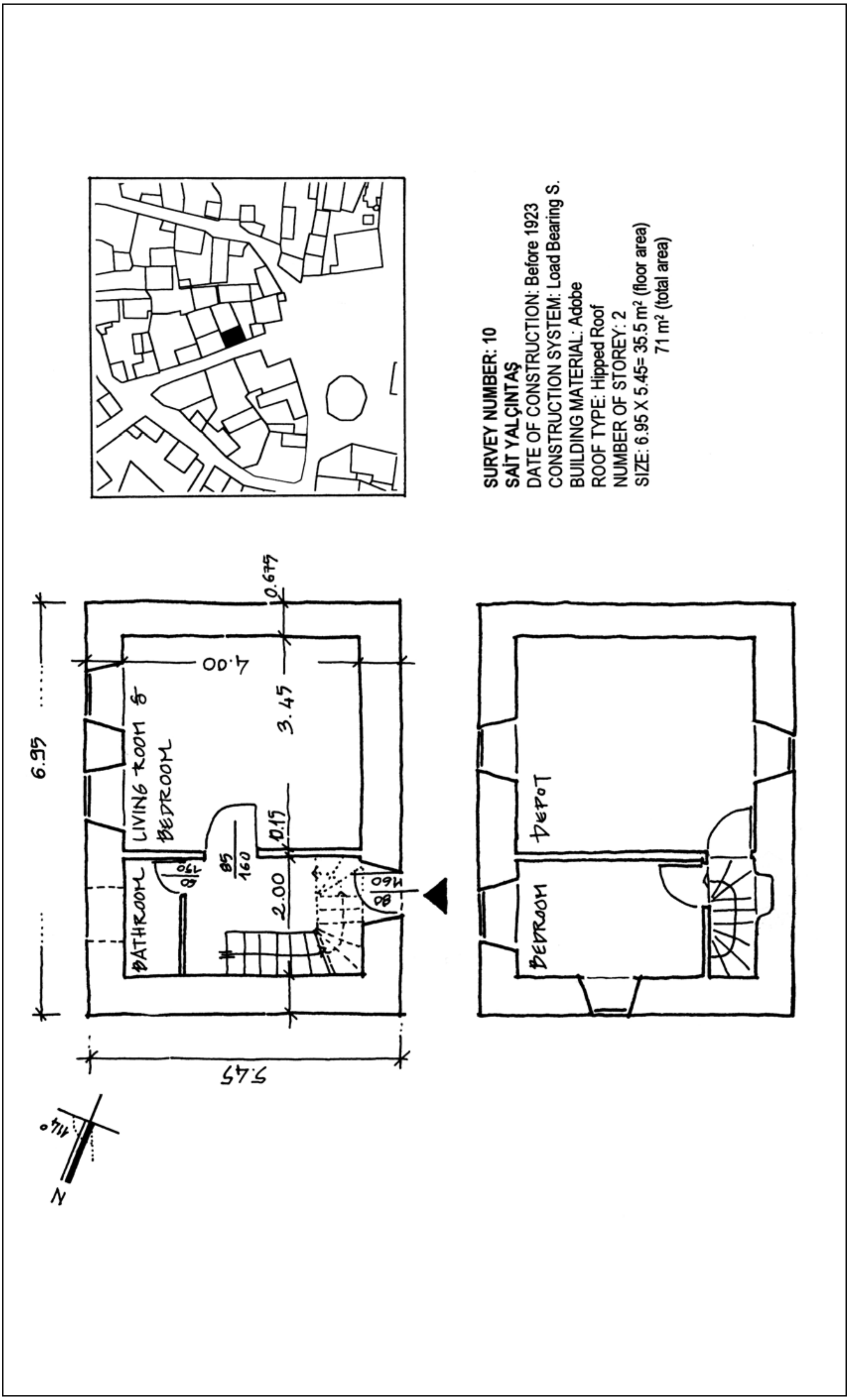


Figure 7.17 *Kulle* type dwelling: Sait Yalçıntaş House

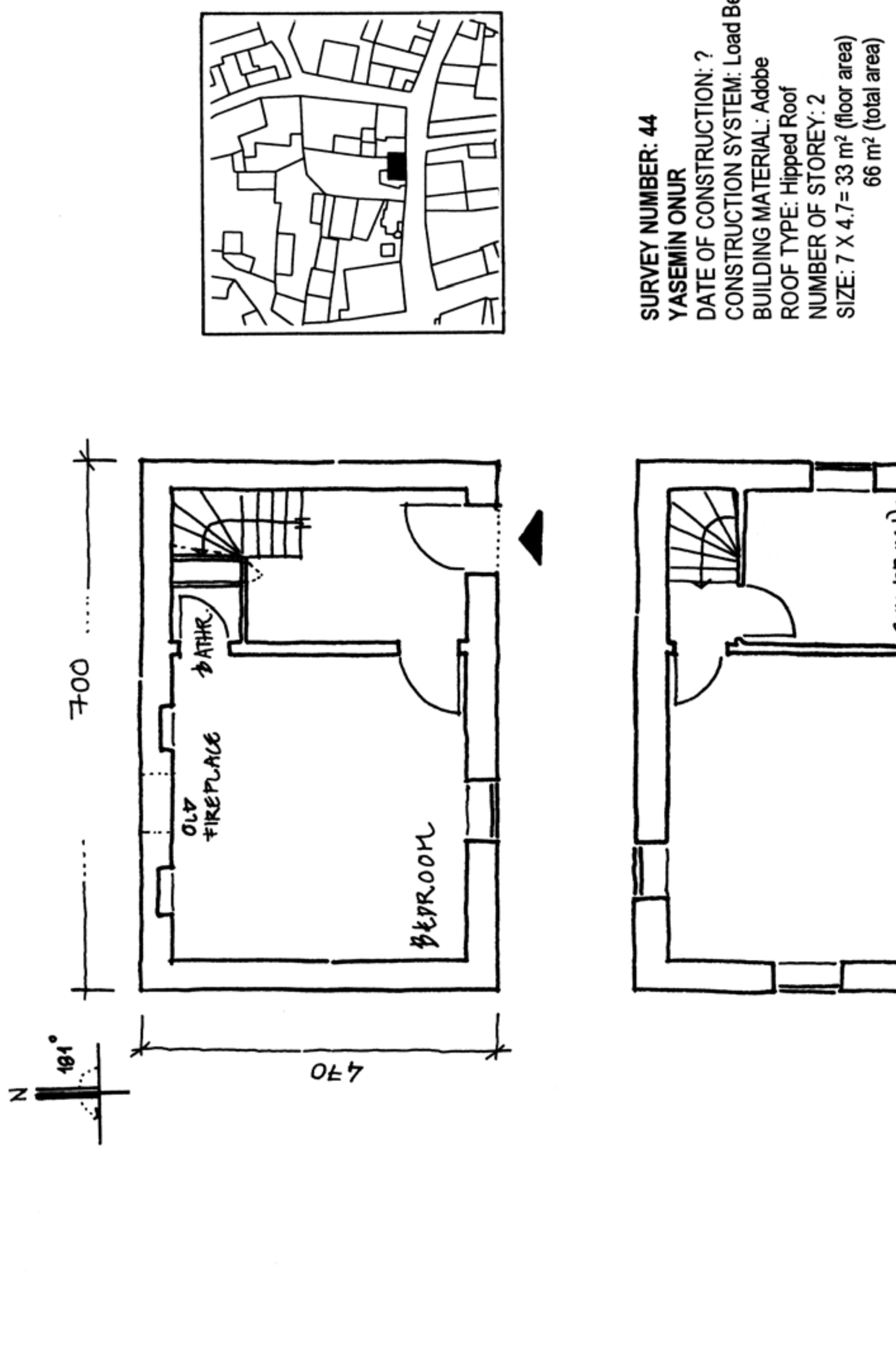


Figure 7.18 *Kulle* type dwelling: Yasemin Onur House

YASEMİN ONUR HOUSE: NORHTERN FAÇADE / S.N.: 44

RUKİYE HANIM HOUSE / S.N.: 101

Figure 7.19 View of *Kulle* type dwelling. **Photography** Zeynep Durmuş Arsan, 2001.

buildings shows variations of 4.60-5.45 x 6.95-7.45 m. The bedroom on the ground floor is allocated as private realm for the parents. The staircase is a multi-purpose space where various activities such as distributing, cooking, storing, bathing and sleeping are held in the same vertical service core. The original place of the kitchen is the ground floor. Yet because of insufficient space, the residents tend to add an extra space for kitchen to the entrance façade. The bath is also on the ground floor, under the stairs. The entrance of the bath is from the bedroom. The room above the kitchen is generally allocated to the children. The *kulle* house is the well-known housing type since it is one of the oldest housing examples of the settlement. The type is rather advantageous due to the location of the living space on the second floor enabling watching the outside and keeping the negative impact of the humidity from the ground.

The *dolma* type of dwelling is a square, on occasion a near-square, prismatic unit composed of four syntactical spaces: three of them directly open on one space, i.e. living room—*salon*—(Figures 7.20; 7.21). In terms of the gradiency of privacy, the most public realm inside the building is the living room which serves as space for circulation, i.e. a larger sized hole, including the entrances of kitchen, family room—*koltuk odası*—, and bedroom. In crowded families, the family room is transformed into the children's room. This unit is the only type that rises upon a low basement, around one meter above the ground level; just to keep the dwelling from the impact of humidity from the ground. This one-storey building with a pitched roof is generally placed upon a boundary on the street. The size is 8 m x 8 m, sometimes in variants of 8.10 x 8.10 m, or 7.60 x 7.75-8.15 m. Our survey has shown that the first *dolma* type of dwellings were built in Seyrek in the 1960s. The type therefore comprises load bearing buildings made of brick, specifically solid brick, instead of the adobe used in the *sakız* and *kulle* types.

All three types have a space in common, i.e. the terrace naturally attached to the front of the mass in varying sizes. The latter is differentiated from the courtyard or the garden by a platform above ground level and/or by its ground pavement, e.g. stone tapestry or thin layer of concrete. Additionally, it is mostly covered by the porch or the pergola—*sundurma*—which is sheltered by leaves of vine or dried reeds, in order to keep out the effects of sun, rain and wind. In the meantime, the terrace plays a connector role as the transitory area between the

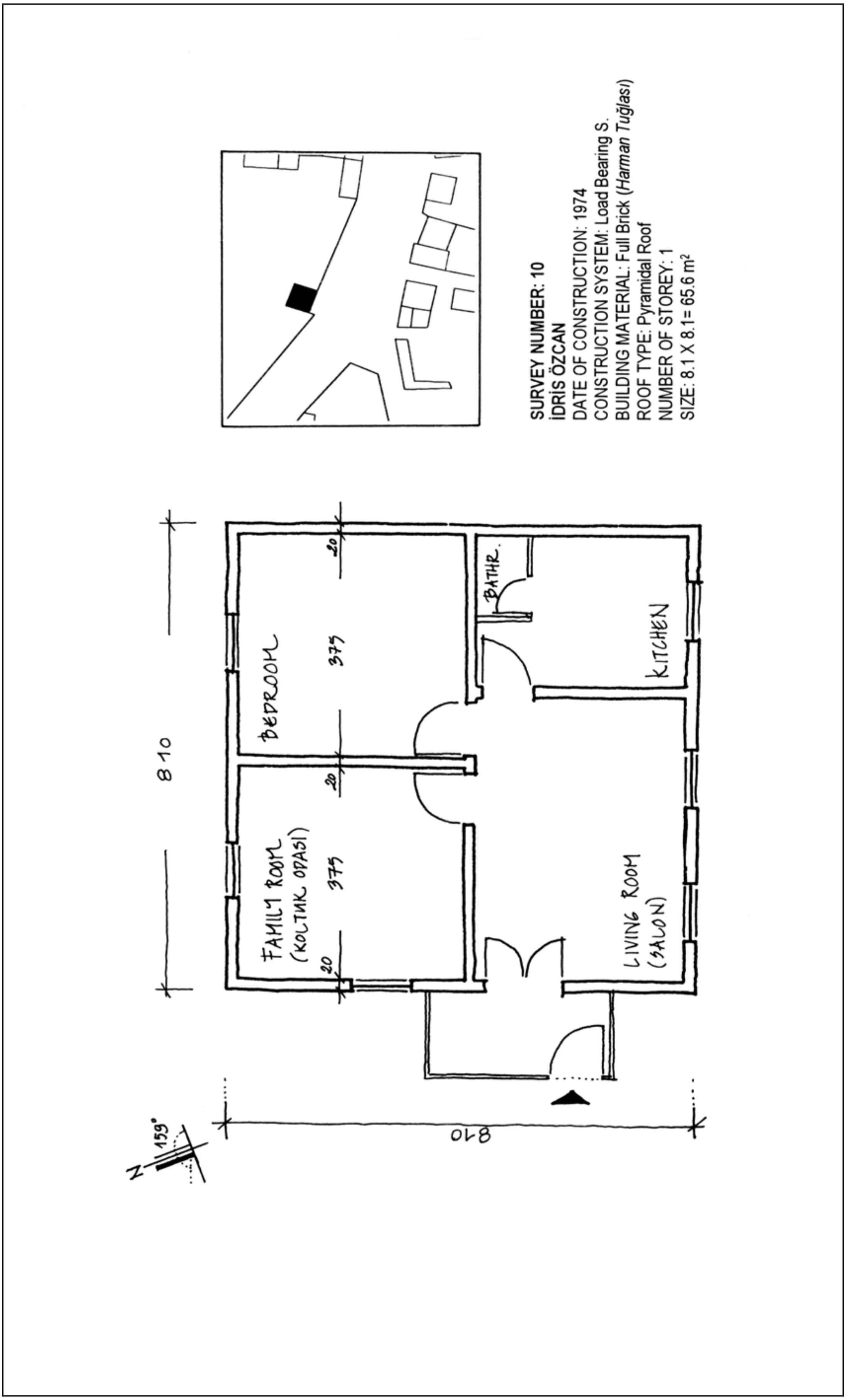


Figure 7.20 *Dolma* type dwelling: İdris Özcan House

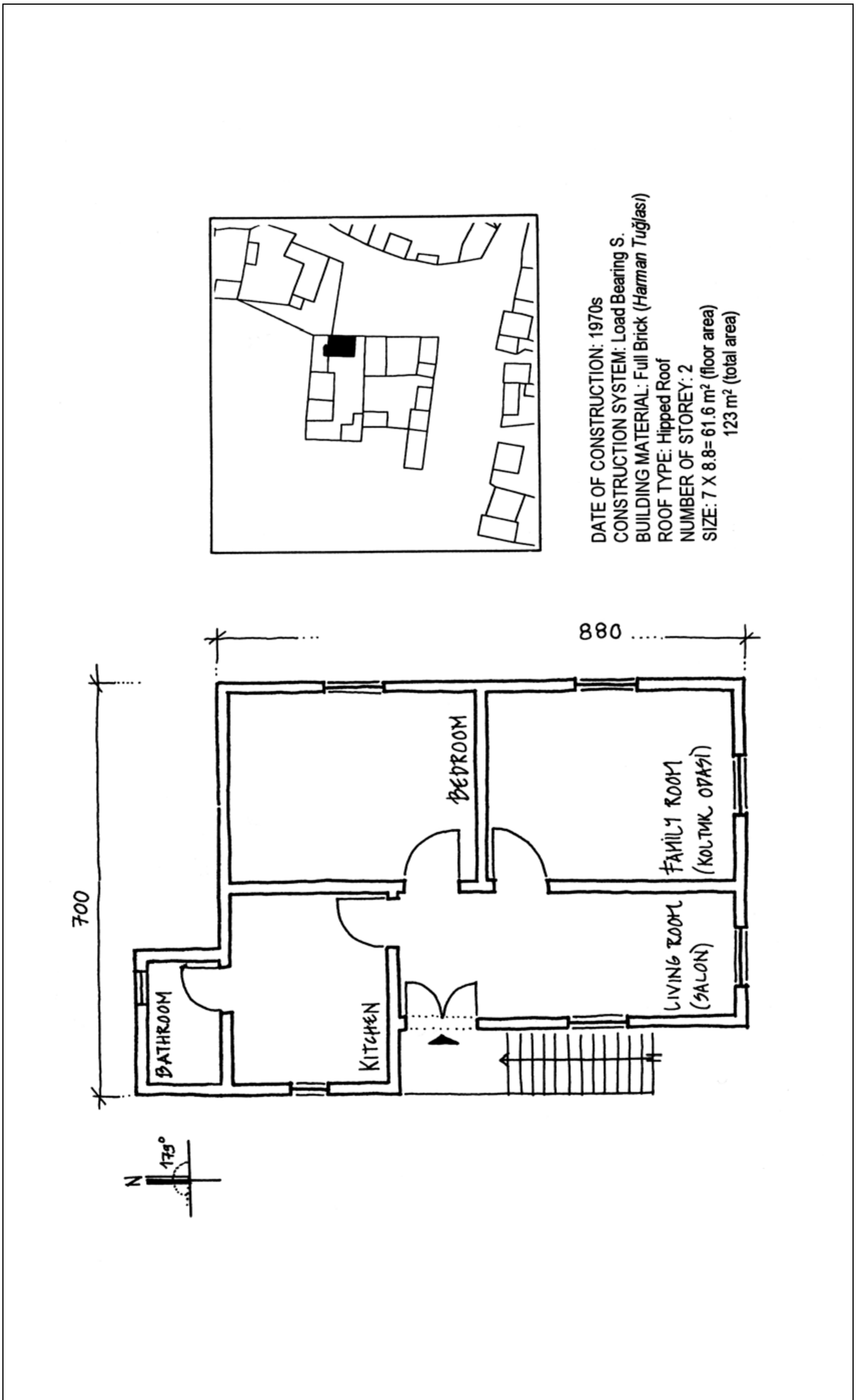


Figure 7.21 *Dolma* type dwelling with the depot on the ground floor

outside and the inside, open and closed spaces, semi-public and private spaces. In fact, the present situation of these dwellings indicates that the most important change in this place is its closure and addition to the main body. Many dwellers prefer to obtain a more protected space in winters, to stop heat loss by the entrance door, and to gain additional storage space inside.

Under the moderate climatic conditions in winter and the hot summer season, the inhabitants of the village prefer to stay outside. With the introverted character of social life, this place facing the inner garden is the central, protected open or semi-open realm where the daily activities of inhabitants mainly occur. Intrafamilial and neighborhood relations mostly take place in this space. The place in the entrance to the dwelling is a "specialised space" (Asatekin 1994, p. 109) where different functions such as preparing the meals, eating, washing dishes and clothes, and resting are held. It is notable that the traditional dwellings with a kitchen sometimes have a cooking and washing place outside, too. In addition, the preparation of annual foods such as tomato paste or cutting and drying *erişte* takes place here. Therefore this place has a smooth surface and seating with movable elements, i.e. furniture: chairs, table, and couch—*divan*.

Variations in typical dwellings: Some of the dwellings in Seyrek are the varied combinations of these three types. They are diversified along with the rising demand for more closed space because of the insufficiency of the units for the functions of living, sleeping, bathing, and cooking. Moreover, these types are transformed in terms of changing life styles, specifically after 1993 when Seyrek became a municipality. The improvement of infrastructural facilities affected the use of space: the inclusion of potable water inside the building is a case in point. Initially the semi-open or open terrace in front of the building was transformed into an enclosed space. Therefore the kitchen, bedroom, bathroom, and toilet were added to the prismatic mass while some particular functions such as sleeping were separated from the living function. The semi-open or open terrace is, then, naturally next to the dwelling unit. Figure 7.22 examines the extensions and variations of fundamental dwellings in the Seyrek settlement. The number of rooms in dwellings is the main determiner of this classification.

Size of dwellings: The social survey of the dwellings marks out the fact that the people in Seyrek live in dwellings whose lot coverage—*taban alanı*—

VARIATIONS OF *SAKIZ* TYPE **VARIATIONS OF *DOLMA* TYPE**

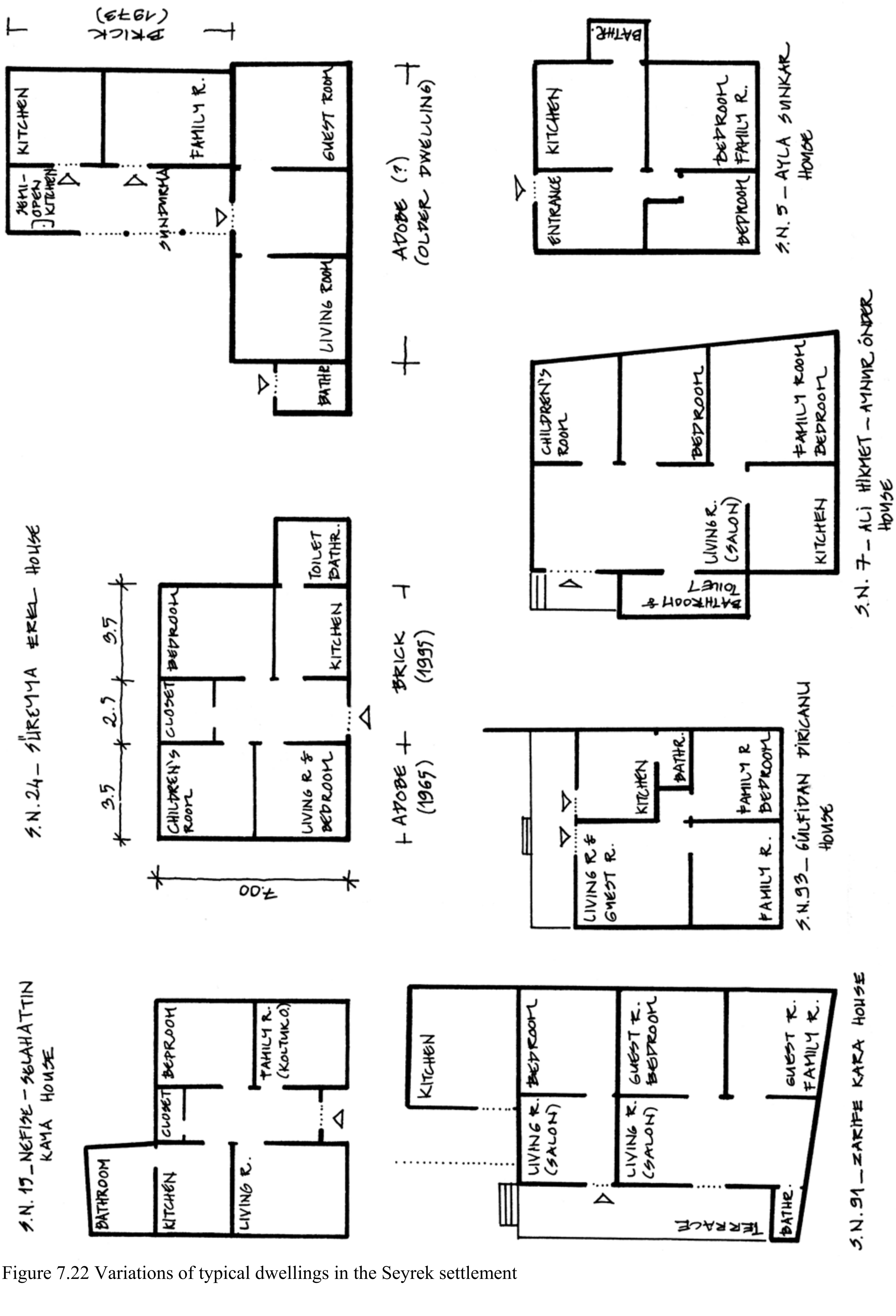


Figure 7.22 Variations of typical dwellings in the Seyrek settlement

mostly ranges between 75 and 90 m^2. Since there are also two-storeyed dwellings in the village and some of these two-storeyed dwellings constitute single units, the total area, i.e. the building use area, of a dwelling may be higher: the majority of two-storeyed single units have a total area between 90 and 110 m^2. The analysis secondly points at the fact that the size of the other dwellings whose lot coverage is less than 75 m^2 make up 35% of the surveyed dwellings. The rest of the dwellings, which have more than 90 m^2 of lot coverage, make up 32% of the surveyed dwellings. In addition, the people living in dwellings of 50 to 75 m^2 lot-size are more than those who live in lot-sizes in the 90-110 m^2 range. Many inhabitants whose houses occupy less than 75 m^2 seek, or at least wish, to add new rooms to the dwellings. On the basis of spatial insufficiencies experienced by inhabitants occupying less than 75 m^2, and average family size, which is 3.1, it may be surmised that the limit required for the dwellings in Seyrek according to present needs and requirements may be at least 75 m^2.

Functions and spaces in a plot: Examination of spaces inside and outside the dwelling regarding their functions indicates that the vast majority of dwellings include living room—*salon*—, kitchen, bedroom, family room—*koltuk odası*— and/or the living room on the interior. It is quite likely that the functions of bathing and the toilet facilities are often separated: the bathroom is in the building, and is typically entered from the kitchen, while the toilet is likely to be in the far corner of the garden. The allocation of a guest room is rarely possible because it is widely stated that there is already a need for further family or children's room. This is because some houses, especially the unrenovated old ones, have a single room for both living and sleeping purposes. For example, the functional overlapping most frequently arises with those in which the children's room and the living or family room are identical.

It so appears that the function of storing is fulfiled either in sheds, shelters or depots on the building plot rather than inside the dwelling. In particular, almost all units familiar with the agricultural activities past and present have the semi-open park area—*saya*—for vehicles, e.g. car, tractor, trailer, as well as for the storage of full-sized agricultural equipment. The items stored outside the dwelling are fuel, e.g. coal, wood, dried dung—*tezek*—for heating, and agricultural crops, e.g. cotton-bales, artificial fertilizer sacks and pesticides in particular seasons. The other most common functions located outside the dwelling are the farming and the breeding of animals for either domestic consumption or for livelihood. More than half of the residents have a separate garden, either big or small for agricultural facilities. In addition, the poultry and livestock shed may be located on the building plot.

Some of the dwellings whose building use area is smaller than 75 m^2 have an additional closed room, adjacent to the mass, used as the kitchen and/or bath. It is remarkable to note the two functions for the dwellings of local inhabitants employed in agriculture: the 'tank' seasonally stocking the diesel oil for the tractors; the 'house for seasonal workers'—*Tayfa evi*—sheltering the family of workers temporarily working for a particular landowner. Many householders complain about living so close up with the seasonal workers in the same plot in the period spanning September and November since these laborer families or groups may be too crowded, noisy, untrustable, and sometimes dirty and unruly. Therefore the householders try to maintain their privacy while constructing a proper house, toilet, and fireplace. However, they even prefer to accommodate the seasonal workers when they have enough space in the plot so as to easily control them in terms of working hours. It should be finally noted that these outer functions and their spaces mostly enclose a courtyard: almost two-third of the householders have both the garden and the courtyard while one-third have only the courtyard.

It is commonly recognized from the physical analysis and personal observations that the source of income determines the outer functions in the building plot. Particularly the agricultural activities, above all cotton cultivation and husbandry, direct the hierarchy, location and layout of specific functions within the boundaries of the dwelling. In fact, this bears an evident distinction between the spatial needs of two types of local inhabitants, i.e. whether or not the householder is dependent on agricultural facilities for his or her livelihood. The first type needs larger sized plots, 550 m^2 and above, including the toilet, semi open and/or closed depot(s), *saya*(s), house(s) for seasonal workers and their toilet, a small garden, shed(s), a smooth area for drying daily/annual foods and/or an area for tank(s). There are also residents who both deal with agriculture and have smaller sized plots. Yet they solve the need for space by using another plot specific for agriculture, by renting or constructing a new depot closer to the field, by storing the agricultural equipment on the street, by accommodating the workers in the fields in temporary nylon sheds, or by quick-selling the crop, e.g. cotton, so as not to have to occupy the limited area in the plot by storage needs. On the other hand, the householders of the second type are self-employed and thus do not need additional space. For instance, the worker in the municipality or in the fields, the bus or tractor driver, merchant, butcher, and the like. The plot size, therefore, decreases to 150-200 m^2 range. This fact notwithstanding, there are common spaces for both, such as the toilet, the semi-open or closed *saya*/depot for storing winter fuel and various equipment, poultry, a small garden, and a smooth area for sitting, resting, and drying foods (Figure 7.23).

Three-storey limit: The number of storeys in a dwelling in the Seyrek settlement varies, yet it is generally one storey. There are a very few dwellings constructed in three storeys. Earlier examples of traditional dwellings are generally in one storey, except the *kulle* houses, which are in two storeys. Most of the two-storeyed dwellings are indeed the single units located in the denser districts of the village, or those owned by inhabitants whose economic power is relatively higher. The new buildings are generally three storeys with a depot on the ground floor. In these types, each floor serves as a separate dwelling unit. There is a tendency to build more storeys among the inhabitants of Seyrek. The interviews with the inhabitants convey that to live on higher floors than the ground is more prestigious since this manifests the economic wealth of the family. Besides, it is widely accepted that living on the second or a higher floor is healthier than living on the ground floor because of humidity problems arising from the ground.

Façade arrangements: There is no dominant façade arrangement in dwellings in Seyrek. The street façade of dwellings off the street are composed of full garden walls higher than the eye level. Buildings that stand as a boundary to the street have openings viewing the street, yet the openings are usually timber or plastic shuttered. The original examples of windows in traditional dwellings have double winged wooden shutters. The size of windows in adobe houses, including *sakız* and *kulle* types, is smaller. Windows are generally in rectangular form with timber jams. The average dimensions of windows are of 75-80 cm in width and of 90-95 cm in length, with a width to length ratio 2 : 3. The dimensions in the *dolma* type and newer dwellings are generally longer. Here, the proportions are entirely different with 3 : 2, 1 : 1 or variations thereof.

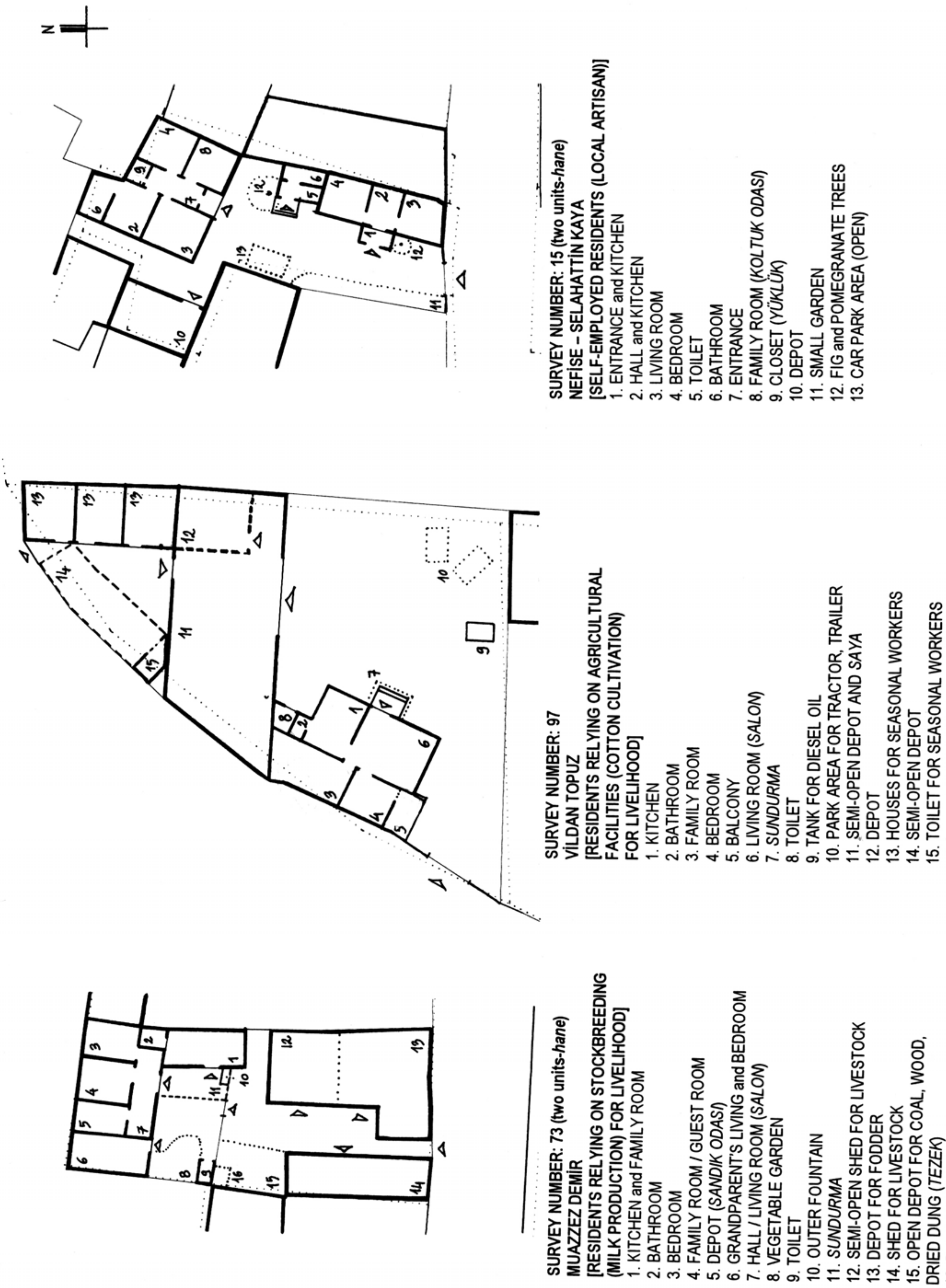


Figure 7.23 Functions and spaces inside and outside the dwellings. Scale 1/400

Co-existence of flat and pitched roofs: The original examples of traditional ratios of dwellings support flat roofs that are covered with rammed earth and laid on timber beams. Today, the majority have been either replaced by concrete flooring or converted to pitched roofs covered with tiles as these make for easier maintenance (Figure 7.24). Almost all load bearing buildings made of brick have pitched roofs. In reinforced concrete dwellings, the roofs are either laid flat or, what is more frequently encountered, pitched with timber framing. The utilization of the flat roof cannot be traced to an intentional function.

Figure 7.24 Adobe dwelling with rammed earth roof; dwellings of load bearing construction system made of brick with pitched roofs. **Photography** Zeynep Durmuş Arsan, 2001.

In terms of *vertical connection of the dwelling in Seyrek*, the following two issues help understand the connection of a dwelling with the earth and the link between the storeys:

Connection with the earth: The traditional adobe dwellings of the Seyrek settlement tend both to fuse with the earth and to take support from the earth. They are bedded on the deep alluvial soil of Gediz Plain. Their strong and direct connection to the earth provides the sense of unity which creates the impression that the earthen ground extended itself upwards through the walls. Yet at the same time, the earth is an easily disrupting building material that needs maintenance once or twice annually. This problem in fact does not exist only for the adobe buildings but also for load bearing brick and reinforced concrete buildings which are easily affected and deteriorate quickly owing to the physical conditions of Seyrek. The water in the case of precipitation, ground water, minor floods, and humidity of air influence the life-span, quality, and bearing capacity of the buildings and their respective construction system. The impact of water rises when it combines with high temperatures, strong winds, and the lateral loads brought by earthquakes. The local solution to this problem is the use of more durable transition materials like stone, resistant to extant physical conditions, especially the water.

Stone as the transitory construction material: The scarce material of the region, the local white stone, is utilized properly in the foundations of traditional adobe buildings up to a level of 0.8 - 1.5 m. The white rubble stones are generally brought in from the hilly area in the west. This connection to nature transforms the building into a consistent and dense object, giving the feeling of both being anchored in the earth and having been constructed in continuity with it (Figure 7.25).

Connection between the storeys: The raising of the living space above ground level and its gradual divorce from the ground seems to be an essential target in Seyrek houses since the settlement is situated in the plain and most of the dwellings are still in one storey. The stairway, either inside or outside, thus acts as the extension of the public realm to the upper levels in terms of both altitude and, metaphorically, social class. It leads the inhabitants from shared public areas such as the street and the courtyard to semi-private and private realms such as the terrace, the verandah, balcony and/or the dwelling.

The connection between the storeys of new dwellings, particularly the reinforced concrete ones, is mostly by means of outer stairs. They functionally provide the continuation of the street and the path to the house in different shapes and pavements. Thus they are open stairs with a balustrade constructed as adjacent to the main body. In several examples, there are semi-open stairs included in the building yet bearing direct visual connection to the outside. These stairs serve as a semi-public realm used exclusively for distributing and connecting, not for sitting and gathering in front of the dwelling. The inner stairs may be seen in the *kulle* type and variations of *sakız* type of houses. They are

Figure 7.25 Use of stone as durable material in the construction of walls. **Photography** Zeynep Durmuş Arsan, 2001.

made of wood enabling the connection of two levels in a shorter way (Figure 7.26).

In terms of *architectural elements of dwellings*, the variety of ceiling surfaces are particularly noteworthy:

Ceiling surface variety: The ceiling texture of dwellings varies in terms of their construction systems and inhabitants' choice. The unrenovated traditional adobe buildings have timber beamed ceilings displaying the constructional characteristics of the rammed earth roof. The reeds are layered up to the rafters and they form the ceiling texture with the repetitious character of rafters. The repaired ones with earthen roof have plywood ceilings to filter soil and reed pieces dropping downward into the inner space. The flat roof with rammed earth requires regular seasonal maintenance to prevent rainwater from leaking in. Thus the majority of roofs were transformed into pitched type set over a concrete slab. Other dwellings in Seyrek have generally whitewashed reinforced concrete roof slabs.

Building material: Earth is the most abundant construction material in Seyrek. The Menemen district is famous for the production of hand-made pottery, and the Gediz Basin has many factories manufacturing building brick and tile. Therefore more than 3/4 of dwellings in Seyrek are constructed with the recyclable, natural material that is the earth, particularly with sun-dried adobe brick or several types of fabricated brick. The original examples of earthen dwellings, of which very few remain, are covered with rammed earth roofs. The roof needs to be repaired every autumn by the renewal of the earthen layer. The load bearing walls are constructed with the adobe bricks composed of the mixture of pieces of straw and a fatty clayed soil, locally termed *geren*, extracted from an area where the plantation is not possible in the west of the village. The mould of the adobe bricks, named *tezkere*, includes four or eight units for mass production of bricks, and is 20 cm in width, 10 cm in height, and 40 cm in length.

The newer dwellings, which have been constructed since the 1950s, have mostly brick masonry walls, particularly the solid brick—*harman tuğlası*—kind that is finished off with a reinforced concrete slab and a timber roof. One of the important transformations in the construction technique is the introduction of the reinforced concrete skeleton system into the village. It presently appears as the most prestigious technique deployed with brick or gas concrete infill walls.

Figure 7.26 Connection among storeys. **Photography** Zeynep Durmuş Arsan, 2001.

Garden walls: In the denser settlement pattern, the dwellings draw the borders of their plots with garden walls made of adobe, brick, and cement block. In less denser districts, only the frontage of the domain is separated by a wall either on or above the eye-level of the body in order to undercut direct perception of the inner layout. The heights vary accordingly with the attention and economic power of the residents, yet are generally between 1.00 m and 2.00 m. Besides, the old adobe walls have a tile or reed coping (Figure 7.27).

7.1.1.4. Peculiarities of the Settlement in Viewpoint of Sustainable Development

On the basis of the investigation about *the pattern and preferences for consumption* of the people of Seyrek, it may be briefly stated that the settlement has been losing its rural qualities since the society has a tendency to consume more energy, water, natural materials, and so on, than it produces. The information derived from interviews, observations as well as the social survey indicate that the inhabitants have in daily life become increasingly more dependent on imported products. These include daily food, transportation and communication and thus, the feature of the settlement turns to the semi-rural village. The consumption habit now permeates the rural social and cultural values of the village. One indication may be the admission and introduction of electrical equipment into daily activities: the most preferred ones are the refrigerator, TV, iron, and washing machine. More than half of the inhabitants also have the vacuum cleaner, oven, electrical heater, ventilator, and electrical thermosyphon in their dwellings. As may be seen in Table 7.7, the usage of electrical appliances in Seyrek comes very close to that in Izmir; in other words, in the dwellings in urban districts. The consumption of electricity rises in winter months because of the rising demand for lighting and heating in the dwelling. The analysis puts forward the widespread use of electricity: nearly half of the dwellings heat water for bathing by electrical thermosyphon; more then 3/5 of dwellings use electricity as the secondary, back up source for space heating. Table 7.8 indicates that the monthly consumption of electricity in early 2001 was quite high, yet then there was a steep drop. The social survey held in the same year conveys that almost all households take care to consume less electricity. The impact of the economic crisis of February 2001 has here, like everywhere else in the country, affected the power of purchase of inhabitants. Therefore many of them limit the consumption

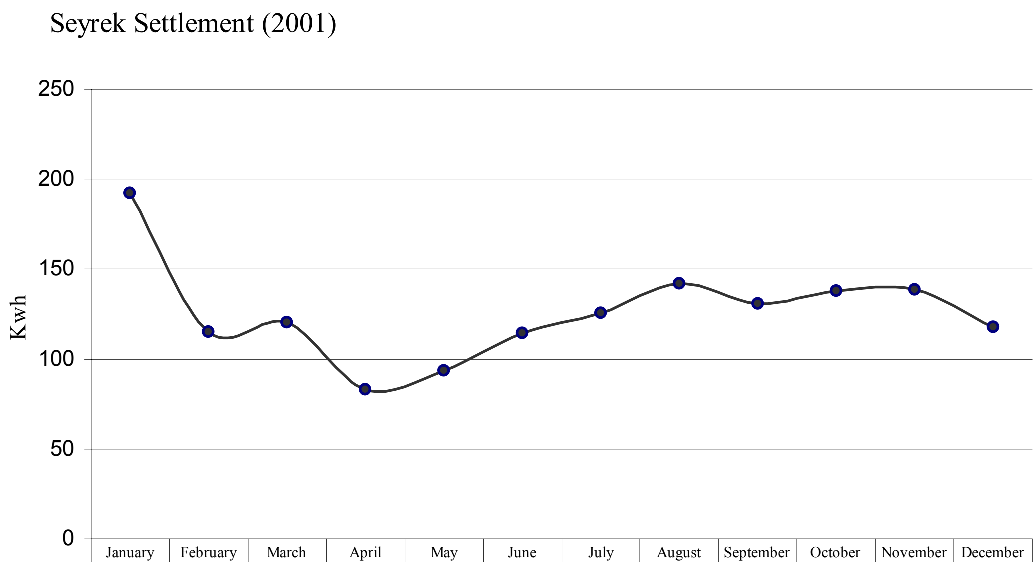
Figure 7.27 Various types of earthen garden walls and copings. **Photography** Zeynep Durmuş Arsan, 2001.

Table 7.7 Percentage of residences by usage of electrical appliances: comparison of Izmir (1998) and Seyrek (2001)

Electrical appliances	**Izmir (1998)***	**Seyrek (2001)****
Refrigerator	99,2	96,9
Television set	98,7	93,9
Iron	96,4	87,8
Washing machine	87,8	74,5
Vacuum cleaner	87,7	71,4
Electrical oven	82,3	69,4
Electrical heater	35,7	64,3
Ventilator	26,7	55,1
Electrical thermosyphon	20,4	49,0
Music player	63,9	33,7
Dish washer	26,4	18,4
Video	15,8	4,1
Computer	8,2	1,0

* *Konutlarda Enerji Tüketimi 1998.* (2002). Ankara: T.C. Başbakanlık Devlet Istatistik Enstitüsü
** Data derives from the social survey of Seyrek in 2001

Table 7.8 Consumption of electrical energy in the Seyrek settlement (2001)[7]



	January	February	March	April	May	June	July	August	September	October	November	December
Seri 1	192,07	115,18	120,34	83,03	93,51	114,56	125,56	142,08	130,63	137,72	138,69	117,87

[7] June 2002 records of TEDAŞ (Türkiye Elektrik Dağıtım Ananim Şirketi: Electricity Distribution Corporation of Turkey, Inc.) Office of Computerized Information. I would like to thank Mrs Necla Yağman for her assistance in gathering this information.

of electricity. Instead they prefer non-renewables: the major source of energy used for space heating is the coal, supplemented with wood, gas, and *tezek*. Here, the only local source is *tezek,* yet its use is limited to those householders who breed cattle. Besides, the heating system is based on the heating of a single space by stove and/or electrical heater.

In terms of the *utilization of solar energy* in the buildings, the applications are limited to very few examples of the installation of solar collectors on the roof for domestic hot water demand, and to the utilization of daylight inside dwelling. Almost all households indicate that there is no need for daytime lighting in the dwelling except in the old earthen dwellings with small sized windows.

Water: In spite of a reasonable expectation of abundance of underwater and groundwater sources in the region, it is a fact that the settlement has problems obtaining fresh water. Seyrek is situated in a region with medium level of ground water. The value is around 13 m (Köksal and Akbulut 1993). Yet in winters, the fields and houses are influenced by long-termed ponds and surface water. The fresh water sources, on the other hand, are at deeper layers, around more than 100 m below ground level (Durmuş Arsan 2002b). The intense human impact of increasing urbanization, industrialization, pesticide use, and the pollution of Gediz River all threaten the quality, flow, and sanitary conditions of fresh water which Seyrek needs to survive.

Seyrek has three local potable water wells situated around the residential area. The oldest one has remained unused due to its location in the residential area (Köksal and Akbulut 1993). The potable water is transferred from the two wells located farther, 3 km to the west near the slope of the hill (Durmuş Arsan 2003).

Since the municipality supplies water to the settlement by a local source, the price is cheaper. The social analysis and observations point at the inhabitants' belief that the most abundant natural resource in Seyrek is water. Thus the potable water in Seyrek is consumed wastefully; nearly 3/5 of residents confess to paying no attention to minimizing consumption and to careful use of potable water. So far, the only problem with potable water has arisen in autumns when the demand is doubled on account of the presence of the seasonal workers.

Waste: The Seyrek settlement has a new sewer system laid down after the village became a municipality. The social survey puts forward that more than three thirds of the surveyed dwellings have a connection to the sewer system while very few of them also have septic pits in the plot. The system is poured into an open discharge canal, transporting the waste to the mouth of the Gediz River without any treatment (Durmuş Arsan 2003). Actually this uncontrolled application bears many disregarded questions, e.g. sanitary problems, bad odor, environmental pollution. The solid waste, furthermore, is regularly collected and transported to the Harmandalı solid waste disposal area where the waste of all northern Izmir is also poured (Durmuş Arsan 2003). The disposal area is at least 5 km from Seyrek, and this transportation brings extra cost upon the relevant municipal department.

Since Seyrek is a flat settlement, the problems with the sewer system require the careful consideration of domestic wastewater. Besides, given that the settlement is an agricultural village, some part of the solid waste may be easily employed in Seyrek. Here, the first concern may be to minimize the amount of the waste, and the second may be to seek for the possibilities of purification, reuse or utilization of the waste before it is released.

In terms of *the treatment of domestic solid waste*, the settlement maintains such methods for the utilization of organic waste in animal breeding and in pouring the ash from the stove to layer the garden. Furthermore, one essential issue in minimizing the amount of waste may be paying attention to buying fewer packaged products. The seasonal shopping for basic foods such as flour, sugar, rice, and so on plays considerable role in reducing waste packaging. Yet it should be noted that seasonal shopping is not a conscious choice performed for waste reduction, but for the sake of the lesser cost of the unpackaged product. As a matter of fact, nearly 1/3 of the surveyed householders dispose of all domestic waste without separating or recycling.

In terms of *sustainable peculiarities in site organization and in the buildings*, climate-based design principles come to the fore: in the quest for cool spaces in summers as well as warm ones in winters: the heavyweight solutions, the massive forms with dense walls, are preferable because of their capacity to absorb heat. The earthen roofs and walls in Seyrek, therefore, cope with the thermal conditions of the flat plain: they act as a thermal balancer by using the bulk of the building itself. Firstly, the earthen surface absorbs heat, prevents overheating and stops the transmission into the inner spaces in summer. Secondly, it keeps heated air inside in winters.

In this case, the dwellings with bulky walls, thick and multi-layered roofs such as earthen residences with flat roofs meet the inner climatic comfort conditions demanding minimum heating and cooling. On the other hand, from the social survey it may be inferred that the majority of those householders who live in houses with brick walls, concrete slab and pitched roof complain about overheating in summer and an inability to heat spaces in winter. The most important reason may be the absence of the decisive criterion which is the energy performance of building materials and construction techniques. For many inhabitants, the provision of living comfort is more important than the fulfilment of good climatic comfort. For example, some of them reject earth as a construction material as it causes dirtiness and is hard to maintain. The residents who hold this view change the form of the roof to avoid the annual maintenance of the rammed earth flat roof. Else, there is an evident inclination to live in load bearing brick or reinforced concrete dwellings. However, based on data about current building materials and construction techniques it may be asserted that construction attempts to leave out the old in order to improve the level of comfort conditions inevitably force concessions in the inner thermal comfort conditions. The primary disadvantage is that the interiors enjoy more heating loads in winters and, of course, more fuel with increasing heating expenses.

The denser districts of the settlement are, furthermore, more advantageous. The close-set buildings and the house clusters serve to create a microclimate in the street and in the plot. Buildings shade each other, thus there is minimum heat penetration in summer. Clustered form also reduces cold penetration in winter.

The chimney shafts in Seyrek act as a component of natural cooling. The long slender form of the chimney rising from the center of the roof offers the chimney effect, that is, a wise solution to increasing ventilation inside the dwelling. Several chimneys work as air scoops that take the eastern hot air stream and direct the flow down into the inner space by harnessing the temperature variations inside and outside. The construction material used in the older ones is solid brick and squared stone. Outer surfaces are mortared. Besides, the holes on the roof of depots or sheds naturally offer air ventilation. (Figure 7.28).

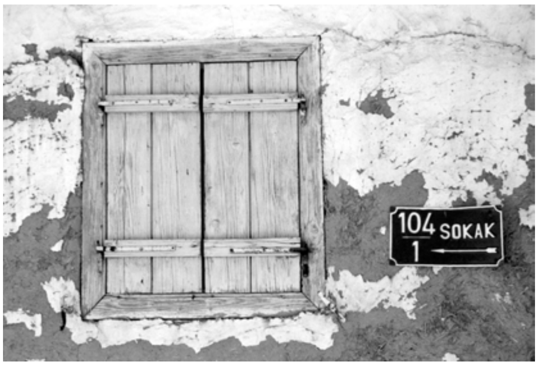
Figure 7.28 Various types of chimney caps as a component of natural cooling. **Photography** Zeynep Durmuş Arsan, 2001.

In terms of the *shading need for the summer season*, several solutions were observed: dark shaded courtyards of dwellings also help lower the temperature, thus causing natural air flow and creating a comfortable microclimate. The natural ventilation also assists in annihilating humidity and streaming the latter out of the building, which would otherwise be absorbed by the building or hover in the air. Here, the living spaces are climatically protected zones around the courtyard. The porch and pergola—*sundurma*—in front of the dwelling, and the shutters on the windows are other shading elements regulating the temperature fluctuation between inside and outside (Figure 7.29).

The impact of whitewashed surfaces: White surfaces of the Seyrek settlement provide a cool atmosphere for living inside and outside, as the color of white reflects the sun, permitting the wall to draw less warmth to the interior. Besides, it supplies good sanitary conditions.

Filtered light: The architectural composition of narrow, shade-inducing streets, the modest dwellings, and high garden walls are complemented by dusty breezes, bright sky and light. The intense light and hot sun in summer affect the daily life and living habits of the inhabitants as well as the formation of the dwelling and its layout in the plot. The social and physical analysis indicates that the majority of the residents use the outside of the dwelling in all seasons and all day long. They do so, however, particularly in summer and in the afternoon. As daily life takes place in outer spaces, people need shaded spaces. The residents

Figure 7.29 Multifunctional shutters: shading element of the façade securing also privacy. **Photography** Zeynep Durmuş Arsan, 2001.



remain under the trees or mostly in the terrace which faces the courtyard or garden and is covered by a small porch, or the pergola locally termed *sundurma* (Figure 7.30).

The local trees, especially the mulberry, fig, elaeagnus, phoenix spp., ficus, acacia spp., melia azedarache—*tespih ağacı*—, and pomegranate with their crowns serve as natural filters protecting from the direct impact of sunlight. The pergola, planted with leaves of vine or ivy, or covered with reeds or roof tiles, is the other filter breaking up and softening light. It defines a special area, an activity node, where the householders enjoy being. This semi-open space provides a shaded area for the functions of living, gathering, and preparing daily or annual foods.

The inhabitants also stay in the dwellings, especially at noon in the summer to avoid direct impact of the sun. The small windows and body of earthen masonry make for a cool atmosphere. The double winged wooden shutters control the influx of direct sunlight. The use of shutters is common in the village. Many dwellings have manually operated shutters made of PVC.

Contrasting tactile experience on pathways: The difference in the pavement texture of paths—altering ground features of the way through the home—in the Seyrek settlement may inform about the circulation realms and the sequence of spaces from the public to the private, running from harder textures to softer ones. The streets are the firm, most built-up, and citified areas of the village for walking. Almost all streets are covered with a thin layer of asphalt or concrete curbstones. The body realizes that the ground is smooth and hard, and gains momentum.

The entrance to a building plot is differentiated by the stone pavement which is bonded into the ground through irregularly coursed rubble stones as the natural result of separating the path through the courtyard from muddy, brackish surface. The stony area sometimes leads to the *saya*. The realization of the ground that is stony, uneasy, and precipitous slows down the pedestrian and welcomes into the territory of the householders. The courtyard, or the core of the open area, is primarily earth mixed with pebble, leaves fallen of trees, and plants. One realizes that the soil is brittle and dry. She looks for the closest way home (Figure 7.31).

Figure 7.30 Light filtered by fig, pomegranate and phoenix trees and porch. **Photography** Zeynep Durmuş Arsan, 2001.

Figure 7.31 Stone pavement and concrete layer juxtaposed. **Photography** Zeynep Durmuş Arsan, 2001.

The arrival on the terrace, an area in front of the entrance door, is realized by the smooth and solid area marked by a thin layer of concrete. This is the place for sitting, resting, working, or drying annual foods (Figure 7.32). After passing the entrance door, one perceives the distribution area, the entrance hall, which is covered first with hard materials such as the earth in adobe buildings or the tiles in newer ones. Next, entry to the room starts mostly with a wooden surface. Then, the carpets give the sense of a warm place.

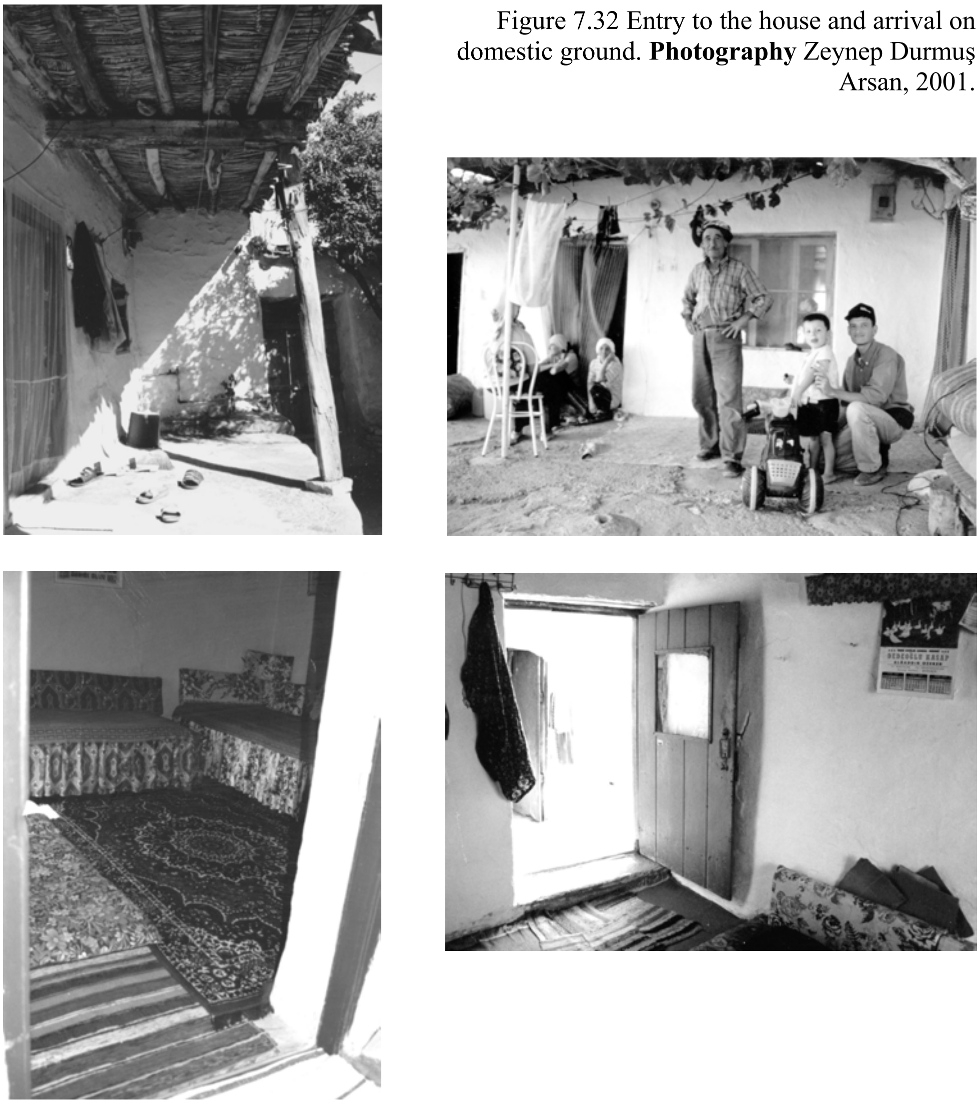


Figure 7.32 Entry to the house and arrival on domestic ground. **Photography** Zeynep Durmuş Arsan, 2001.

Things from their life: Things such as furniture, tools, decorations, and so on display lives and inclinations of inhabitants. They are dominant constituents whereby the inhabitants differentiate their space and environment. Presently, most important is the television set or refrigerator. The change in eating habits, cooking facilities, wardrobes for storage functions are all the result of changing needs and life style. The rooms have become more crowded than earlier (Figure 7.33).

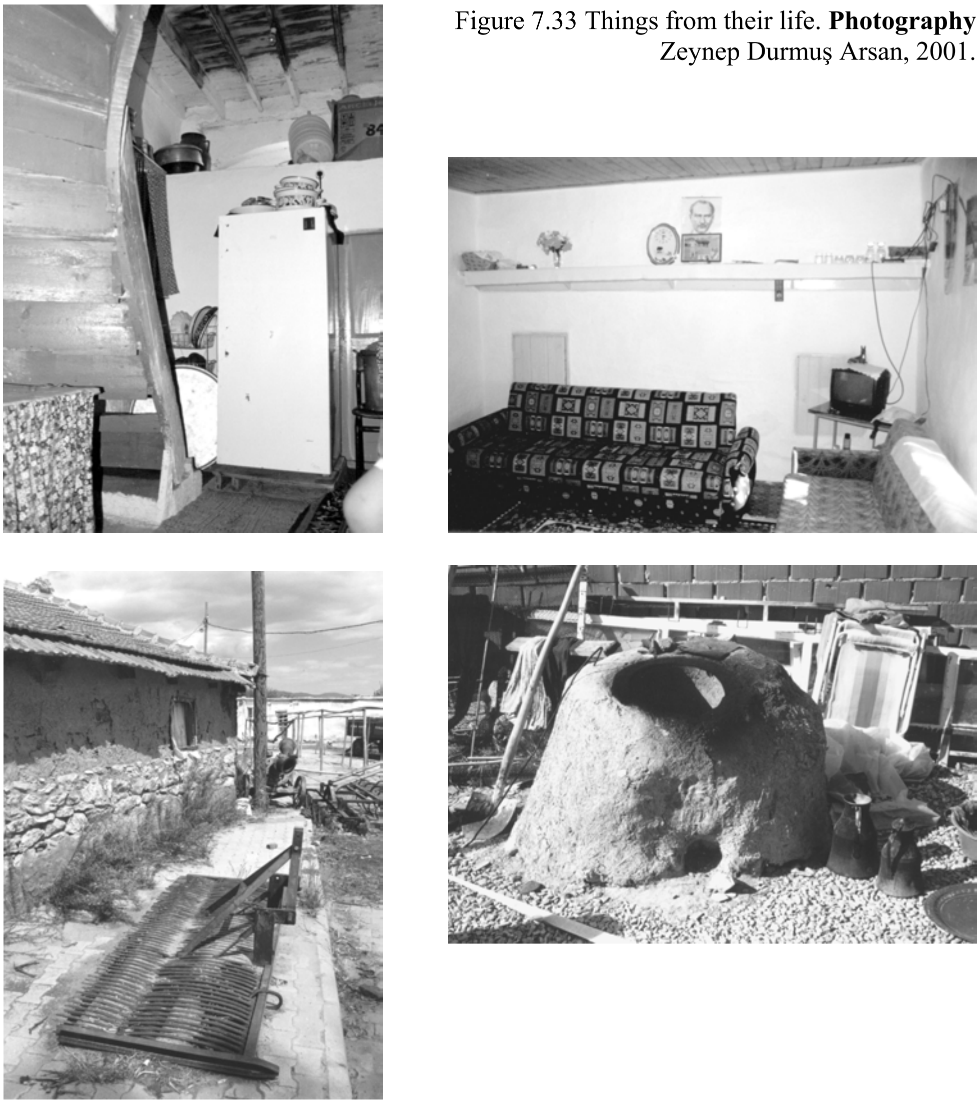


Figure 7.33 Things from their life. **Photography** Zeynep Durmuş Arsan, 2001.

7.1.2. User Needs

The social survey for determination of user needs suggests that the majority of inhabitants are satisfied with living in Seyrek and in their present dwellings. Nearly 75% of them state that the size of building is sufficient for satisfying the needs of the householders. Those whose houses are between 75 and 90 m^2 are the most satisfied. Only 20% of the inhabitants highlight spatial insufficiency. Here family size is an important factor: since the average number of persons per unit—*hane*—was 3.1 in 2002, and the families were not unreasonably crowded, the satisfaction degree with the building size was, unsurprisingly, quite high. The most important source of satisfaction appears to be spatial qualities of the dwelling: the largeness and comfort of the rooms, and living on the second floor—i.e., above the ground level—are the reasons most frequently indicated for satisfaction. The existence of the kitchen inside the building, the spaciousness and comfort of kitchen and bedroom, and the inclusion of all wet spaces in the dwelling are the other factors for satisfaction specific to spatial quality.

More than half of surveyed householders are satisfied with the current condition of their building. They specifically highlight their preference for living in a detached house, instead of a multi-storey building, because of its quiet, independent, and more private atmosphere within a garden. The location of the dwelling is also important: living in the village rather than in the closer urban pattern of Izmir is underscored. The reasons for this inclination may be grouped in two. The first is related to social conditions, above all with the quest for close neighborly relations. The householders are aware that relations among neighbors are better in a small village than in an urban district. The second reason is related to the physical conditions. They enjoy living in their own village since it is calm and quiet, airy in summer; there is more greenery and a healthier environment; they feel more free and secure, and have easy access to the road and the market.

In terms of satisfaction with the building material, for a few dwellers, adobe as the construction material is desirable, since it is an easily repaired, self-buildable, locally available material handling which does not require skilled labor. Notably, moreover, it is low-cost as well as providing positive thermal comfort conditions since it makes for cool in summer and preserves heat in winter. Actually the satisfaction with the building is also contingent on the fulfilment of comfort conditions in the building without active heating and cooling systems and artificial lighting. The utilization of passive systems such as those that allow sufficient influx of sunlight and respect for the micro-climatic conditions seem among elemental satisfactory concerns. The completion of the infrastructure of the dwelling such as the connection of the sewer system and potable water, and the absence of the problem of humidity appear to the householders worth mentioning.

Like issues of satisfaction, complaints about the current conditions of the dwellings are considerably numerous: the issue that is the object of the most frequent complaint is spatial insufficiency, especially as regards wet spaces and children's room. In terms of wet spaces, the location of the kitchen and/or toilet outside the dwelling, the small size of kitchens, and the togetherness of toilet and bathing functions are subjects of dissatisfaction. The absence or insufficiency of the children's room is one of the focal points for families. Indeed the complaint concerning multifunctional spaces for both sitting and sleeping functions is related more to the construction year of the building. The older dwellings, particularly the adobe ones constructed before the 1950s, face this problem. Some of the dwellers, besides, complain about the absence of a guest room as a separate space inside the dwelling. As a result, in terms of new space requirements in the dwelling, only 24% of the inhabitants express the need for more space. The spaces for which need is expressed are respectively wet space, bedroom, children's room, and living room.

Remaining complaints specific to spatial items concerns the inefficiency of inner space organization because of the evolutionary expansion of the dwelling by the *ad-hoc* addition of rooms. Besides, householders whose houses suffer from humidity and drainage problems are averse to living in one-storey buildings. They would prefer to live in the two-storeyed detached houses.

The impossibility of repairs due to economical constraints is the second most frequently recurring issue of complaint. Many householders underline that there is, in fact, an urgent need for maintenance, addition or the construction of a separate building. Yet this, they point out, is impossible on their present level of income based on agriculture.

The existence of the humidity problem is one of the major causes of dissatisfaction. More than half of the surveyed dwellings have the humidity problem. Complaints about drainage and humidity strictly follow those addressing construction material. When the householders concentrate more on the impact of direct water on account of the absence of drainage and/or the problem of humidity by the high level of ground water, they are in fact complaining about material deterioration in the building components, especially on the solid ground floor and the walls. For example, some householders dislike adobe as a building material because they appraise it as putting up inadequate resistance to impact of direct water, easily breaking into pieces thereunder, being difficult to clean and difficult to maintain, plaster, and paint. In tandem, the dissatisfaction with construction material may be associated with those about inner comfort conditions. Many householders who live in reinforced concrete buildings or in load bearing buildings of brick—solid or horizontally perforated—express as problems the overheating of spaces in summer and inability to heat them in winter.

In terms of the required repairs in the dwelling, more than half of the householders underscore the necessity for the annual repair of building components, spaces and/or elements. The most underscored demand, accounted as 72.7%, is related to the annual reparation of the wall plaster. Many householders complain about the spilling out of the plaster and the deterioration of paint caused by the humidity problem. The second requirement concerns leakage on the roof, particularly on the flat roof of rammed earth or reinforced concrete. The rest of the required repairs may gradually be enumerated as follows: repairs on the solid ground floor, wet spaces, building components such as windows or doors, technical installation, and the suspended floor.

From the results of the social survey, it appears that there is a slight tendency toward desire for living in a new dwelling: almost one-third of householders either already attempted a new dwelling or they are thinking about it. The vast majority of existing attempts surprisingly are located in the Seyrek settlement while the rest are directed more at Menemen and less at Izmir. The quest for an apartment flat accounts for as much as 70% of the attempts. The construction system is, therefore, reinforced concrete skeleton system except one, that is, the load bearing system in brick.

The investigation of the preference for a new dwelling and its qualities indicates that more than half of the householders—60.7% of them—favor living in a detached house by stating that, 'we want to live in a house like our house'. There is a marked distinction among the inclination for the detached house and for the other two, namely the two-storeyed house with the depot on the ground floor and the apartment flat. Those who want to live in two-storeyed houses describe their wish as a house on columns: the escape from the humidity problem caused by the ground water and the dust and dirtiness on the ground floor are the most emphasized reasons. Those who want to live in an apartment flat are in expectation of a modern living environment, yet they want to maintain the close-knit social life they are accustomed to. They attach importance to neighborhood relations, and for this reason they emphasize the choice for an apartment flat in the Seyrek settlement.

In terms of the choice of a construction system for a new dwelling, there is almost equal inclination between the reinforced concrete and load bearing systems, yet first ranks the reinforced concrete one. It is quite possible to assert that the householders who currently live in adobe buildings prefer to live in the reinforced concrete houses because of the choice of building material, not the system itself. These persons declare that they prefer reinforced concrete dwellings so as to escape from the troubles with adobe and the dirtiness of earth even though they are actually aware of the heating problems of reinforced concrete dwellings. In the case of a load bearing dwelling, the options for the major building material vary: brick is by far the most preferred one. Adobe comes second, yet is the most wished for. Many dwellers, especially these belonging to the older generation, mention that adobe buildings are the lowest-cost buildings in terms of heating expenses in winter while they are found to provide a healthier, breathable, and cooler inner space in summers. However, the householders believe that adobe is an outdated and non-modern material. Besides, they highlight that there are no craftsmen dealing with adobe in Seyrek any more even though they wish to build an adobe dwelling. Therefore, a majority of them do not favor adobe. The third material is, surprisingly enough, gas concrete. Some of the householders are aware that gas concrete provides good heat insulation because several detached dwellings of gas concrete were recently constructed in the new residential development area.

7.1.3. Legal Arrangements

The history of planning studies in Seyrek may be dated back to the mid-1990s, starting soon after 1993, when the settlement first became a municipality. Initial studies about the development plan of the municipality of Seyrek were realized by city planner Mustafa Sayar of the *Iller Bankası*—The Bank of Provinces—and the first plan became valid in 1995.

The second, and most recent, development plan was prepared by the Doğan Cartography Corporation in July 1997. According to this plan, the settlement was divided into eleven sub-regions so as to organize the building lots and estates according to of Article 18 of By-law No. 3194.[8] However, the re-regulation of the land ownership pattern was completed only for six regions, including the case area of this dissertation, as illustrated in Figure 7.34.

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[8] Article 18 introduces regulations for land readjustment as defined by Larsson (1997, p. 141): "the landowners collectively leave land for streets and other public places, build the required infrastructure wholly or partly and adapt existing boundaries to the new plan. The new building sites are distributed according to area or value of inputs."

LEGEND December, 2003

Area where Article 18 of By-law No. 3194 has been implemented

Area where Article 18 of By-law No. 3194 has not been implemented

Figure 7.34 Implementation status of Article 18 of By-law No. 3194

The building block of the project envisages new four-storeyed dwellings in detached order with the floor area ratio—*TAKS*—of 0.3 and the total area ratio—*KAKS*— of 1.2. Additionally, all buildings must be separated by at least 3 m from the lateral and the rear boundaries of the plot and 5 m from the front boundary of the building block.

Even though the most recent plan was declared to be a revision plan based on the former, it appears that almost all plenary decisions taken previously, including the organization of building blocks, street sections, and provisions for new buildings, were modified. Several provisions and modifications are briefly reviewed in Table 7.9.

It may be inferred from the table that both plans envisaged a similar picture for Seyrek, an urbanized settlement rather than a semi-rural town. Given these plans, it would be unrealistic to expect that the Seyrek settlement will sustain its agricultural based semi-rural lifestyle and the building character with the proposed site organization, building and population density by the regulations for new residential development zone in the periphery of the current settlement pattern. Especially by adding two more storeys, the latest plan introduces a

Table 7.9 Comparison of regulations for buildings in new residential areas of Seyrek by the development plan of 1995 and the revision plan of 1997

	Development Plan, 1995	**Revision Plan, 1997**
Organization of building in the building plot	detached order	detached order
Setback distance (min)	3 m from the lateral and the rear 5 m from the front	3 m from the lateral and the rear 5 m from the front
Floor area ratio (max)—*TAKS*—	0.3	0.3
Total area ratio (max)—*KAKS*—	0.6	1.2
Number of storey (max)	2	4
Population capacity of the residential development zone[9]	7,880 persons	22,120 persons
Net Residential Density	240 per/ha	508 per/ha

[9] According to the development plan of 1995, the new residential development areas cover 328,190m^2 of land with a total area ratio—*KAKS*—of 0.6. When the size of the new dwelling is accepted as around 100m^2 and the family size is 4 persons, the population capacity of the new residential area will be 7,880 persons. According to the development plan of 1997, the new residential development areas cover 435,810m^2 of land with a total area ratio—*KAKS*—of 1.2. When the size of the new dwelling is accepted as around 100m^2 and the family size is 4 persons, the population capacity of the new residential area will be 22,120 persons.

dramatic rise in the population of Seyrek, compared to that almost 24 times as high as the population in Seyrek municipal center with a population of 950 in 2002. On the other hand, without dealing with the burden on Gediz Plain and the delta, and the current conditions of the infrastructure of Seyrek, both plans relentlessly regulate urban functions and permit urban facilities beyond the capacity of the Seyrek settlement to provide for water, energy, and transportation needs of the population, to cope with their waste and pollution, and to sustain the social, cultural, aesthetic, spiritual, ecological and economic values of the inhabitants that have evolved through a long period of time.

In terms of the regulations for new constructions in the old residential area, both plans propound decisions that lend priority to transforming the settlement pattern instead of conservation, rehabilitation and continuation. Nothing less than the spatial organization of the particular life style and the way of livelihood contingent on agriculture in Seyrek, the organic shaping of building plots and the range of functions housed in the structures, dwelling-building lot relations, the typologies of dwellings and inner functions are disregarded. The conservation of existing street and path texture are not considered, either. The revision plan permits new buildings on the old structure, yet it does not bring any restrictions about repairs, alterations and the restoration of existing buildings. One would expect the articulation of such restrictions and, moreover, one would expect them to pursue harmony with the traditional building characteristic of Seyrek. Instead, the new building density proposed for the existing residential area is quite high: it encourages more the making of new constructions than the repairing of the existing ones. There are no rules for reconstructions and new buildings defining the forms, building materials, proportions, scales, and the architectural elements peculiar to Seyrek. Restrictions about building sizes concentrate on the size of the building lot and the dwelling. According to the enactment, if the plot in the old settlement pattern is more than $200m^2$, a new dwelling must have a floor area ratio of 0.81, and total area ratio of 3.24. The decisions about the location in the plot determine that a new dwelling is adjacent at most on two sides of the plot, and separated by at least 2 m from the other sides. If the plot size is less then $200m^2$, the maximum floor area on the ground is limited to $160m^2$ and at most to four storeys. To sum, it may be deduced that the current settlement pattern of Seyrek, the architectural qualities and the living habits are irrevocably under threat by the proposed space organization scheme of the valid development plan. In addition, it is clear that the building codes do not deal with the peculiar conditions of Seyrek. Therefore it may be asserted that the regulations by the latest development plan constitute a barrier for the sustainability of the built environment, i.e. the local sustainability of Seyrek.

The regulations of 1997, moreover, result in a series of alterations in the existent land ownership and street patterns. The new buildings are designed and constructed without consideration of the characteristics of the residential pattern, the sequence of public-private space, silhouette, density and the morphology of the village. The implementations of Article 18 of By-law No. 3194 practiced first by the latest plan dictate a new landownership pattern disregarding the already grifted, organic layout. In fact, this implementation is not peculiar to Seyrek: many old settlements, especially where semi-rural and rural ones are concerned, in Turkey are by virtue of By-law No. 3194 subject to the same.[10] The application of Article 18 runs, needless to say, counter to the concept of local sustainability since it does not take the local conditions into consideration, deriving, as it does, from a policy that may lead to the eradication of local diversity and the deterioration of the settlement pattern, which actually epitomizes the distinctive rural character of the Seyrek settlement.

In terms of *legal arrangements on the macro scale*, the status of conservation of Gediz Delta is three-fold: the status ordered by the former Ministry of the Environment (currently The Ministry of Forestry) in the scope of the Bern and Ramsar Conventions; the status ordered by The Ministry of Forestry defining the Delta as Wildlife Protection Site; the status defined by The Ministry of Culture establishing the delta in several degrees of natural and archaeological sites.

The first one, defined by The Ministry of Environment, is related to the international conservation status described in the Ramsar and Bern Conventions, which have been discussed above (see pp. 252-55) (Figure 7.35). The Ramsar Site in the Gediz Delta covers almost 3/4 of the wetland area, yet it does so insufficiently. It covers mostly the western and southwestern seashore of the delta

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[10] See Özdemir et al. (2001) for the results of the study conveying proposed physical and social transformations by the development plans and the implementations of Article 18 which actually deteriorate the distinctive rural character of similar settlements.

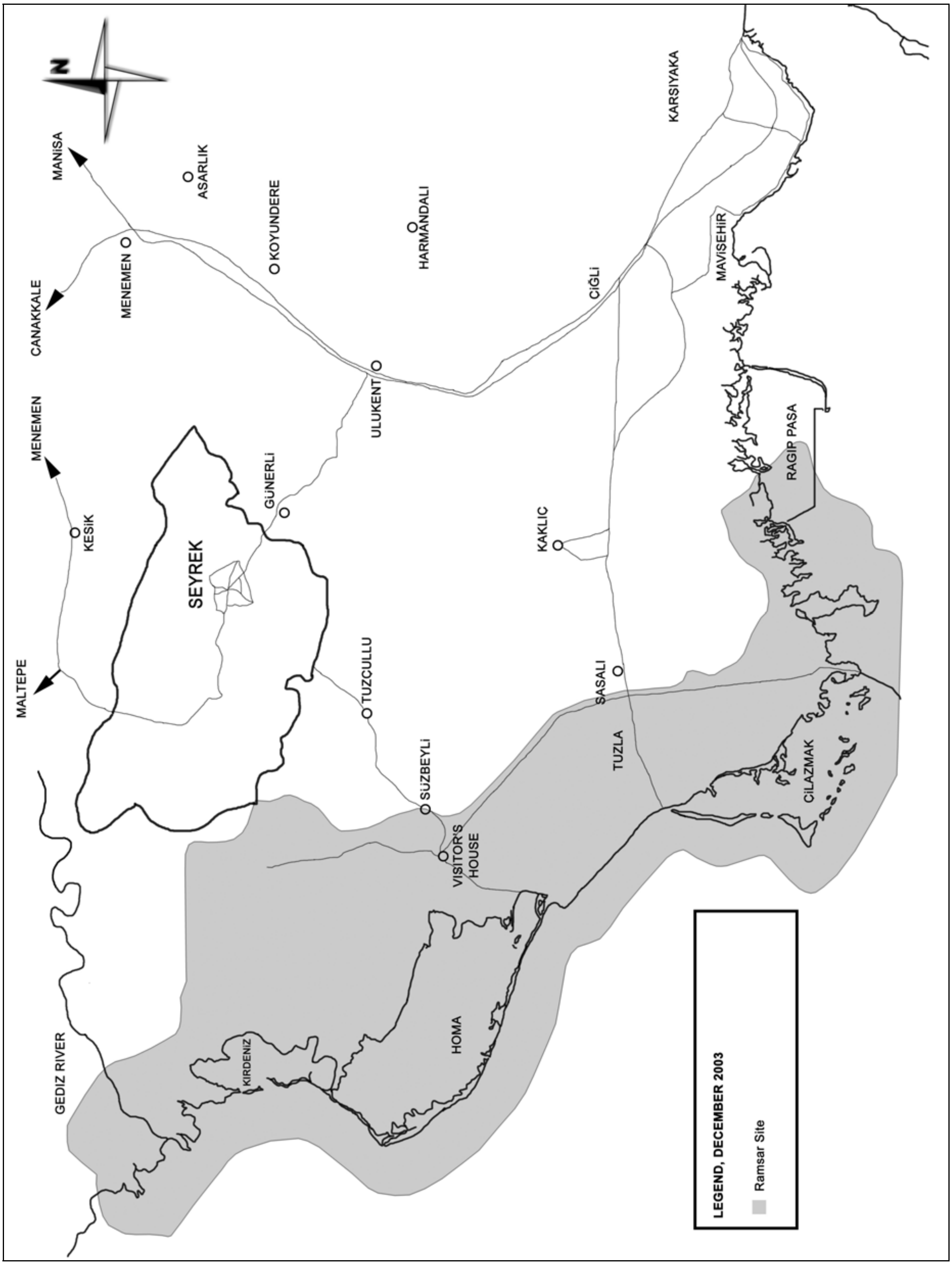


Figure 7.35 Boundaries of Ramsar Site ordered by the former Ministry of the Environment (now Ministry of Forestry) in Gediz Delta

and leaves out the mouth of the old river bed on the east side of the Treatment Plant.

The second conservation status, the Wildlife Protection Area under the auspices of the General Directorate of National Parks, Hunting and Wildlife Department of The Ministry of Forestry, is the oldest and the most effective status in terms of the protection of an area that includes three lagoons located on the western coastline, the reed beds on the east of the Kırdeniz Lagoon, the northern part of Çamaltı saltpans and the visitor center of The Ministry of Forestry (Figure 7.36). In 1980, the issued area was declared a Wildlife Protection Area, and in 1981 the same area was declared a Natural Conservation Area, an area protected under the Law on Protection of Cultural and Natural Assets. Actually, with 8,000 ha, this category concerns the smallest segment of the Gediz wetland and has been actively conserved and regularly controlled by the members of The Ministry of Forestry since 1980.

The same area was additionally declared as a First Degree Natural Conservation Area in 1999 by the Ministry of Culture (Figure 7.37). The Leukai archaeological settlement located on the three hills in the middle of the same region was also brought under control by the declaration of the site as First Degree Archaeological Conservation Area in 1985. Actually, the conservation status granted on 18 February 1999, Decision No. 7770 enacted by The Ministry of Culture covers the most extensive area possible, spanning the boundaries of the municipalities of Seyrek and Maltepe in the north and Sasalı and Çiğli in the east. It targets prevention of the destruction and upkeep of the ecological health of the Gediz Delta, particularly by means of the removal of fishermen shelters, the prohibition of pasturage, and the prevention of discharging waste water into the irrigation canals. On the other hand, the other vulnerable piece of delta, brought more recently under control, is the southeastern Gediz Delta. The southern Gediz Delta is under pressure by the extension of the city, Izmir. The degree of natural conservation area next to Mavişehir district was bewilderingly leveled out in four months in 2002 from the second to third degree that enabled new constructions. In fact, the First Degree Natural Conservation Area, by both including the wildlife conservation site in the north and extending close to the Mavişehir housing development area in the east (an area that includes residential highrises and conglomerations of shopping malls), spans a larger area than the Ramsar Site. In

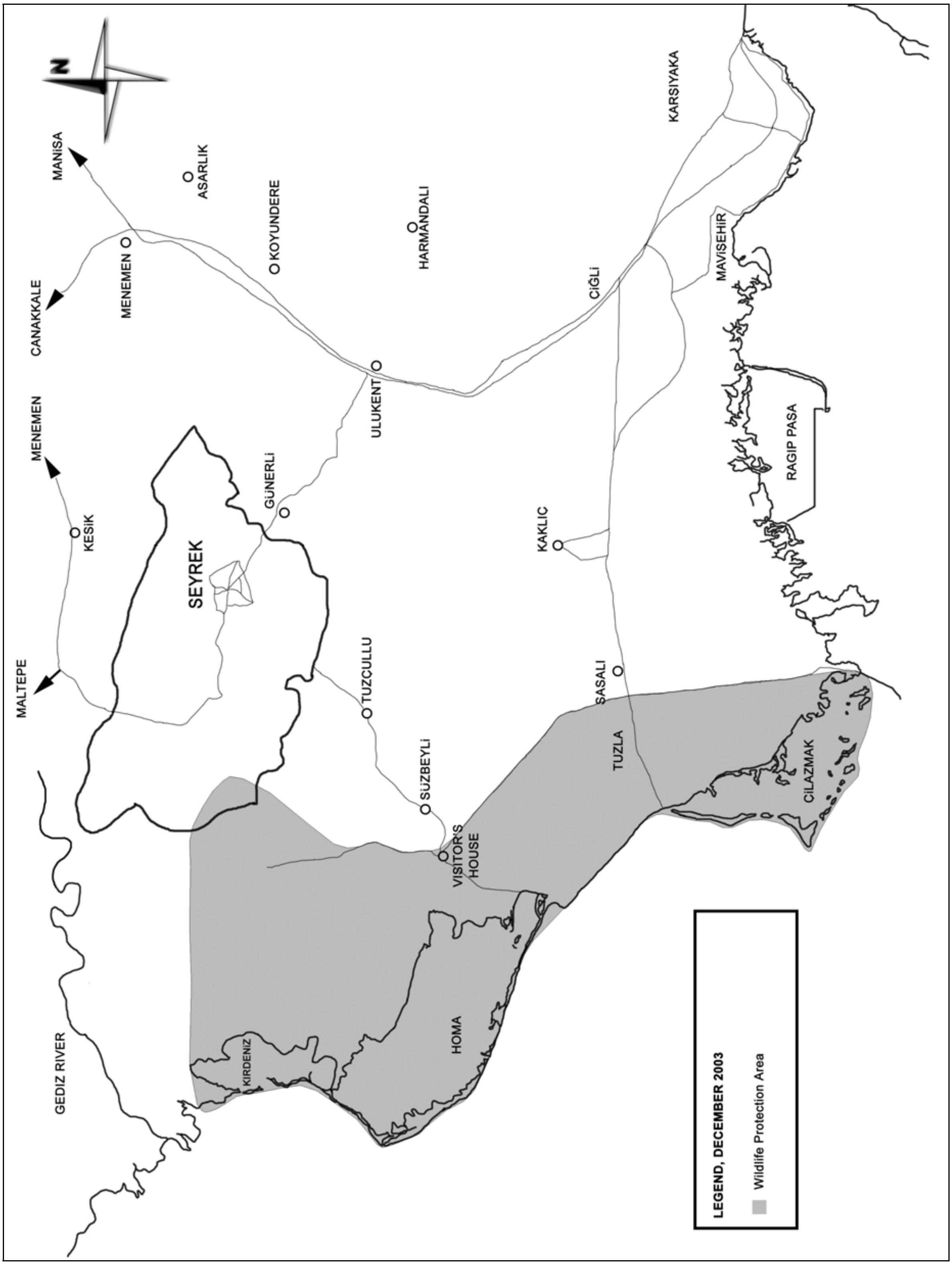


Figure 7.36 Boundaries of Wildlife Protection Area ordered by The Ministry of Forestry in Gediz Delta

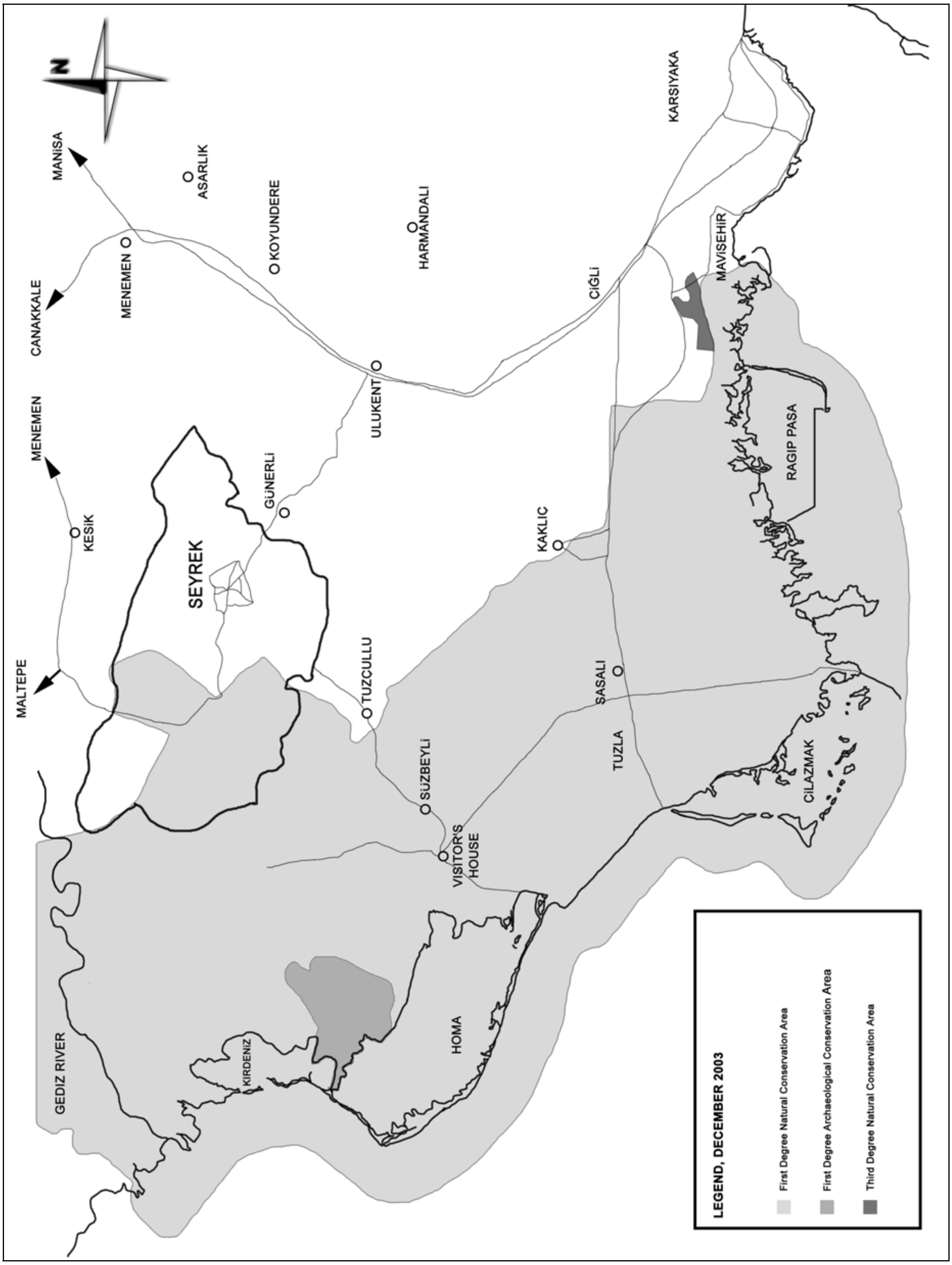


Figure 7.37 Boundaries of Natural and Archaeological Conservation Areas defined by The Ministry of Culture in Gediz Delta

spite of defining the most vigorous, therefore important, conservation type, this status enacted by The Ministry of Culture simply will not suffice to halt and prevent human interference.

The entirety of the delta has been deprived of a holistic conservation approach (Onmuş et al. 2002). For a long time, the Wildlife Protection Area—known also as Izmir Bird Paradise—on the west seashore of the Delta alone was taken as the most vital region for birds. Therefore the conservation facilities respecting the whole delta did not receive consideration for further protective devices (Kaplan et al. 1997). As a result, the several conservation status mentioned above were partially confirmed to fragments of land which, even taken as whole, are inadequate for a proper wetland conservation policy. The status defined by The Ministry of Culture established lower conservation status in particular areas such as that issued in the south eastern Gediz Delta which in fact scientifically deserve full protection. Finally, most of the conservation regulations have not been implicated or monitored by the authorities as needed.

In terms of *major authorities for architectural and planning activities*, Gediz Plain officially comes under the auspices of two institutions: the Greater Izmir Municipality and The Ministry of Public Works. Authorization to approve of the development plans for municipalities located outside the boundaries of the Greater Izmir Municipality Adjacent Area such as Seyrek belongs with the central planning authority, that is, the Ministry of Public Works. In terms of the *administrative structure*, Gediz Plain falls within the boundaries of two districts, Menemen and Karşıyaka. There are five further municipalities: Çiğli, Sasalı, Ulukent, Seyrek, and Maltepe (Figure 7.38). The saltpans are under the control and management of TEKEL—The State Monopoly which, among other things, administers the Salt Establishments. The Wildlife Protection Area is managed by the General Directorate of National Park attached to The Ministry of Forestry. The treatment plant and the closer Ragıp Paşa Lagoon are under control of the Greater Izmir Municipality. The Çilazmak Lagoon hosts a co-operative fishing company. The Homa Lagoon fishery is managed by Ege University, Faculty of Fisheries, in Izmir (Elbir 1998).

With such chaos of administrative auspices, local and central planning authorities and the various conservation statutes, the Gediz Delta and the plain have been irrecoverably losing in ecological value and health. The congruent, if

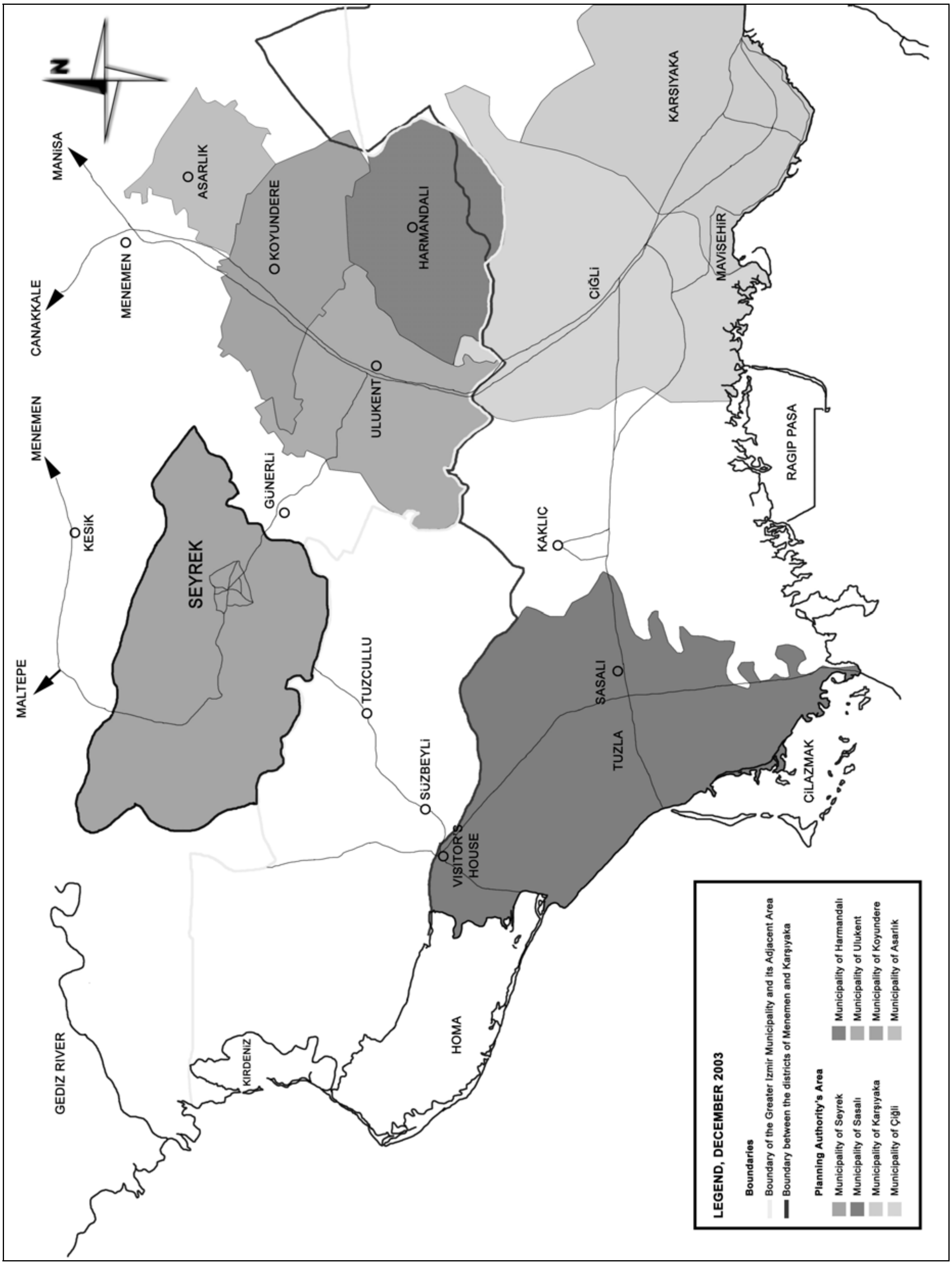


Figure 7.38 Administrative structure in the Gediz Delta: Planning Authority's Area Map, December 2003

not identical, responsibilities of administrative boards, the overlapping authorization territories and the disagreements among the local, central and private institutions cause even further difficulties in the implementation of conservation activities in the delta.

The investigation of the determination of active and possible problems in the delta by the Ege Bird Watching Group renders self-evident the insufficiency of conservation status and their violation by urbanization trends, filling up of the seashore in illegal ways and locations, the extension of saltpans as well as their management that remain unconcerned about the ecological cycle, the saltiness of fresh water habitats, illegal solid waste disposal, the efforts for the drought of marshlands, hunting and pollution (Onmuş et al. 2002). Figure 7.39 briefly illustrates the actual troubles that have been at work until the last quarter of 2002 and the location of the problems in the Gediz Delta.

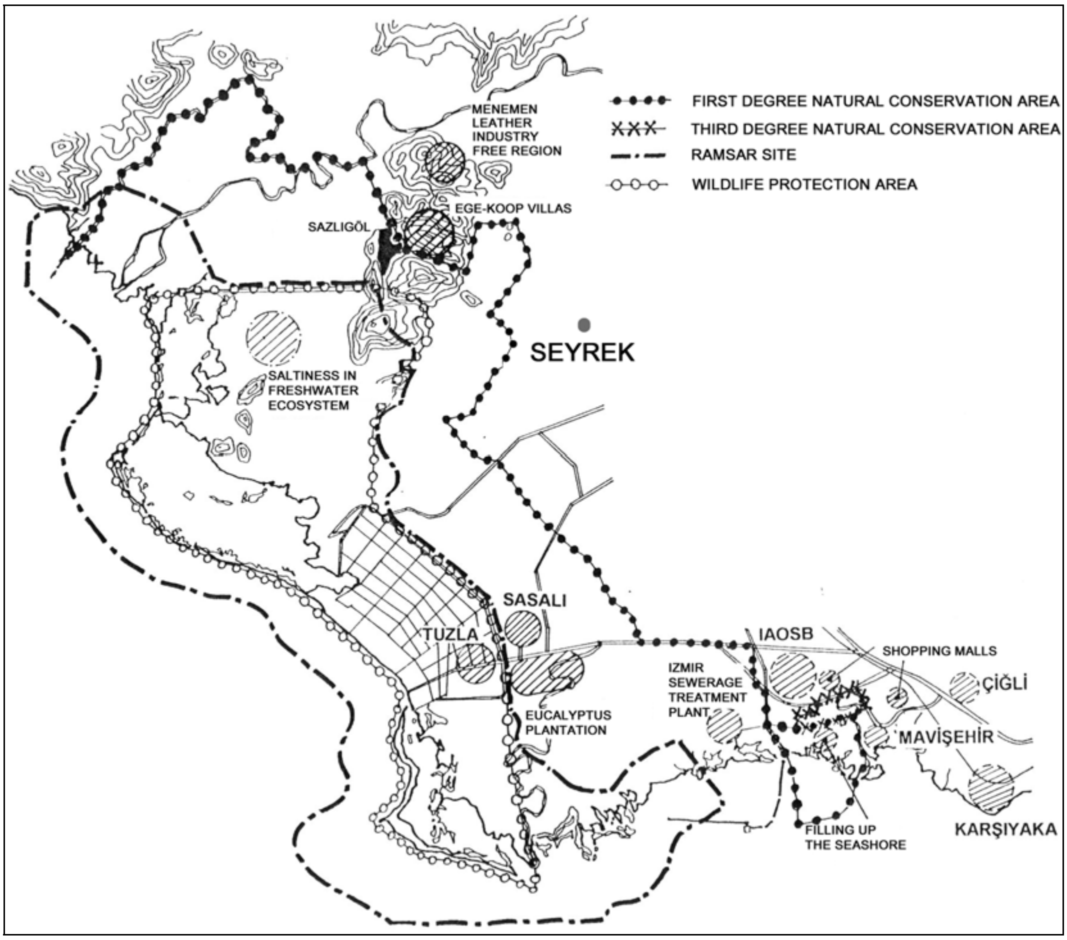


Figure 7.39 Problems and borders of conservation areas, December 2002 (based on Onmuş et al. 2002)

As a result, there is an urgent need for a management plan regulating the chaos of authorization in the Gediz Delta, encouraging civic engagement by local and central authorities, ensuring the conservation of the wetland ecosystem while regarding and balancing the economic activities in the plain. In fact, a management planning project for the delta was commenced in 1998, but remained inactive for a long time. The latest attempts for the preparation of a management plan have been accelerated by The Conservation Commission of Bird Paradise assembled by the governorship of Izmir in May, 2003.

7.2. Opportunities and Threats in the Case Area

The examination of multifaceted opportunities and threats, which the project of a housing development in Seyrek faces, offers a concise panorama for appraising the case area as to where the opportunities lie for attaining local sustainability and which threats ought to be urgently halted. This framework posed by the SWOT analysis technique helps develop appropriate, mature and acceptable sustainable architectural strategies. In the identification phase of opportunities and threats, the preceding study of capacity framework becomes the base: the revision of strengths and weaknesses is illuminating in terms of both pointing out what needs to be done and placing problems and obstacles into perspective. Here not only those peculiar to the building block in Seyrek but also of an extensive regional analysis encompassing Gediz Plain and the Seyrek settlement need to be considered. Even though this larger-scale viewpoint may at first sight seem irrelevant to housing design, the reader ought recall that the very argument of this dissertation is that the merest activity of building design must take into consideration increasingly wider contexts of life and Earth. Accordingly, the project we are herewith presenting privileges a respectful design approach not only for the case but also for the conditions of Gediz Delta. It intends not to be a sterile and abstract project designed for a sterile, abstract, non-existent, virtual environment. As a result, aspects of this comprehensive approach that foregrounds analysis of threats and opportunities may be listed as in Table 7.10 and Table 7.11.

Table 7.10 Examination of multifaceted threats which the project of housing development in Seyrek faces

Factors	*Threats*
Capacity of natural resource base	a. Current irrigation policy of the General Directorate of State Hydraulic Works (DSI), influencing the fresh water regime of Gediz Plain b. Ecosystem damage by TEKEL salt production to enlarge the salt pans c. Weakening productivity of soil in terms of the capacity of Gediz Plain to sustain agricultural activity and to supply the demand of fresh fruit and vegetable of Izmir d. Spoiling of the underwater regime by Atatürk Industrial Zone, and Menemen Leather Industry Free Region through over-exploitation of water in production processes
Climate	a. Cold eastern wind in winter
Land destruction by Izmir-Aydın Highway, the Izmir Beltway	a. Splitting of agricultural land by Izmir-Aydın Highway, Izmir Beltway
Land-use decisions: erroneous by-law application in the Gediz Delta	a. Conversion of agri-fields of Gediz Plain into secondary housing areas by Sasalı and Seyrek Municipalities
Illegal implementation by local governmental boards	a. Illegal implementations by Sasalı Municipality that disregards international agreements, i.e. Ramsar and Bern Conventions, in the Gediz Delta[11] b. Illegal application by Greater Izmir Municipality, Izmir Sewerage Treatment Plant: the demolition of ecologically vulnerable salty coastal areas registered as First Degree Natural Area by pouring more than 600 tons unstable mud per day to fill in wetlands in the Southern Gediz Delta c. Pouring demolition waste to fill up the coastal zone of Gediz Delta, and illegally change the coastal line of Izmir bay
Improper by-law decisions of local governmental boards	a. Conversion of ecologically vulnerable wetlands into industrial development areas as realized by Çiğli Municipality for the development of the Atatürk Heavy Industrial Zone in Çiğli b. Decisions of the Regional Commission for the Conservation of Cultural and Natural Properties: Manipulation to decrease Second Degree Natural Site into Third Degree in Çiğli-Kipa wetland next to Mavişehir*,* and thus obtain permit to build c. High population density enacted by the latest master plans of municipalities of Seyrek and Sasalı that is beyond the carrying capacity of built environment; beyond, that is, capacity of the building block and the extant infrastructure

[11] What is implied by an illegal application is infraction of the codes and by-laws enacted by the Turkish government. The improper and erroneous by-law decisions mentioned here, on the other hand, are indeed legal applications, yet these regulations conflict with the discourse of sustainability by disregarding ecological, social, and economic aspects. These may be equally termed 'illegitimate' from the perspective of sustainability.

	d. Drying application of Greater Izmir Municipality in the south of the district of Sasalı along the Sasalı-Izmir Motorway by eucalyptus plantation
Pollution caused by regional or local formations	a. Air, water and noise pollution originating in Atatürk Heavy Industrial Zone, Çiğli b. Air, water and odor pollution originating in Menemen Leather Industry Free Zone, Maltepe c. Soil pollution in agricultural fields of Gediz Plain originating in the use of agricultural pesticides and artificial fertilizers d. Water and soil pollution caused by the Gediz River carrying the whole untreated waste of Gediz Basin
Pressure by Ege-Koop	a. Effort of expansion and thus intervention in the First Degree Natural Conservation Area, e.g. Sazlıgöl, by Ege-Koop toward secondary housing and recreation facilities
Seismic structure	a. Earthquake risk because of the poor quality of the ground b. Location in the first-degree earthquake region
Topography	a. Problem of humidity depending on the high-level of ground water b. Flood risk

Table 7.11 Examination of multifaceted opportunities which the project of housing development in Seyrek faces

Factors	*Opportunities*
Climate	a. Calm eastern wind in summers
Construction material and technique	a. Presence of locally abundant materials—earth and brick—and the local manufacturing possibilities for brick, tile, and gas concrete b. Local building construction technique based on locally available material like earth and brick in Gediz Plain
Energy gain	a. Advantages of latitude for solar radiation b. South-faced linear building block
Inhabitants	a. Local inhabitants of Seyrek who already have many sustainable habits posed by their lifestyle and sustainable building features by an evolutionary building production process

7.3. Premises for Seyrek Municipality and the Gediz Plain for the Coming Decade: A Possible Development Scheme

The most important economic sector in the Seyrek Municipality and the Gediz Plain is today agriculture. However, one may safely predict for the coming decade that the main economic sector of the region will change from agriculture to industry. Industrial activities rather than agriculture are likely to play a major role in economy. In terms of *agricultural facilities* in Seyrek and the Gediz Plain, the rationale of this transformation may be based on the following:

1. Agricultural areas: The total land available for agricultural facilities will decrease. It is fairly certain that a portion of the fields will be converted into areas for industrial facilities and housing.

2. Question of fresh water for irrigation: The need for fresh water in agricultural facilities and the ongoing salinity of the agricultural landscape, as well as the rising water demand of industrial and residential areas, may continue and cause crucial fresh water deficiency in the agricultural plain. Agricultural lands presumably lose their fertility because of salinity resulting from sea-water penetration and the decrease in underground and surface fresh water reservoirs. Fresh water from Demirköprü Damp in Manisa could not meet the demand since drought may continue in Turkey in the coming years.

3. Pesticide use and artificial fertilizers: Continual use of pesticides and chemical fertilizers on agricultural land may inevitably cause the soil to become less productive. Especially the lands now used for cotton cultivation may become unfruitful, as this widespread agricultural crop requires increased amount of chemicals in comparison with other crops cultivated in Gediz Plain.

4. Pollution: It is almost certain that pollution will have negative effect on soil fertility. The water pollution of Gediz River is hazardous to the fields running along the river bed because the irrigation water from Gediz River carries dangerous elements composed of heavy industrial and residential refuse. The Gediz water is not subjected to any purification process before its utilization for crops, husbandry and humans. Air pollution from the heavy industrial zone in Aliağa and Izmir, Atatürk Heavy Industrial Zone and Menemen Leather Industry Free Region increases the concentration of toxic wastes in the soil. Eventually, agricultural land left in the heart of dense urban development will definitely lose its productivity.

5. Shrinking fields: Agricultural area per farming family may decrease, despite current governmental policy executed by the Union of Irrigation in Lower Gediz—*Aşağı Gediz Sulama Birliği*—to enlarge agricultural lands. Agricultural lands are perhaps divided into smaller shares to be transmitted to the subsequent generations. Thus it tends to become more difficult to obtain a livelihood from ever smaller fields.

6. Purchasing power of the farmer: Given that problems emergent in the agricultural sector and the lack of backing to farmers is likely to continue, the number of farmers, who have traditionally depended on agriculture for their livelihood, maybe decrease.

7. An aging agricultural population: The keep of uncultivated agricultural lands would probably increase as the inhabitants who are able to till the fields get older. It is very probable that young people who are employed in agricultural activity will move to urban centers like Izmir for increased job opportunities, and thus the average age of inhabitants remaining in Gediz Plain is likely to rise.

On this basis, we may estimate that the agricultural economy in Seyrek and Gediz Plain is likely to change character in the coming decade. The various features of this change may be itemized as follows:

1. It appears to a decrease in agricultural activity specifically in products such as cotton, wheat and corn that currently occupy large agricultural lands. There may be a tendency to fresh vegetable and fruit cultivation which in turn may gradually emerge as the alternative.

2. The agricultural sector possibly tends especially to particular crops such as tomatoes, cucumbers, pepper and the like which are directly related to industrial production in pickling, canning, and for cycling in tomato sauce and wine factories.

3. It is quite possible that fresh fruit and vegetable cultivation in the Gediz Plain, serving the inner market of Izmir, will decline and move more to the Foça hinterland and the Manisa plain. It is seemingly that the pollution of Gediz River may cause a decrease in daily fresh food demand from the Gediz Plain. However, the area may still continue to supply a small portion of the daily fresh fruit and vegetable demand of the Karsiyaka and Çiğli region.

4. Some of the large agricultural properties will presumably change hands and come to be occupied as industrial and housing areas.

5. Ecological agricultural activities may be introduced in the Gediz Plain. It may conceivably become widespread, but not include all the agricultural lands. Besides, it is rather unlikely to undertake wholly certified ecological agriculture because the agricultural lands of the Gediz Plain cannot posses all the required characteristics. Instead, the cultivation of semi-ecological crops is possibly

stimulated for the inner market. Ecological husbandry may also expand within the ecological breeding methods using fodder from ecological agriculture.

6. The fresh water problem for agricultural irrigation may be solved in the southern parts of the Gediz Plain by using clean water from the Izmir Sewerage Treatment Plant.

Given this panorama of agricultural facilities, one may expect a development in *industrial facilities* in Seyrek and Gediz Plain which may occur on account of the following:

1. The Izmir, Cumaovası–Basmane-Aliağa Double-Line Railway Project: This project will undoubtedly stimulate industrial development in the Gediz Plain. It will first strengthen economic links between the Aliağa Heavy Industrial Zone, Atatürk Industrial Estate, and Izmir. The easy, fast and cheap transportation opportunity for both industrial production and the people living and working there, may improve the feasibility of new industrial areas along the railway line.

2. Extension efforts of the Izmir Atatürk Industrial Zone: Izmir Atatürk Industrial Zone necessitates increasing the capacity of industrial production. Therefore it is likely to extend in the northern parts instead of Çiğli Wetland in the southern region which is registered as a First and Third Degree Natural Conservation Area.

3. The new industrial development in Sasalı: The recent conversion process for agricultural land into industrial areas by the Municipality of Sasalı has led to a new growth pole at the south-west side of Gediz Plain. The rapid growth demand of Sasalı Municipality for industrial areas may continue in the northern parts alongside Çamaltı Salt Pans.

4. Menemen Leather Industry Free Region as a growth pole: Even though the leather industry has lost its feature of being one of the most profitable sectors, it may regain its productivity contingent on the development on other related sectors in Gediz Plain such as textiles and ready-made clothing. Investments may continue and increase because of its free-zone feature.

5. The low income from agriculture: The low profitability of the agricultural sector will presumably lead farmers to sell their fields to further their livelihood. This is likely to start a new process in the industrial development of Gediz Plain. The fields may be easily sold off to customers who will be investors in the industrial sector.

The acceleration in industrial economy in Seyrek and Gediz Plain will undoubtedly cause physical transformations in particular regions. From the information above, the spread of industrial areas in the case area may be predicted as follows:

1. A new industrial belt is likely to appear in the western part alongside the Izmir, Cumaovası–Basmane-Aliağa Double-Line Railway. This area may start with the Izmir Atatürk Industrial Estate in the south and extend nearly to Menemen in the north.

2. Industrial areas in Gediz Plain is quite likely to be located in Seyrek and Sasalı Municipalities, Menemen District, alongside the Seyrek-Izmir and Maltepe–Izmir Motorways, between the Çanakkale–Izmir Motorway and Izmir Beltway, around the Izmir Atatürk Industrial Zone and lastly in the Menemen Leather Industry Free Region.

3. Industrial areas between the Seyrek Municipality and Izmir Atatürk Industrial Zone may become connected.

4. The industrial zone of Sasalı Municipality may extend so far as approach Tuzçullu, situated adjacent to the Seyrek Municipality.

5. The most important export production of Menemen District today is dried fruit in terms of both quantity and value. Therefore fruit juice factories may possibly be established in Gediz Plain.

6. The richness of agricultural crops in Gediz Plain may require new cold-storage depots and warehouses located between Seyrek and Çanakkale-Izmir Motorway.

7. Industrial activities in Seyrek will presumably develop especially in the high value-added industrial product sector based on agriculture and husbandry, i.e. pickling, canned food, tomato sauce and wine factories, milk and meat products.

8. Textile and ready-made clothing sector may develop in the Seyrek Industrial Zone. The cotton production in Gediz Plain may lead to the establishment of new rope and textile factories. Instead of spending money for the transportation of local cotton, it is very possible that the inhabitants prefer to process their cotton in their own small factories. Moreover, some textile and ready-made clothing factories in Izmir Atatürk Heavy Industrial Zone may move to the Seyrek industrial zone.

9. Small scaled hand-made carpet and weaving workshops may be formed by inhabitants of Seyrek.

10. The trade based on the food sector may also increase in the Municipality of Seyrek. Since Seyrek has large meadows and agricultural areas, husbandry is likely to advance. Thus, the meat and livestock market trade may also grow, and the number of small dairy farms producing products like yogurt and cheese may increase.

In terms of *transportation facilities,* the development of quality in transportation will accelerate the transformation process through urbanization in Gediz Plain. There are already particular planned transportation routes whose construction is underway. Thus predictions regarding the developmental direction of the transportation pattern of the delta may be enumerated as follows:

1. The Izmir, Cumaovası–Basmane-Aliağa Double-Line Railway Project will be completed. The three stops, Egekent, Ulukent, and Koyundere, between Çiğli and Menemen Districts will open to public transportation. This railway project most probably eases transportation for the inhabitants of Seyrek. They will use from the Ulukent train station for travel to Menemen and Izmir.

2. The Izmir–Aydın Highway, Izmir Beltway may be extended from the Izmir–Sasalı Motorway to the Çanakkale–Izmir Motorway. If this road will be constructed, it can fairly facilitate highway transportation to Seyrek.

3. The Izmir–Foça Motorway may be shortened by the rehabilitation of the stretch between Gerenköy–Maltepe–Ege-Koop Villas–Seyrek which is likely to be connected to the Izmir–Aydın Highway, Izmir Beltway.

4. The new service road for inner city transportation may be opened on the west side of the Çanakkale-Izmir Motorway which may thus become a transit road.

5. A new railway line may be constructed for access to the Menemen Leather Industry Free Region alongside the Menemen–Kesik–Maltepe Motorway.

In terms of *socio-cultural structure and population*, it appears that the Izmir, Cumaovası–Basmane-Aliağa Double-Line Railway Project will improve interconnections between the city of Izmir and the village municipality of Seyrek. While the inhabitants may maintain their strong relationship with Menemen in terms of shopping, entertainment and dealings with administrative bodies, they are likely to come to depend increasingly on Izmir for urban facilities such as cheaper shopping, more qualified education, or more job opportunities.

Some of the inhabitants who had left Seyrek may return to engage in agriculture or industrial activities relevant to agriculture. These immigrant villagers can bring back expertise after living in modern urban contexts, joining hands with those who have stayed in Seyrek in order to take charge of their livelihood.

In point of fact that the present development plan of the Municipality of Seyrek foresees a new socio-cultural structure with its proposed population. All transformations raised by agricultural, industrial, and transportation facilities inevitably bring about the modification in population pattern as well as the settlement pattern: one may expect that the character of the population of the Seyrek settlement will presumably become more cosmopolitan. The easy access to Seyrek may accelerate coming of new residents to settle in Seyrek. It is envisaged that there may be three types of householders. The first two categories of residents may be the local inhabitants of Seyrek, some requiring agricultural facilities for their livelihood while others will not. The third category may be comprised of the new residents of Seyrek who work in the surrounding industrial areas. Furthermore, the housing areas may expand especially along the Ulukent-Seyrek-Maltepe line. As a result of housing policies in the north development axis of Izmir, the increasing trend in housing along the Izmir-Çanakkale Motorway will inevitably result in the two-sided housing zone running parallel to the road, including the agricultural fields of Gediz Plain.

CHAPTER 8
PRESENTATION OF DESIGN TOOLS

The present chapter undertakes to critique and evaluate the condition and possibility of sustainable architecture by a practicable project. In other words, it inquires into a paradigm of the realization of sustainable architecture in Turkey by positing *a* design for the particular case area in Seyrek. In brief, the housing development project in Seyrek provides a testing-ground for considerations of sustainability in Turkey. It undertakes to do so by highlighting the background of the *local* definition of sustainable architecture such as has been founded particularly in Chapter 3. Indeed, sustainability is a global concept. Yet its critique must be undertaken vis-à-vis architectural solutions developed in the context of local approaches. This critique is conducted here by offering a 'set of possible tools of design' geared toward Seyrek. This set, it is hoped, will be revealed by the end of the present chapter. Too, it is argued, it will serve as an examplar for designing *optimum* sustainable projects particular to Seyrek by means of various combinations of the design tools peculiar to the function of housing development and the case area in Seyrek.

8.1. Goals, Priorities, Strategies and Tasks for the Sustainable Housing Development Area in Seyrek

Comprehensive studies in the capacity framework research, presented in Chapter 7 above, concluded with the re-evaluation of the objective, specification of goals, clarification of priorities and relevant strategies to accomplish them, and the definition of particular inevitable tasks. This is the decision phase in which opportunities and threats are examined from a sustainable point of view, and then the capacity of the case area is converted into the logical cause-effect relationships facilitating sustainable characters of the housing development. This implies that, for example, the heating of water in Seyrek is a problem in terms of both the economic and ecological sustainability of the region because the heating systems are mostly contingent on the expensive electrical energy or polluter fossil fuels, and there is a lack of interest in water heating by solar collectors. Yet the latitude of Seyrek provides an opportunity, and thus the use of solar energy in the heating of water may be the critical outcome.

The following part manifests the objective, goals, priorities, strategies and some tasks of the project. Here, conflicts between the preliminary goals, as defined in Chapter 7, and the limited and limiting conditions of Turkey are taken into consideration. The understanding of conflicting points enables the specification of priorities, strategies and inevitable tasks of the project. Due to the intention of refraining from repetitions and to reveal the framework of each design tool in an understandable cause-effect relationship, in this chapter, each goal will be given not one by one, but within the relationship of priority and its peculiar strategies.

Low cost, affordable, energy-efficient and environmentally respectful housing in the Seyrek settlement: As a semi-rural village, Seyrek is situated in the middle parts of the Gediz Plain—a strategic location in terms of three issues: the village, in fact, is situated all too close to Izmir, and only 8 km from the most developed route of the northern growth axis. Secondly, it is on a diagonal short-cut road between Izmir and Foça that is frequently used for access to and from the residential and industrial development areas in the west. Lastly, Seyrek bears ecological importance by virtue of its location in the buffer zone of the Gediz Delta.

Although the Seyrek settlement has not been entirely affected by the process of urbanization, there are two particular attempts that will accelerate the course of development in life and environment in that direction. These are the new residential development areas which are devised to settle 22,120 persons in the center and 20,000 persons in the Ege-Koop villas in the west. The construction of the second residential area is almost completed. When the records of the current planning decisions are accepted as the base, the population of the Municipality of Seyrek, which was 2,028 in 1997, is envisaged to increase by at least 42,120 persons. This population projection implies the arrival of a new group of people into Seyrek, a movement of newcomers next to the local inhabitants, and radical transformations in the social structure. This projection was made, and approved, in the macro scale. Further newcomers are thereupon projected, viz. those who may immigrate to the region because of rising job opportunities. These newcomers, unlike the first contingent of newcomers mentioned above, may thus possibly come from the low or middle income groups.

It is reasonable to expect that similar physical and social transformations will occur in many other parts of the plain, and thus one may easily infer that total land available for agricultural facilities will decline radically. According to yet another projection for the coming decade, striking progress in the industrial economy will replace the agricultural sector. It may be thus safely asserted that the rise in job opportunities may essentially bring about an extra housing pressure in the delta. Proposed housing neighborhoods in the Municipality of Seyrek may satisfy this demand to a large extent. However, it seems possible to ratify the same housing requirement in the other region to the east of the Izmir-Çanakkale Motorway, particularly in the Municipalities of Harmandalı, Ulukent, Koyundere and Asarlık, without destruction of the agricultural land use of the plain.

Along with the proposed housing density rooted in the current planning decisions of the Seyrek settlement, one may predict the prescribed transformation process through the modernization and urbanization characterized by the non-agricultural sector for livelihood. The organization, in other words, of building blocks, the density of dwelling, spatial layout, and the proposed neighborhood relations of the development plan of 1997 will eradicate the rural settlement pattern and semi-rural life style. One conspicuous factor here is the feature of the development plan that conflicts with the existing social, cultural, economic, ecologic, aesthetic and spiritual aspects of the settlement. One cannot very well conclude that this regulation will motivate a proper physical transformation restoring the already damaged ecosystem health of the wetland while sustaining agricultural activities. In other words, conversely, the vulnerable equilibrium in the delta based on the mutual interrelations between the wetland ecosystem and agricultural habitat will be obstructed at the very heart of the plain. All these conditions in the case area signify a preference witnessed also in other southern countries, that the economic priorities and progression goals, even in the local scale, are consistently placed ahead of local social, cultural, spiritual and ecological values. In brief, the existing norms and regulations do not support sustainable development in the Seyrek settlement.

In this case, we may ideally believe, developing a new contrary planning approach that will sustain the semi-rural qualities of Seyrek with its rural settlement pattern, the social structure, living habits and architectural tradition becomes inevitable. In terms of sustainable design, we may expect the residential policy of the development plan of 1997 to have been established purposefully. However, local building codes should encourage a design strategy that respects the process of designing the new into the old, and respond to the peculiar architectural tradition, while recognizing and distilling current needs and technologies.

In reality, however, this is the condition of the Seyrek settlement that cannot be ignored. Given this fact, the two design approaches may be developed for the housing development project of this dissertation: the first option may be the rejection of all norms and planning decisions specific to the residential development area of the development plan of 1997, and to design an ideal sustainable housing project. Yet this idealist approach falls far of applicability and accessibility. At the same time, this decision itself contradicts the idea of sustainability which is respectful of local conditions. The second one, therefore, comprises a humble approach over against the higher-minded one rejecting extant planning decisions in their entirety. It considers a way to design and construct sustainable solutions under extant conditions, and to seek for ways to develop the better solution among a series of the bad. In point of fact, the main design approach of the present study is the second option that has been already well-tried in numerous southern countries. This design attitude may be best described in the following terms:

1. Creation of optimum sustainable architectural solutions in the present local conditions.

2. Search for the feasible designs that are more sustainable, accessible, and applicable by means of predicting those that will be inevitably realized if the sustainable designer were not to make this effort.

The housing development project in Seyrek—of course it is still true, as explicated in the previous chapter—aims at the sustainability of the semi-rural built environment and social life. When this preliminary goal is re-evaluated in line with the physical and social surveys of Seyrek, the objective of the sustainable housing project in the settlement may be specified as follows: to design low impact houses to attain optimal solutions for diminishing the ecological footprints of the buildings in Seyrek and the Gediz Plain, and to realize the finest architectural solutions that are simple, effective, attainable, affordable, and the best possible under existing circumstances in the case area. At the same time, one will aim at responding to the spatial layout, inner and outer functions and any type of requirements voiced by occupants whose wishes have evolved through agricultural activity.

To support the local inhabitants of Seyrek in preferring to live in the sustainable dwellings instead of four-storeyed, detached form apartment blocks is an important goal for the applicability of the project. Therefore, user satisfaction is prioritized: the fulfilment of user needs and requirements, and the re-evaluation of them from the sustainable point of view is the most significant priority of this project. In order to provide for accessibility, applicability and convincibility of the sustainable housing development project, the following two priorities are to be emphasized:

Priority 1: Lowering building cost

Priority 2: Highlighting local qualities and established habits

Reason for the first priority: According to the social analysis, it may be asserted that the high building cost is the foremost factor for many local inhabitants to refrain from new construction activities including repairs. Lowering dwelling costs may become the most considerable basis for inhabitants' choices and sympathies. Besides, these dwelling needs ought to be so affordable and desirable as for the newcomers from low and middle incomes who will also settle in Seyrek.

Reason for the second priority: It is a noticeable fact derived from the social survey and interviews that the initial desire of local inhabitants is to live in a place which has qualities similar to Seyrek's. In other words, the large number of householders express preferment of living in their own settlement, rather than in the city, Izmir, by emphasizing the fact of feeling safe and free in the former, the village's calm, fresher aired, cooler, greener atmosphere, and particularly the close neighborhood relations. They prefer living in the detached house within a garden, rather than an apartment flat, by highlighting its more private, secure, quiet, and free status. For these reasons, it may be expected that the local inhabitants will first choose the dwelling which ensures the continuation of the extant spatial characteristics and social structure while merging them with current needs and requirements. The continuation, rehabilitation and betterment of the semi-rural constitution and the agriculture-based socio-economic structure of the village, therefore, become targets of priority. It should be noted that all these cover the integration of newcomers without occasioning social exclusion.

According to the projections for the coming ten years in Seyrek, there will be three groups of households that will have diverged according to their source of livelihood and demographic origin, viz. the local inhabitants and the newcomers. The first two categories of residents are the local inhabitants of Seyrek, some requiring agricultural facilities for their livelihood, while others do not. The third category will be made up of new residents of Seyrek who work in the surrounding industrial areas. In terms of which households may live in which type of houses, Table 8.1 briefly explains the proposed dwelling type:

Table 8.1 Set of possible relationships between the household, i.e. the user, and the type of dwelling

Group of residents	Type of dwelling
First group: local inhabitants relying on agricultural facilities for livelihood	detached house
Second group: local inhabitants relying on non-agricultural sector for livelihood	detached house or multi-storeyed dwelling
Third group: newcomers relying on non-agricultural sector in Seyrek or surrounding industrial areas for livelihood	multi-storeyed dwelling[1]

Strategies determined for the fulfilment of these priorities:

First priority:

Strategy 1: Creating employment opportunities for local people so as to harness self-help construction techniques and to use attained construction skills in further constructions.

Basis: On the basis of the social survey, it may be inferred that a number of dwellings in the village were already constructed by the occupiers owners/dwellers themselves and/or by the collective labor of relatives actively involved in the construction process. Here, the first strategy encourages the revitalization of this traditional construction method, the collaborative self-help scheme with which the local inhabitants are familiar, in order to decrease the building cost.

[1] Newcomers may indeed choose to live in the detached dwellings. This author does not intend to adopt a preventive approach. In the context of this case study, however, the premise is that the new inhabitants of urban origin will opt for living in multi-storeyed dwellings.

Moreover, the younger generations of the village have suffered extremely from unemployment in and around Seyrek. The investigation of things whose lack are felt in the Seyrek settlement conveys that the most emphasized one is the absence of job opportunities. Some of the inhabitants, especially the younger ones, who work with the craftsmen for building their houses, may qualify themselves for regular jobs in construction. This evolutionary process, in fact, may ensure the continuity of talented, qualified and conscious construction laborers for new sustainable buildings in the Seyrek settlement.

Strategy 2: Core and expansion system for dwellings so as to render possible for the householders to complete their homes in the future when they can afford it.

Basis: The decision for making expansions to the dwelling is logically bounded to the economic conditions and the space requirements of a particular family. This is a process that evolves spontaneously. The physical survey in Seyrek conveys that there were already a number of efforts to enlarge the dwellings by adding rooms of various types. Yet at the same time, a majority of residents were found to have been postponing making additions because of economic incapability. The regulation of this expansion in terms of the size and direction will both guarantee quality of the spaces in terms of sustainable issues, and enable the inhabitants to meet the expense of the expanded home more easily.

Strategy 3: Attaining low energy buildings that conserve energy, utilize passive energy systems, and use ambient renewable forms of energy so as to minimize energy loads and thus, the expenses.

Basis: From the social survey and interviews with the householders, it may be inferred that the building material and construction system influence the overall heating and cooling loads of the dwelling, and inevitably the energy costs the dwellers have to pay. The choice for the simple, horizontally perforated lightweight brick and reinforced concrete systems have comparably caused increase in the heating expenses in winter while causing uncomfortable conditions in summer. Here, the third strategy aims at lowering the expenses for energy while bettering inner comfort conditions only by simple, wise, applicable, replicable, and affordable architectural solutions based on passive design principles.

Moreover, the physical analysis shows that the Seyrek settlement is completely dependent on external energy supplies: the burden in any supply has brought about discontinuities in daily life. This strategy thus aims at lessening dependency on fossil fuels such as coal, wood, gas, and on electricity for heating, cooling, lighting, ventilating, transporting, and so on. The means to do so reside in facilitating local energy sources such as solar and wind energies. The main vision behind this priority is that the local production of energy and the use of ambient ones are cheaper than the importing of energy, and more environmentally friendly so as to minimize environmental problems caused by the production and transportation of energy.

Second priority:

Strategy 1: Reducing the net residential density of the latest development plan by reference to the average value of the densest parts of the Seyrek settlement.

Basis: Physical analyses obviously convey that the settlement pattern of this semi-rural village is characterized by organically scattered relationships of residential buildings located in larger sized plots in the periphery. Therefore, the net residential density ranges from around 43 dwellings per ha in the settlement center to half and less in the fringes. Besides, in the densest part of the village, the number of single dwellings in two storeys is larger than in the periphery. The main reason for this is, as repeatedly pointed out above in varying contexts, very numerous residents prefer increasing the floor area of the dwelling by enlarging vertically upon smaller sized plots, and gaining more semi-open or open area for the functions related to the agricultural lifestyle. Furthermore, the detailed physical analysis of the densest districts indicates that the sum total of the area of closed depot(s), shed(s), and dwelling(s) in one or two storeys on the average consist of 50% of the plot size. In other words, the total area ratio—*KAKS*—of the plot is around 0.5. Here the building-use-area of dwellings increases slightly since some of the dwellings are in two storeys: the majority of two-storeyed dwellings measure between 90 and 110 m^2.

These facts, i.e. changing size of the plots and the organization in it, are quite likely the result of the livelihood dependent on agriculture over a long period of time. If the continuation of the semi-rural character of the town is the primary target, the preservation of the formation of building blocks, the size of plots, location of the dwelling in the plot, the arrangement of two buildings in separate plots, the number of storeys, and the spatial organization of functions in the plot should be the basis for the new residential activities.

Therefore, the first task is geared toward residential density: here, the primary proposition is that the total floor area—*KAKS*, i.e. *emsal*—must be 0.5 per plot. In other words, when the norm for the number of dwellings is accepted as that data offered by the densest parts of Seyrek (43 dwellings per ha), and the sum of closed area in a plot is taken as around half of the plot size, regardless of whether the householder chooses to erect the building vertically or laterally, the size of the closed area must not exceed 50% of the plot size.

Limiting total floor area enables both equity for different types of users in constructing the same sized closed spaces, and freedom for inhabitants to choose living in detached or multi-storeyed dwellings. According to this regulation, those relying on agricultural facilities for livelihood, for instance, can continue their habitual lateral functional relationships in the plot, while the adjacent neighbor who relies on the non-agricultural sector for livelihood can opt to raise up the dwelling, or to live in a multi-storeyed dwelling by means of possessing the equal rights for the total closed space.

The second task concerns the size of the building plot and the requirements of the residents: the size of the plots in the case area may be grouped into three in keeping with the user groups. It is quite reasonable that the three groups of householders may reside together in the case area. However, their spatial requirements vary at least in terms of the source of income. The extant development plan does not consider the relationship between the requirements of user and the plot size. Conversely, it proposes almost equal-sized plots regulated by Article 18 of By-law No. 3194, without demarcating the varying spatial expectations of householders, e.g. storage need of residents dealing with cotton cultivation or the expectancy of greater socialization of the residents working in a factory. Thus what is proposed by this dissertation is the differentiation of plot sizes according to user type, and inevitably, their occupations. What is the crucial strategy here is to consider the differences in spatial expectations and determine an optimum bottom limit for each according to the required functions in the plot. Table 8.2 briefly explains the size of plots in comparison with the current average values in the village, in the case area by the development plan of 1997 and the proposed ones, in terms of three groups of residents. It is a notable fact that the plot size is bounded to the space requirements of related functions and respective spaces. Table 8.3, thus, also introduces the functions and related spaces outside the dwelling but in the building plot.

Table 8.2 Actual and proposed plot sizes for three groups of inhabitants

group of inhabitants	plot size by the development plan of 1997	plot size derived from analysis of cadastral parcels (min)	proposed plot size for particular house type (min) (m^2)	total buildable area (E: 0.5)
first group	14 plots in varying sizes between 572 and 757 m^2	550-600 m^2	600 m^2 (detached house)	300 m^2
second group		150-200 m^2	200 m^2 (detached house of one storey) 300 m^2 (detached house of depot on ground floor) 400 m^2 (detached house of two storeys)	100 m^2 150 m^2 200 m^2
third group		-	600 m^2 (multi-storeyed house of single block) 1100 m^2 (multi-storeyed house of double block)	300 m^2 550 m^2

On the basis of the total area ratio—*emsal*—and the plot sizes of the case, the minimum and maximum number of dwellings and corresponding capacity of population of the case area may be seen in Table 8.4.

Table 8.4 Population capacity of the case area according to present and proposed density

Development plan of 1997 (max)	Housing Development Project (min) *	Housing Development Project (max) **
112 dwellings/ 448 persons	28 dwellings/ 112 persons	41 dwellings/ 164 persons

* If all plots are occupied by detached dwellings
** If all plots are occupied by multi-storeyed dwellings

As seen in Table 8.4, when the possible family size is accepted as four persons, the net residential density of the case area is maximum 164 person/ha. As a result it may inferred that the density of the case area is lowered in proportion to

Table 8.3 Comparison of actual plot sizes currently in use in Seyrek and those proposed for particular households: functions and spaces outside the dwelling but in the building plot

group of inhabitants	plot size by development plan of 1997	plot size derived from the analysis of cadastral parcels (min)	functions and spaces outside the dwelling but in the building plot (actual) (+) generally (/) sometimes (-) seldom	proposed plot size for particular house type (min)	proposed functions and spaces outside the dwelling but in the building plot (proposed) (+) certainly (/) quite possible (-) perhaps
first group	14 plots varying between 572 and 757 m^2	550-600 m^2	courtyard (+) WC (+) semi-open and/or closed depot(s) (+) *saya*(s) (+) poultry (+) semi-open sitting and resting area (+) small garden (/) animal shed(s) (/) smooth area for drying daily/annual foods (/) kitchen (closed) (/) house(s) for seasonal workers and their WC (-) fireplace (-) bathroom (-)	600 m^2 (detached house)	courtyard (+) semi-open and/or closed depot(s) (+) *saya*(s) (+) poultry (+) semi-open sitting and resting area (+) small garden for own food needs (+) smooth area for drying daily/annual foods (+) animal shed(s) (/) tank(s) storing diesel oil (/) house(s) for seasonal workers and their WC (/) fireplace (-)
second group		150-200 m^2	courtyard (+) WC (+) depot for winter fuel and various equipments (+) poultry (+) semi-open sitting and resting area (+) smooth area for drying daily/annual foods (+) small garden (/) *saya* (/) kitchen (closed) (/) fireplace (-) bathroom (-)	200 m^2 300 m^2 400 m^2 (detached house)	courtyard (+) depot for winter fuel and various equipment (+) semi-open sitting and resting area (+) smooth area for drying daily/annual foods (+) small garden for own food needs (+) *saya* (/) poultry (/) fireplace (-)
third group		-	-	600 m^2 1100 m^2 (multi-storeyed house)	courtyard (+) closed depot for storing winter fuel and various equipment (+) semi-open sitting and resting area (+) *saya*-car park area (+) smooth area for drying daily/annual foods (-) small garden for own food needs (/)

the denser parts of the Seyrek, and decreased at most by 32% of the development plan of 1995, and 68% of the development plan of 1997.

Strategy 2: Adapting the *dolma* and *sakız* type houses as a core plan that both enables several possible additions and orients the cultural reception of the new dwellings.

Basis: The Seyrek settlement center has a total of 302 dwellings most of which demonstrate particular typological characteristics in terms of inner space layout. The houses in *kulle*, *dolma* or *sakız* types, or their several derivations display the habits about the organization and use of inner spaces. Because most of the inhabitants of Seyrek wish to live in a dwelling like their current houses, the cultural tolerability of up-to-date designs depends on the deciphering and understanding of this tradition. The harmonious interpretations of the old types will both fulfil the current needs and preserve the local inhabitants from cultural deterioration.

On this basis, this dissertation proposes two series of dwelling examples, viz. D and S series, for the housing development project in Seyrek. The subsequent part including various pages of figures and tables presents these proposed dwelling types without any narrative. In architecture, the fundamental method of rendering design intelligible is use of visual language. Linguistic description alone, does not represent the project: it merely clarifies certain aspects of it. Below, the reader will therefore find the designs represented in the technical language of architecture. These 29 pages exclusively display the projects without verbal elucidation. Clarifying elaboration is then given in section 8.1 entitled "Design Tools."

Thus Figures 8.1 and 8.2 demonstrate the evolution process of categories of D and S houses based on the interpretation of *dolma* and *sakız* types in the Seyrek settlement. The list of proposed variations of types S and D is enumerated in Table 8.5. Figures 8.3 through 8.12 give each dwelling plan in a scale of 1/100. Figures between 8.13 and 8.18 convey various combinations of the location of the dwelling in the plot, the possibilities of adjacency and position of dwelling in the adjacent plots according to the types S and D. Finally, information about all the differing groups of dwellings is brought to a close with the presentation of the sample dwelling type D_1 and D_1', given in Figures 8.19-8.26. Here the intention is both to demonstrate various sustainable qualities which are already repeated and adapted to the other types as well as present in the D_1 house type, and offer a reliable testing ground for the design tools which will be clarified in the following section. The drawings of the sample dwelling in 1/80 scale are also proof of the hypothesis of this dissertation concerning the applicability of sustainable solutions under conditions such as those of Seyrek, Turkey.

1. Present layout: functions and spaces inside the *dolma* type dwelling
2. Climatic evaluation of the *dolma* type
3. Core and expansion system of the type D dwelling
4. Functional layout of the type D
5. Spatial layout of the type D

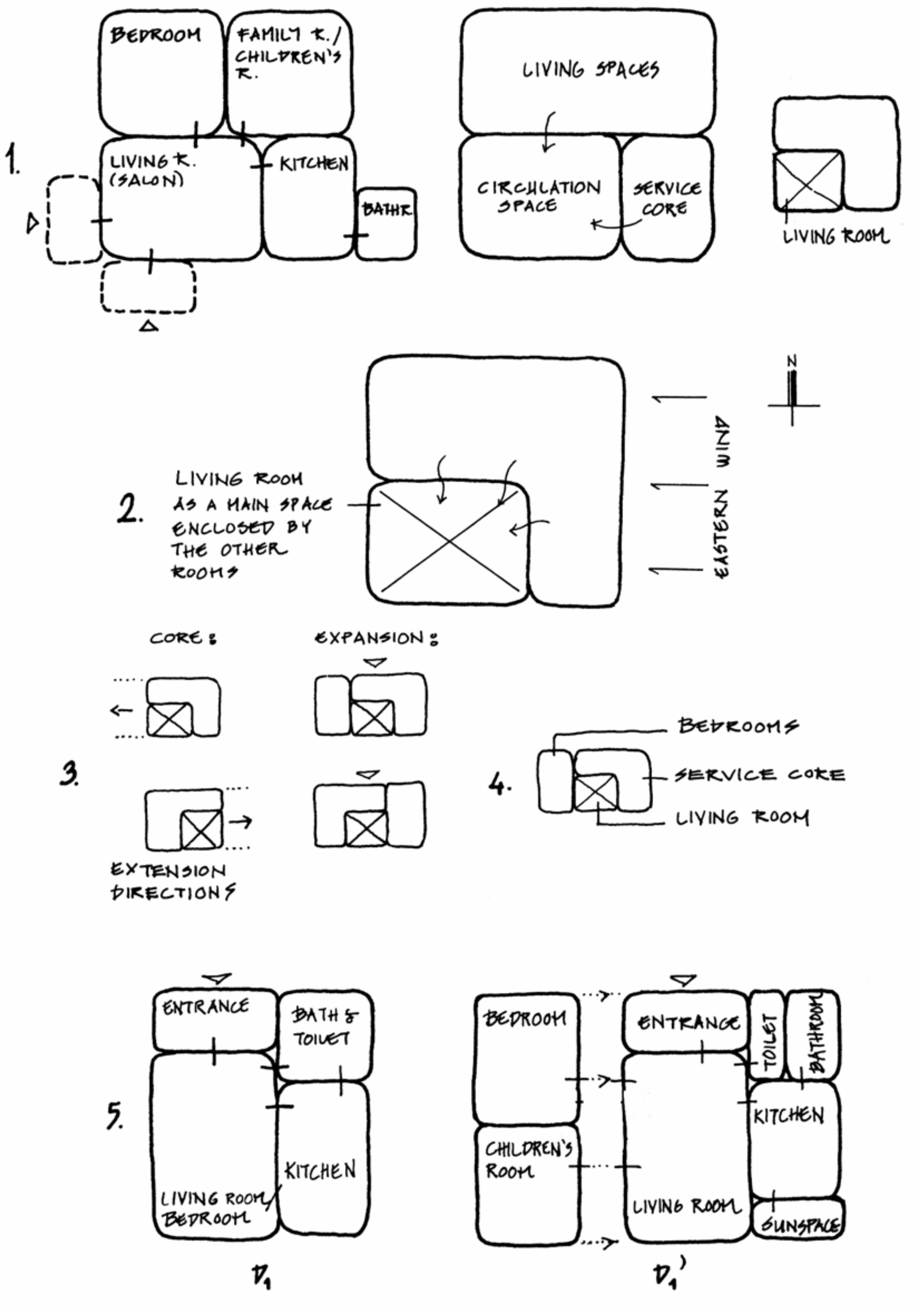


Figure 8.1 Evaluation process of type D dwelling

1. Present layout: functions and spaces inside the *sakız* type dwelling
2. Climatic evaluation of the *sakız* type
3. Core and expansion system of the type S dwelling
4. Functional layout of the type S
5. Spatial layout of the type S

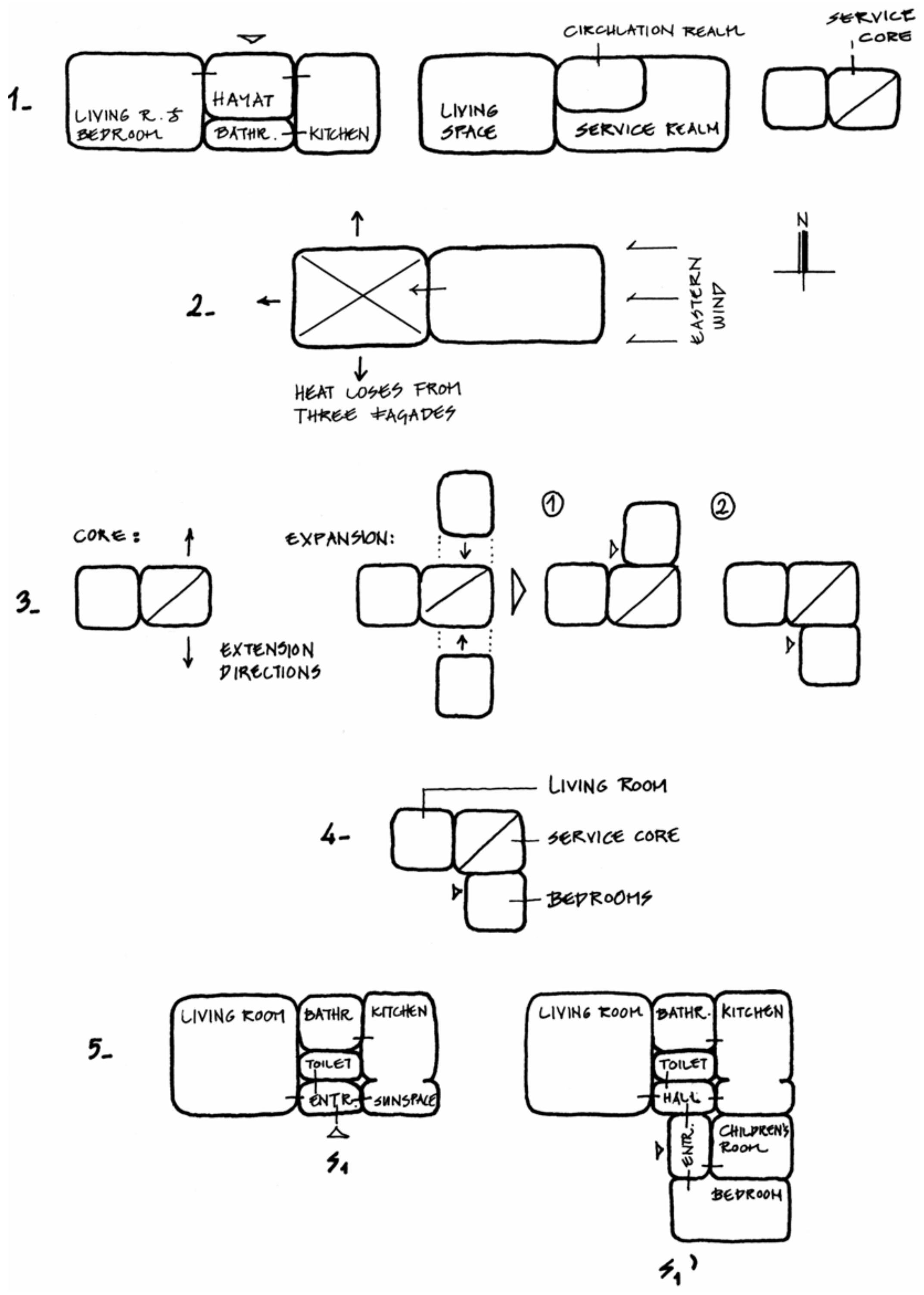
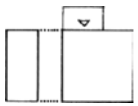
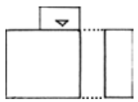
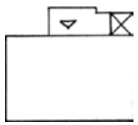
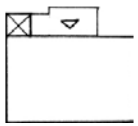
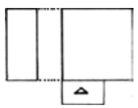
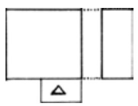
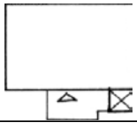
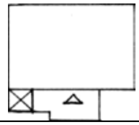
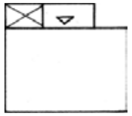
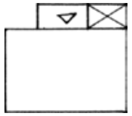
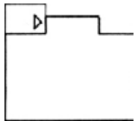
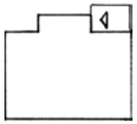
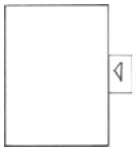
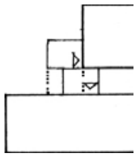
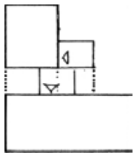
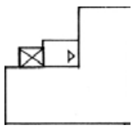
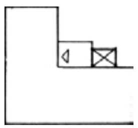


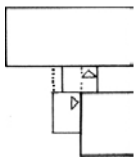
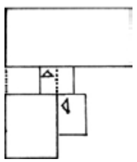
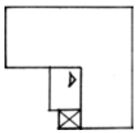
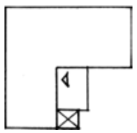
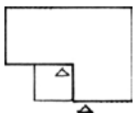
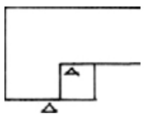
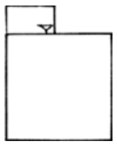
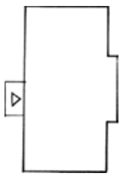
Figure 8.2 Evaluation process of type S dwelling

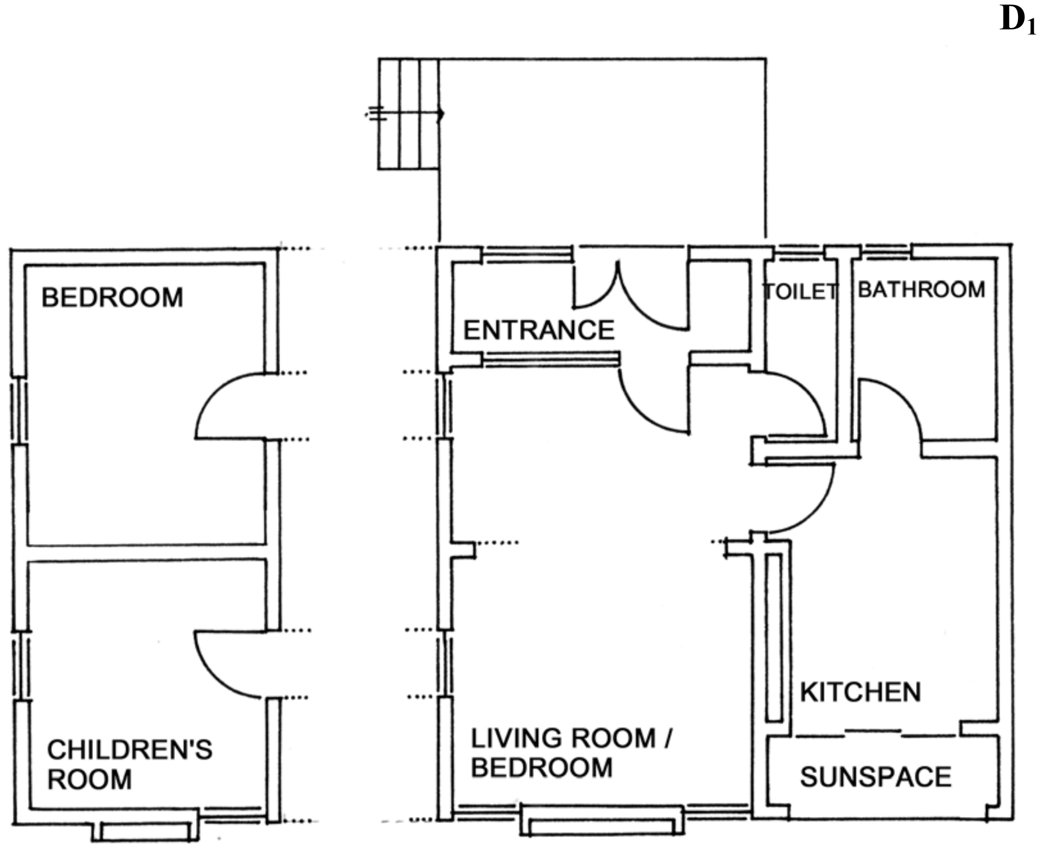
Table 8.5 Accommodating diverse households: list of proposed variations of types S and D (continued below)

Accommodating diverse households:	**Basis and advantages:**
The *Dolma* and *Sakız* type dwellings of Seyrek may be adjusted to the core and expansion system for new dwellings.	* Variable family size, household age, origin, and source of income in the new community of the case area require a range of unit sizes, layouts and arrangements. * The most efficient way to accommodate different households is to design a core plan, so that one core plan may be adapted to create several different house models. This design method is particularly useful for inhabitants who may wish to expand their dwelling later on. Designing for future additions provides flexibility in construction. Areas are allocated for private expansion whose form and method of construction are already suggested. Besides, the dwelling sizes are arranged according to ability to afford the house for buying or renting. Here the proposed building sizes indicate minimum values that may be increased according to the inhabitants' financial ability.

Types D and S	**Shape**	**Possibility in reverse order**	**Number of Units (max)**	**Specific Feature(s)**	**Number of Storeys (max)**	**Dimensions (m) (max) (width x length x height)**	**Dwelling Size (m^2) Floor Area**	**Dwelling Size (m^2) Total Area**	**User Type**	**Required Plot Size (min) (m^2)**	**Total Buildable Area (E: 0.5)**	**Buildable Area Excepting Dwelling**
D_1			2	Lateral and vertical extensions; house with northern entrance	1	7.5x7.6x3.5 11x7.6x3.5	57 84	57 84	First group Second group	600 200	300 100	243 216 43 16
					2	7.5x7.6x6.2 11 x7.6x6.2	57 84	114 168	First group Second group	600 400	300 200	186 132 86 32
D_1'			2	Vertical extension; semi-open staircase on the northern façade	1	10.8x7.6x3.5	82	82	First group Second g.	600 200	300 100	218 18
					2	10.8x7.6x6.2	82	164	First group Second g.	600 400	300 200	136 36
D_2			2	Lateral and vertical extensions; house with southern entrance	1	7.5x7.6x3.5 11x7.6x3.5	57 84	57 84	First group Second group	600 200	300 100	243 216 43 16
					2	7.5x7.6x6.2 11 x7.6x6.2	57 84	114 168	First group Second group	600 400	300 200	186 132 86 32

D_2’			2	Vertical extension; semi-open staircase on the southern façade	1 2	10.8x7.6x3.5 10.8x7.6x6.2	82 82	82 164	First g. Second g. First group Second group	600 200 600 400	300 100 300 200	218 18 136 36
D_3			1	House with depot on ground floor	2	10.8x7.6x5.7	82	108	First group Second group	600 300	300 150	192 42
D_4			1x3:3	Multi-storeyed housing facing mainly south	3	10.8x7.6x8.9	88	264	Second and third groups	600	300	36
D_5		-	2x3:6	Multi-storeyed housing	3	10.8x15x8.9	81x2:162	486	Second and third groups	1100	550	64
S_1			2	Lateral and vertical extensions; house with northern entrance	1 2	11.1x5x3.5 11.1x5x3.5+ 4.7x5.8x3.5 11.1x5x6.2 11.1x5x6.2+ 4.7x5.8x6.2	56 83 56 83	56 83 112 166	First group Second group First group Second group	600 200 600 400	300 100 300 200	244 217 44 17 188 134 88 34
S_1’			2	Vertical extension; semi-open staircase on the northern façade	1 2	11.1x5x3.5+ 4.7x5.6x3.5 11.1x5x6.2+ 4.7x5.6x6.2	82 82	82 164	First group Second group First group Second g.	600 200 600 400	300 100 300 200	218 18 136 36

S_2			2	Lateral and vertical extensions; house with southern entrance	1	11.1x5x3.5 11.1x5x3.5+ 4.7x5.8x3.5	56 83	56 83	First group Second group	600 200	300 100	244 217 44 17
					2	11.1x5x6.2 11.1x5x6.2+ 4.7x5.8x6.2	56 83	112 166	First group Second group	600 400	300 200	188 134 88 34
S_2’			2	Vertical extension; semi-open staircase on the entrance façade	1	11.1x5x3.5+ 4.7x5.6x3.5	82	82	First group Second group	600 200	300 100	218 18
					2	11.1x5x6.2+ 4.7x5.6x6.2	82	164	First group Second g.	600 400	300 200	136 36
S_3			1	House with depot on the ground floor	2	10.1x5x6.2+ 4.4x2.9x6.2	63	126	First Group Second group	600 300	300 150	174 24
S_4		-	1x3:3	Multi-storeyed housing facing mainly south	3	9.4x9.4x8.9	88	264	Second and third groups	600	300	36
S_5		-	2x3:6	Multi-storeyed housing facing mainly west	3	8.8x18.2x8.9	84x2:168	504	Second and third groups	1100	550	46



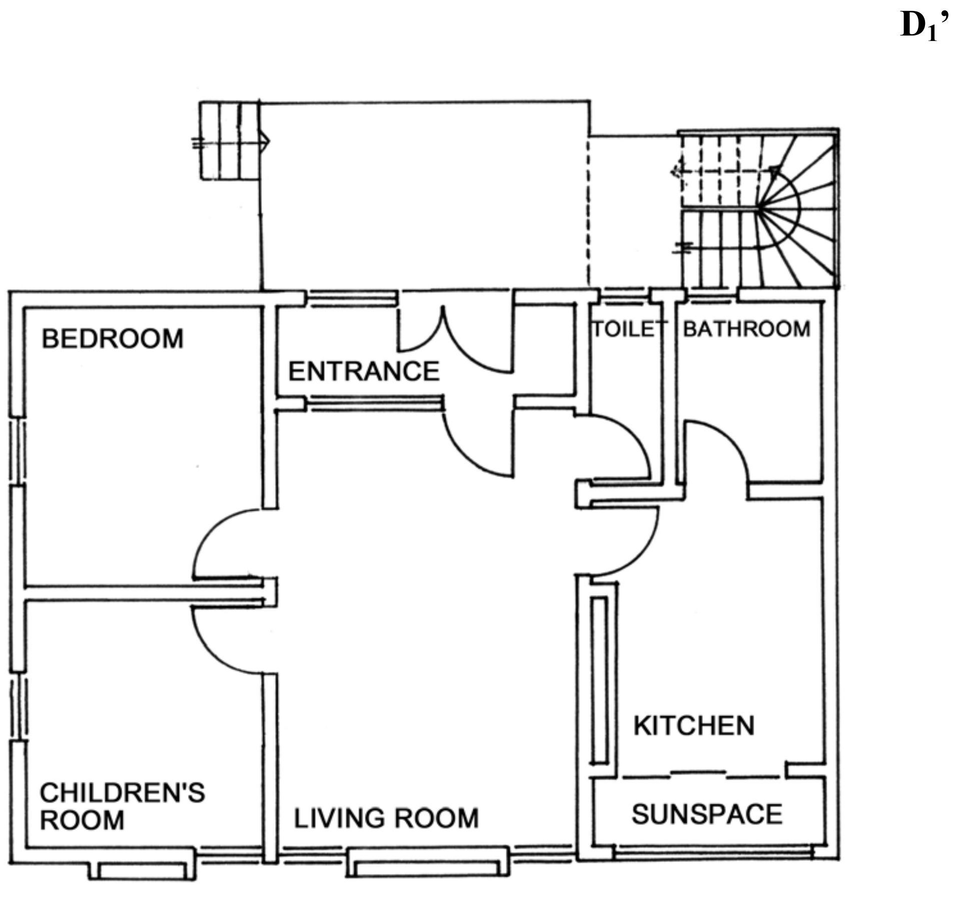


Figure 8.3 Plans of types D_1 and D_1' dwellings (house with northern entrance); Scale 1/100

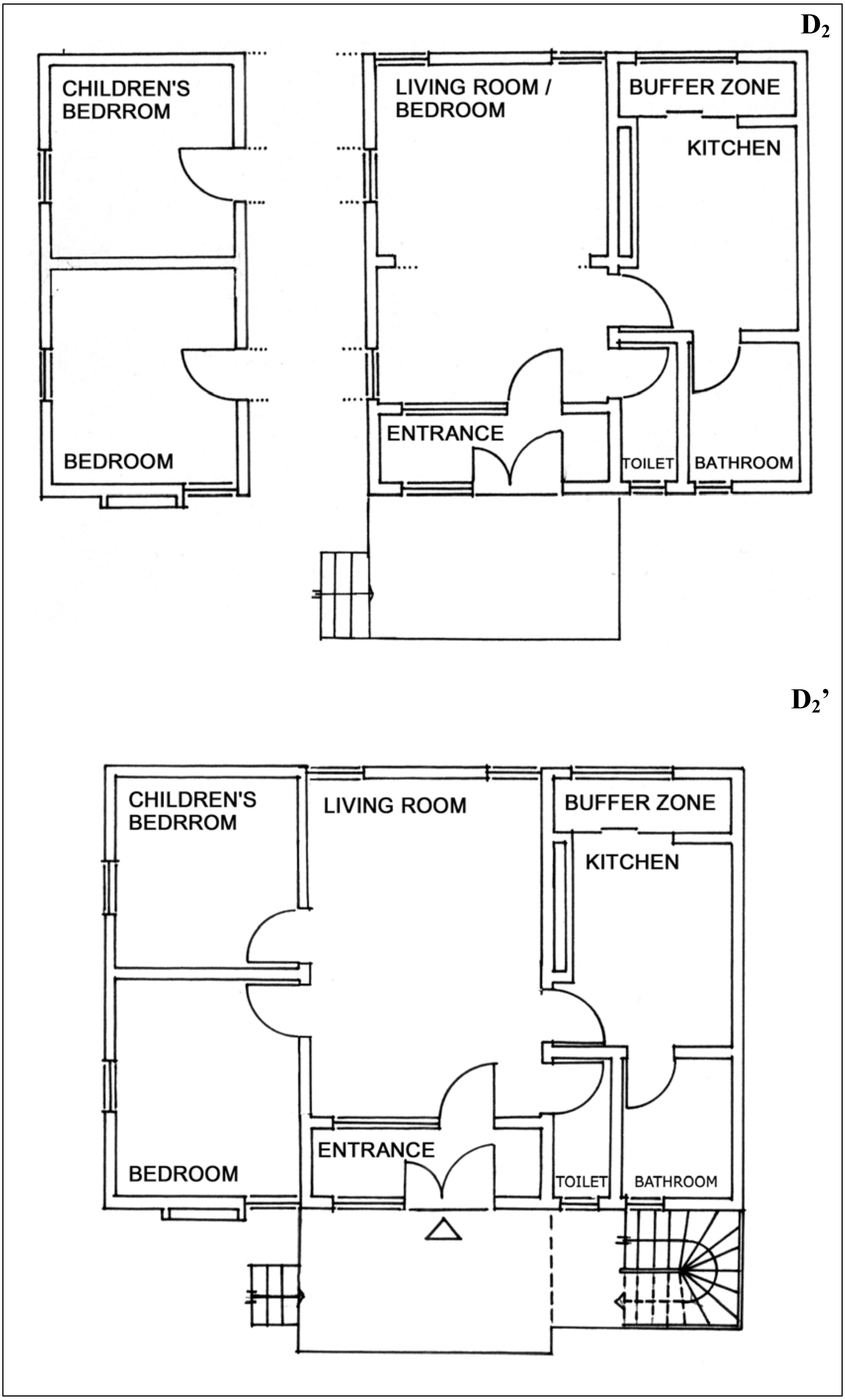


Figure 8.4 Plan of types D_2 and D_2' dwellings (house with southern entrance); Scale 1/100

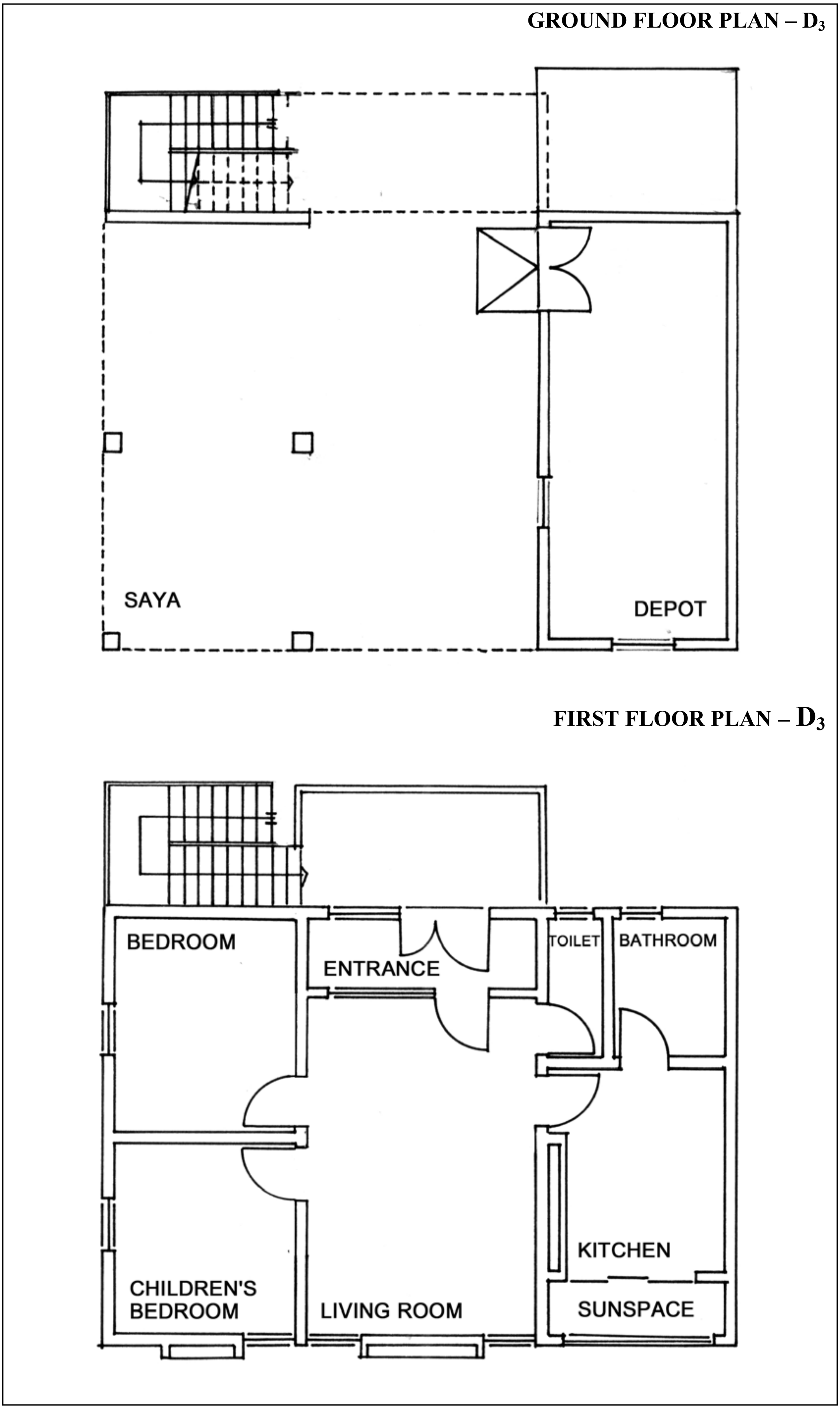


Figure 8.5 Plan of type D_3 dwelling (house with depot on the ground floor); Scale 1/100

D$_4$

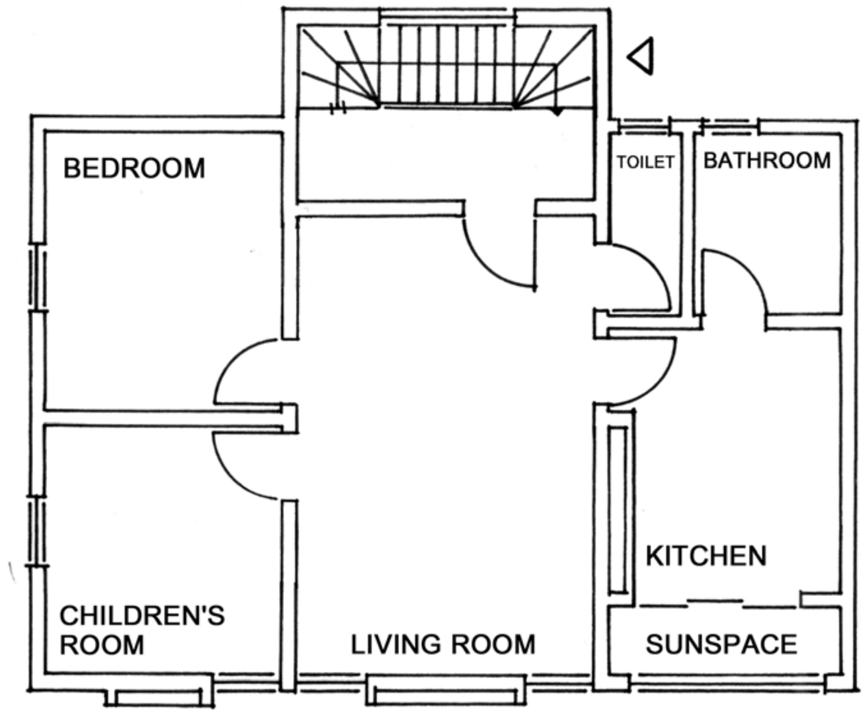


Figure 8.6 Plan of type D$_4$ dwelling (multi-storeyed housing facing mainly south); Scale 1/100

D$_5$

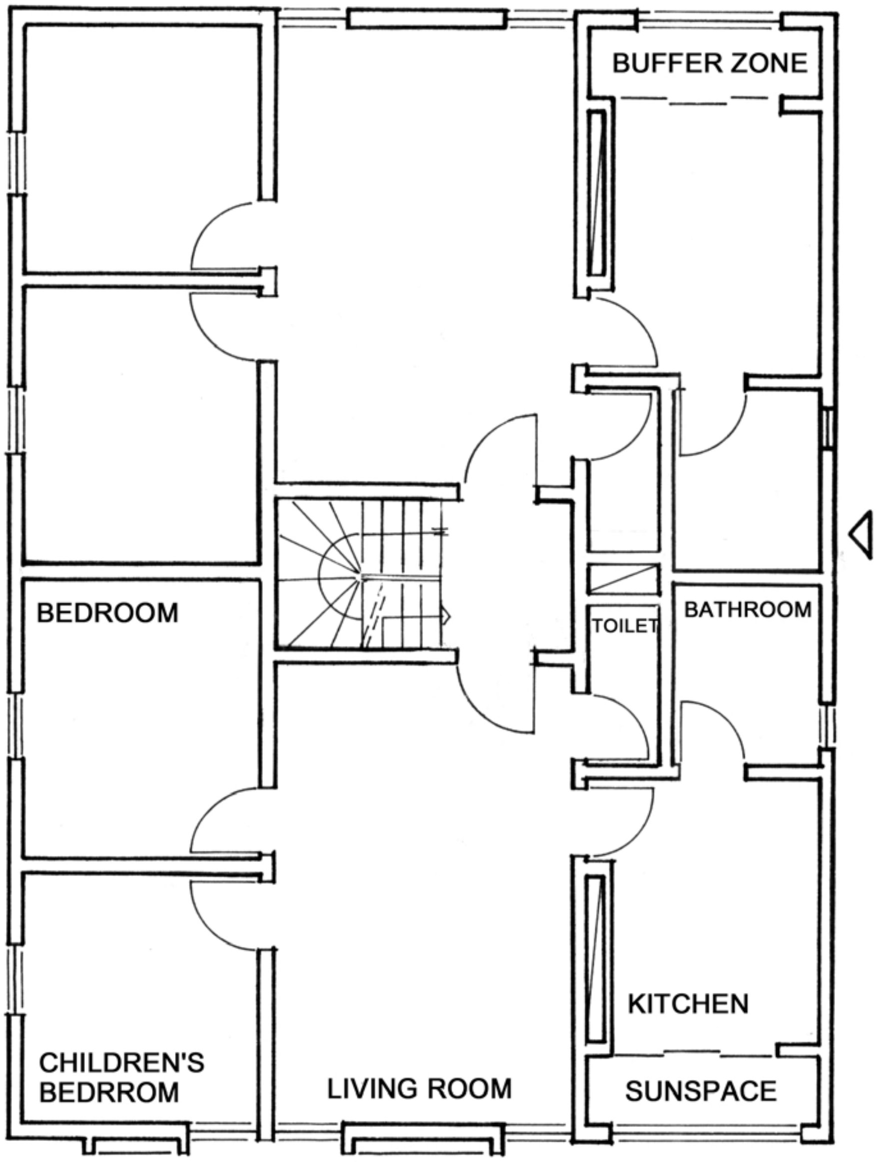


Figure 8.7 Plan of type D$_5$ dwelling (multi-storeyed housing); Scale 1/100

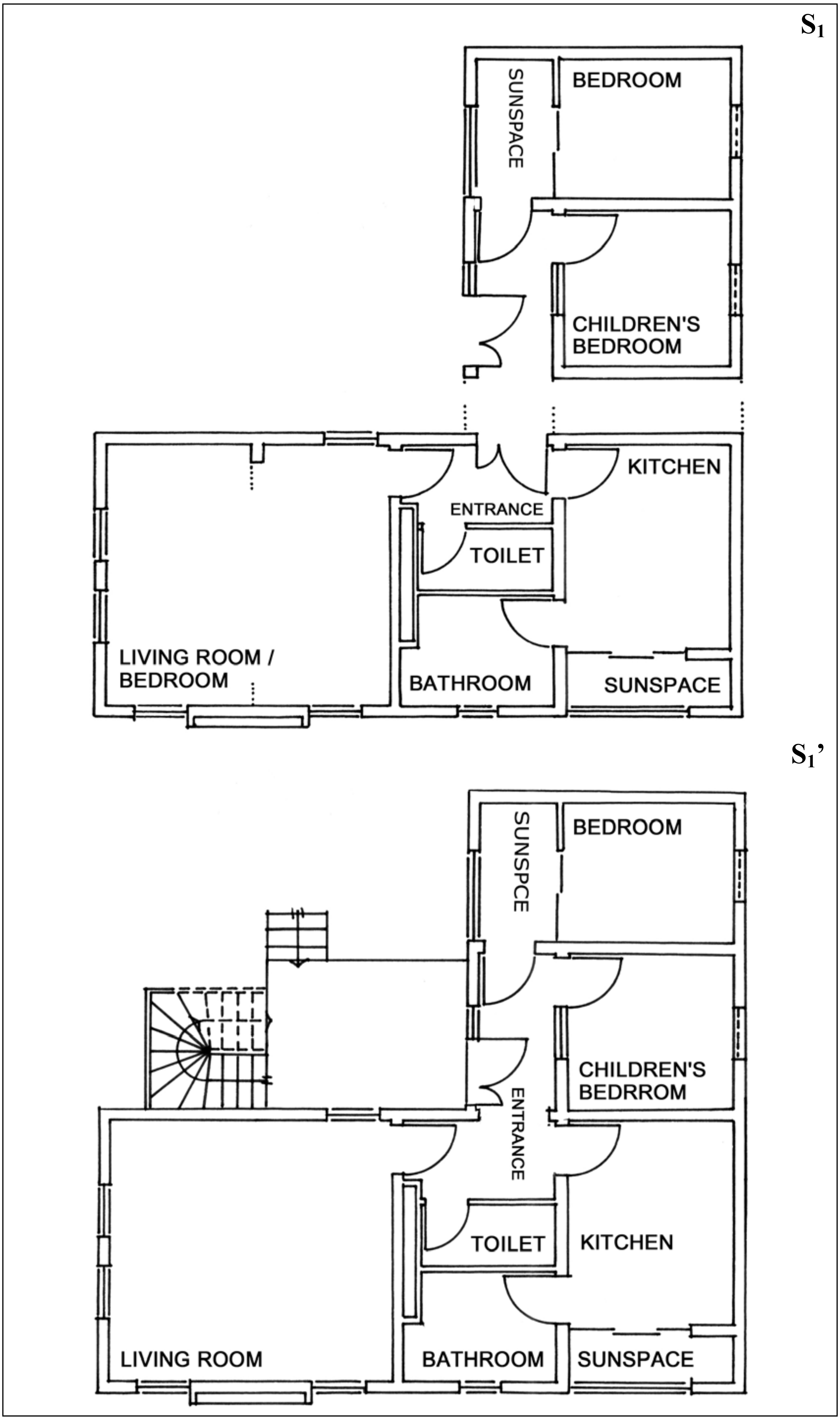


Figure 8.8 Plans of types S_1 and S_1' dwelling (house with northern entrance); Scale 1/100

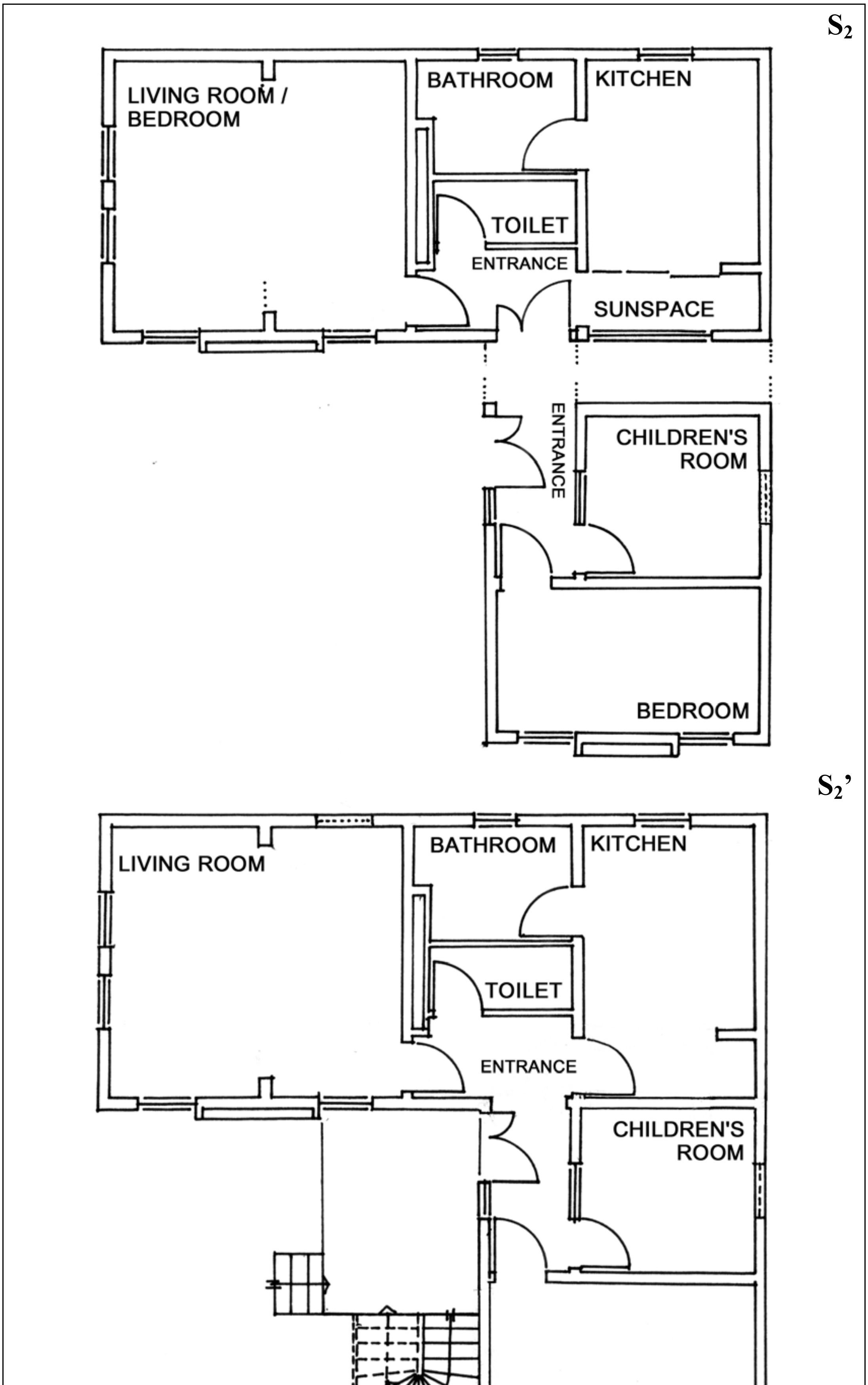
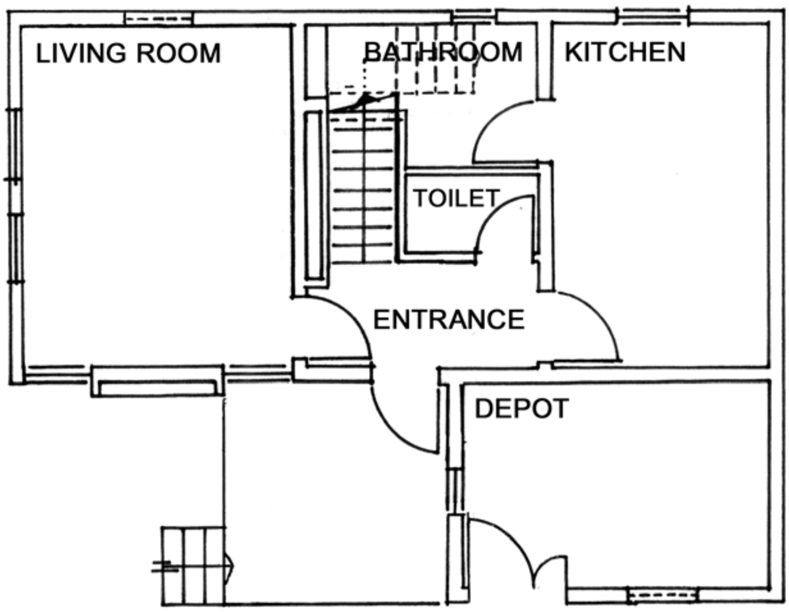


Figure 8.9 Plan of types S_2 and S_2' dwelling (house with southern entrance); Scale 1/100

GROUND FLOOR PLAN – S_3



FIRST FLOOR PLAN – S_3

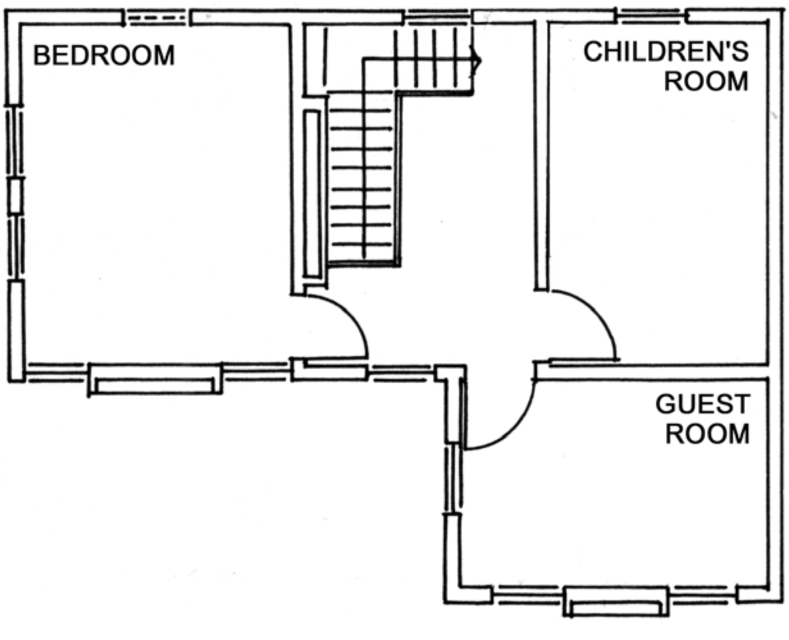


Figure 8.10 Plan of type S_3 dwelling (house with depot on the ground floor); Scale 1/100

S_4

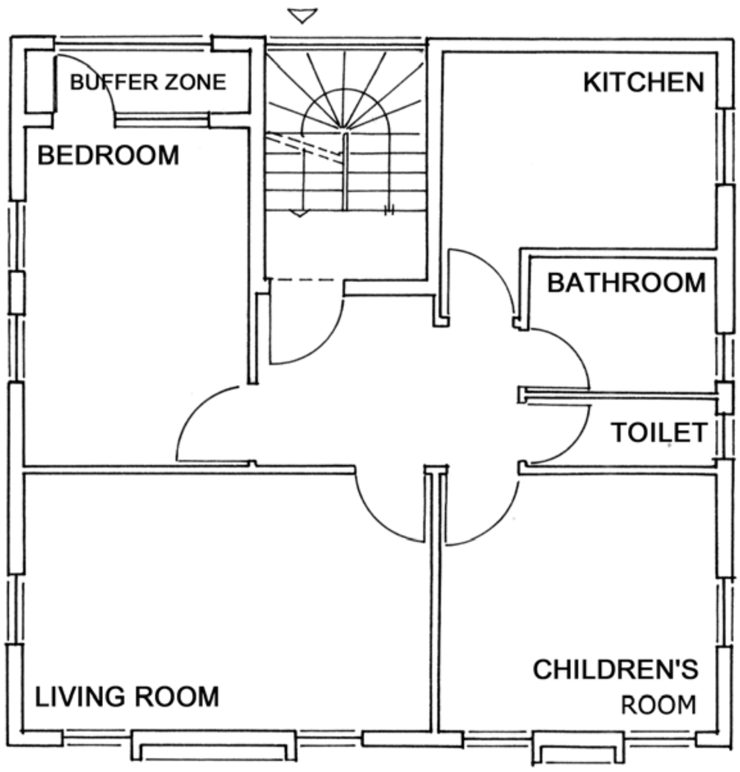


Figure 8.11 Plan of type S_4 dwelling (multi-storeyed housing facing mainly south); Scale 1/100

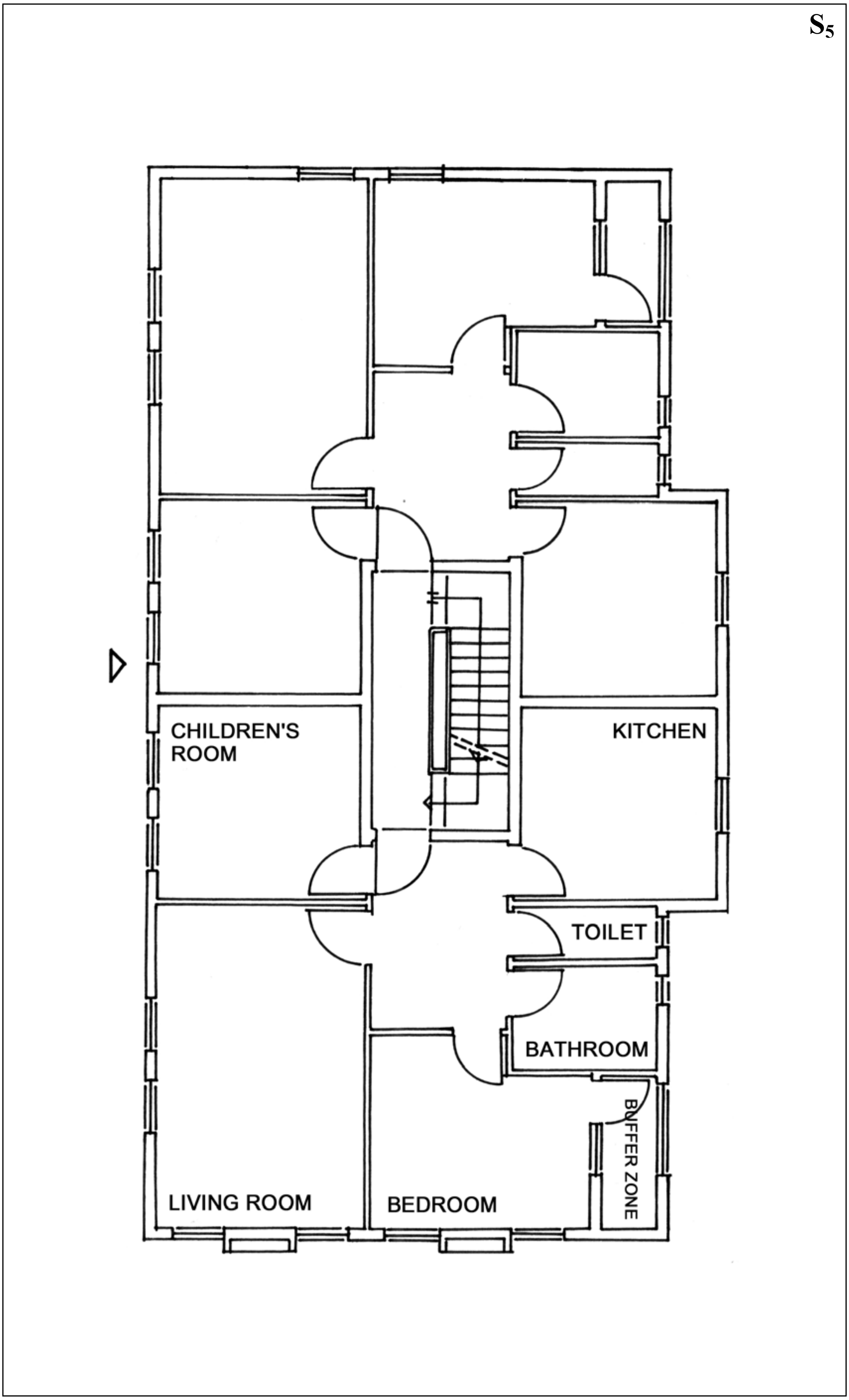


Figure 8.12 Plan of type S_5 dwelling (multi-storeyed housing facing mainly west); Scale 1/100

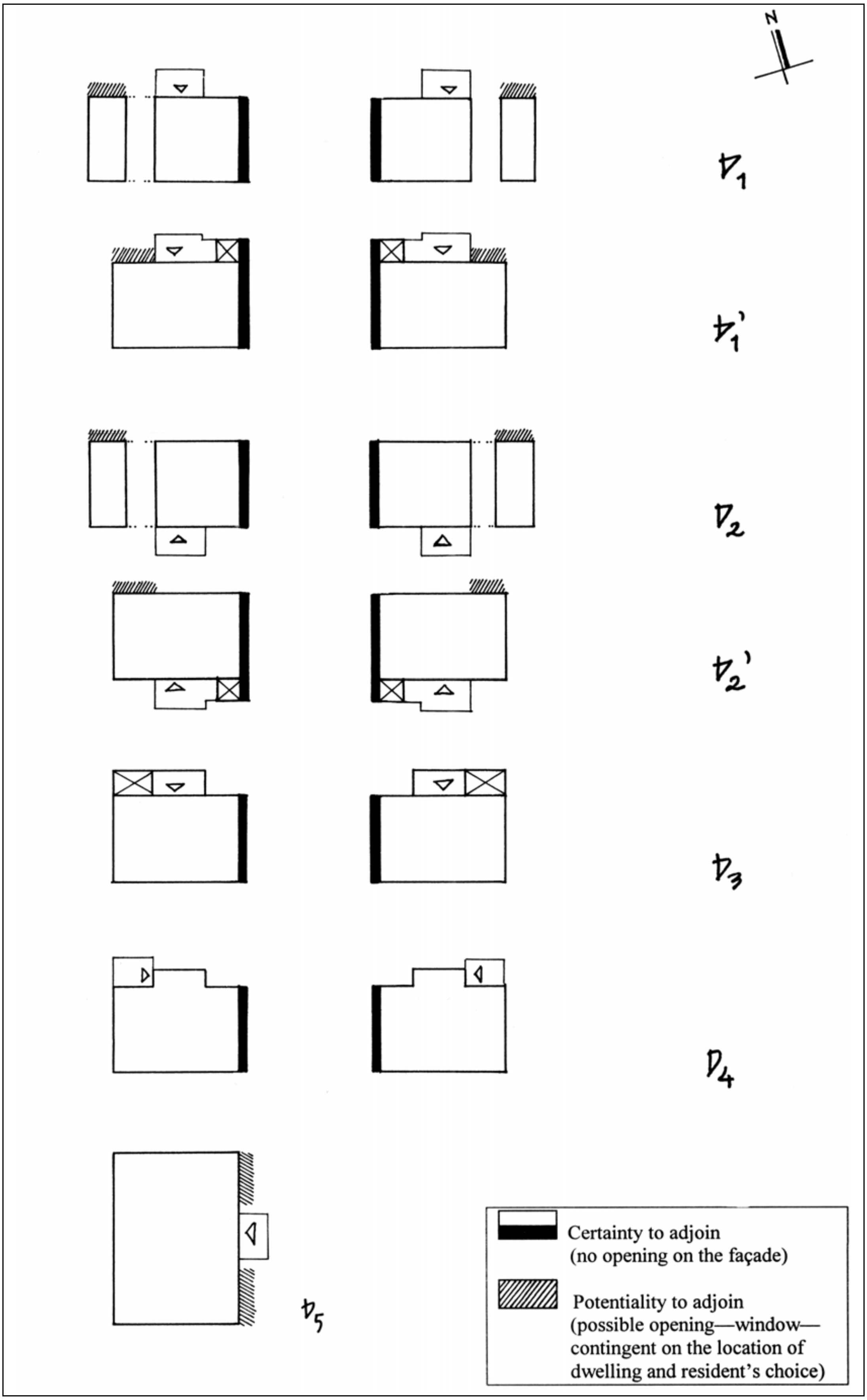


Figure 8.13 Scheme indicating the adjoining possibilities of the building mass for D series of dwellings: adjacency of another building either in the same plot or in the neighboring plot

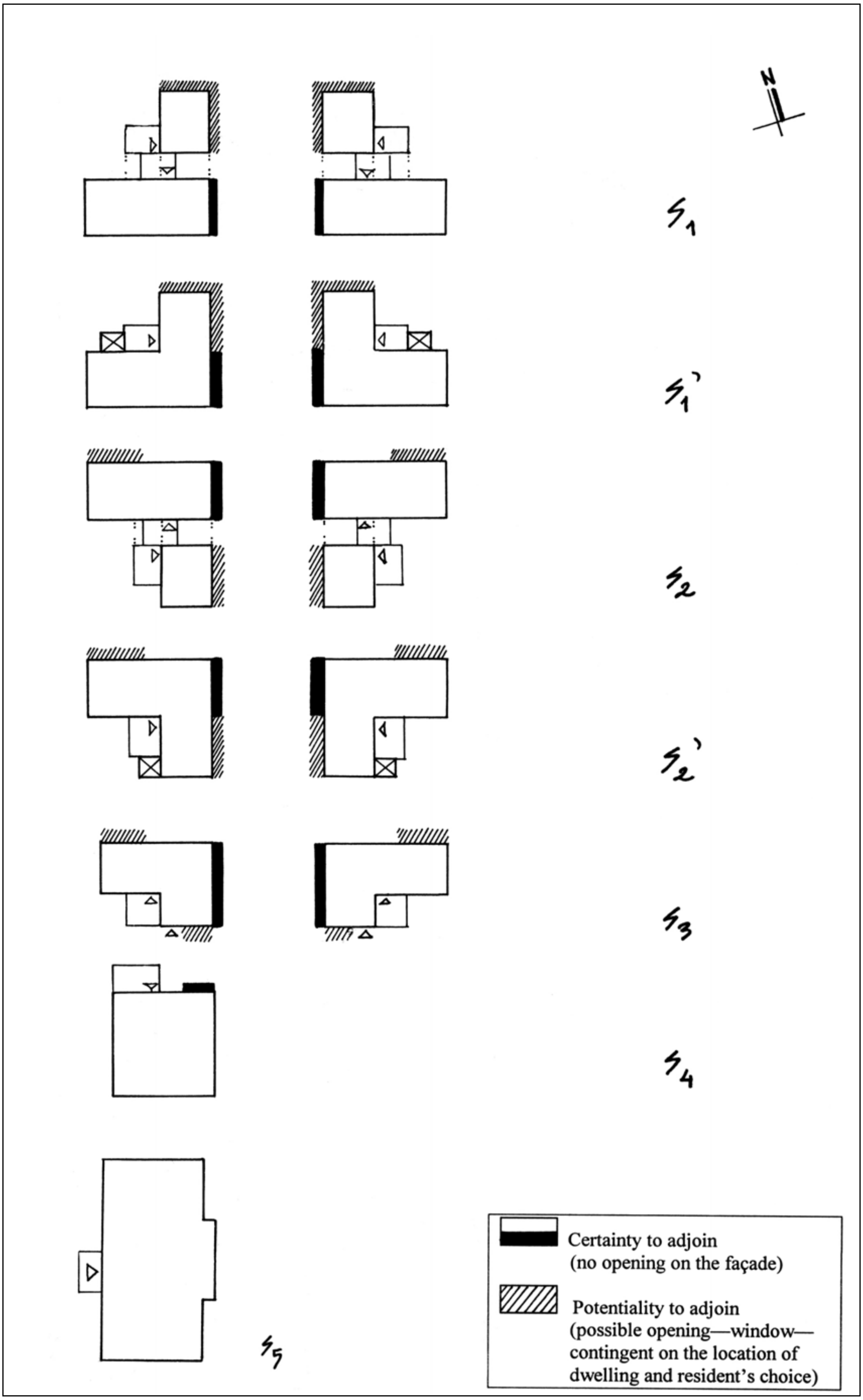
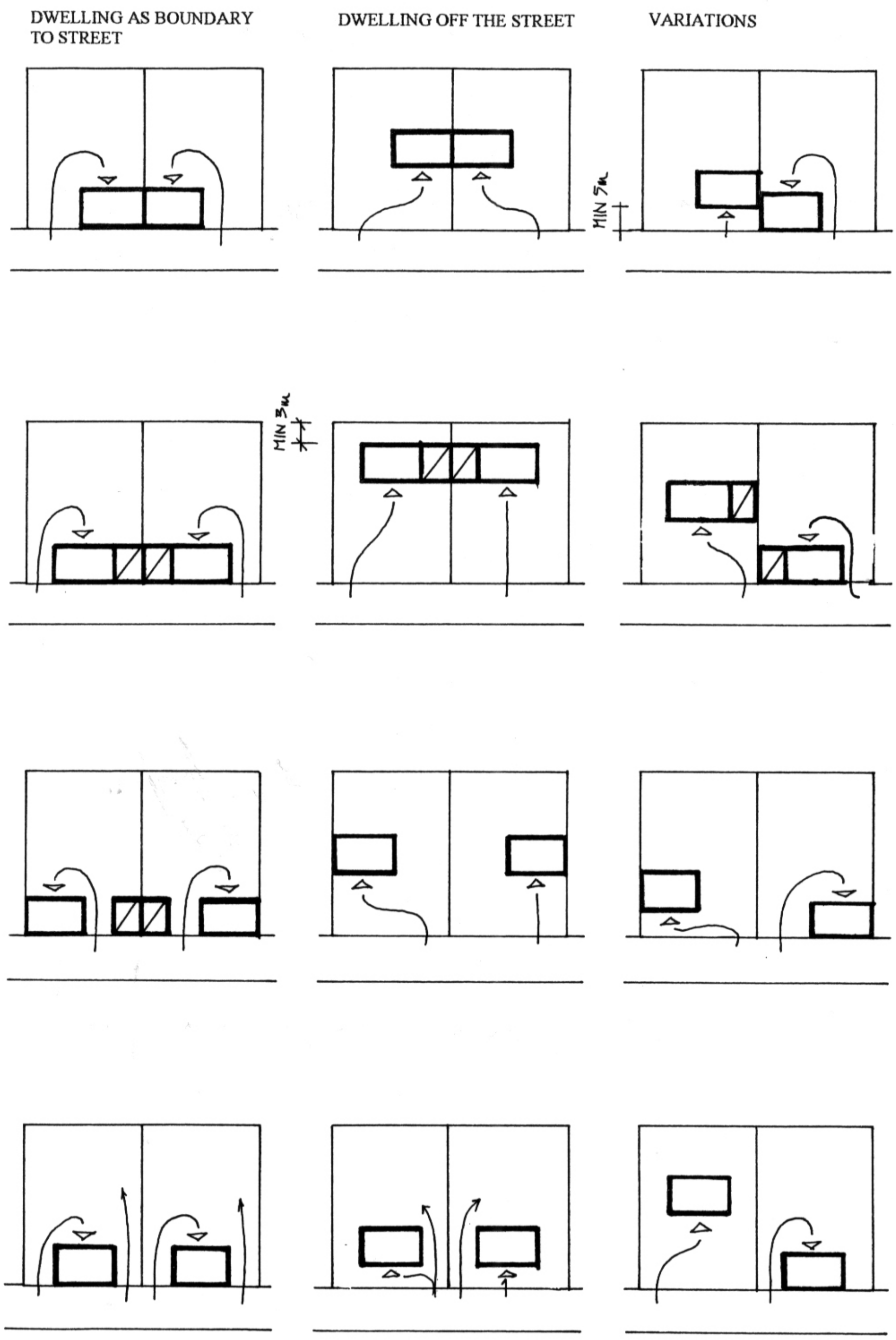


Figure 8.14 Scheme indicating the adjoining possibilities of the building mass for S series of dwellings: adjacency of another building either in the same plot or in the neighboring plot

D_1, D_1', D_2, D_2', and D_3 in the plot with southern frontage*

General features:

1. Adjacency to the frontage and lateral sides of the plot**
2. Min 3 m. to the rear boundary of the plot
3. Dwellings off the street: minimum setback is 5 m



* Configurations for dwellings in the plot with northern frontage are the same as with southern frontage

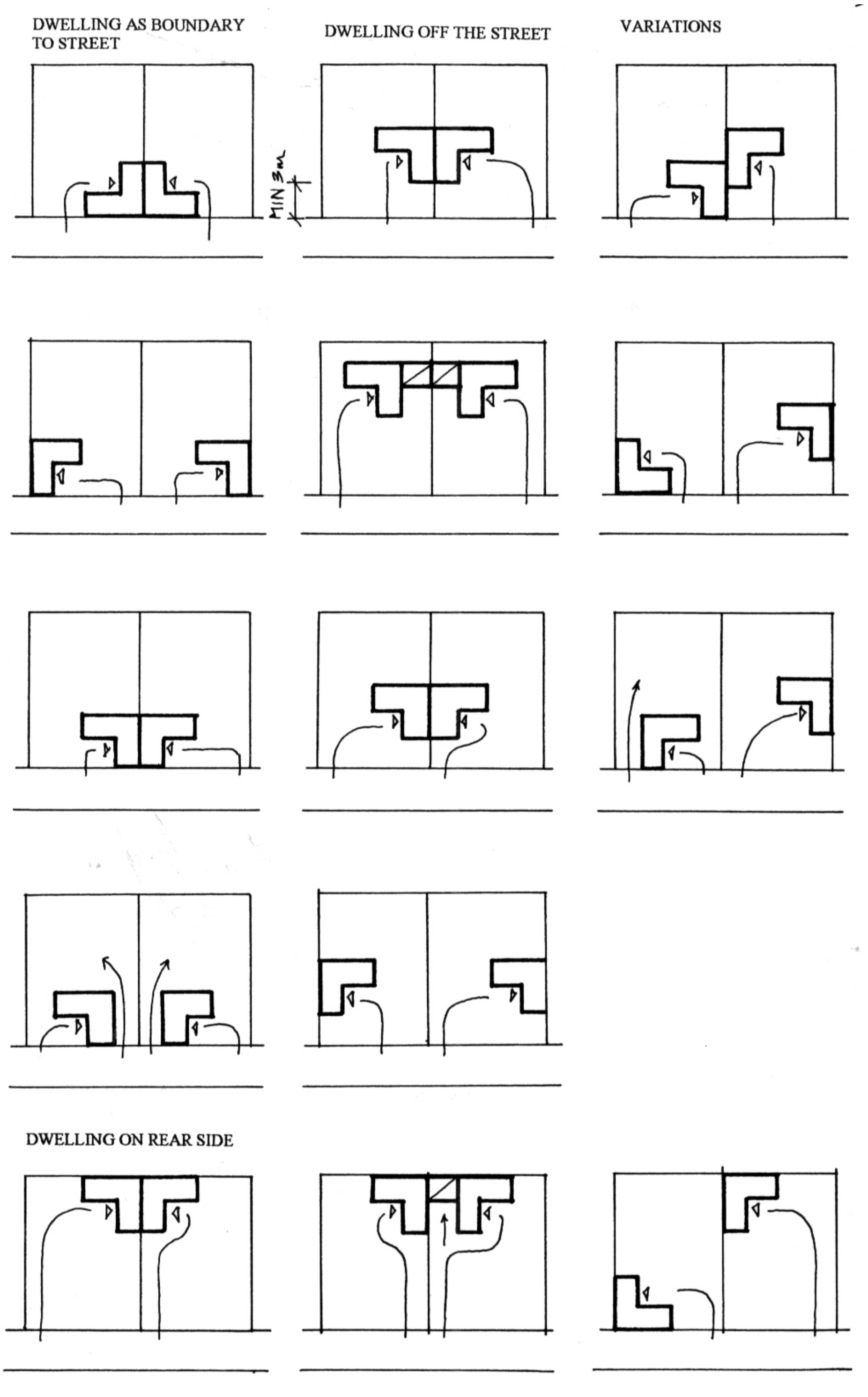
** No adjacency to rear side in order to keep the privacy in living room and bedrooms

Figure 8.15 Possible location of two dwellings in adjacent plots in type D detached dwellings (D_1, D_1', D_2, D_2', and D_3)

S_1, S_1', S_2, S_2', and S_3 in the plot with southern frontage*

General features:

1. Adjacency to the frontage, rear and lateral sides of the plot**

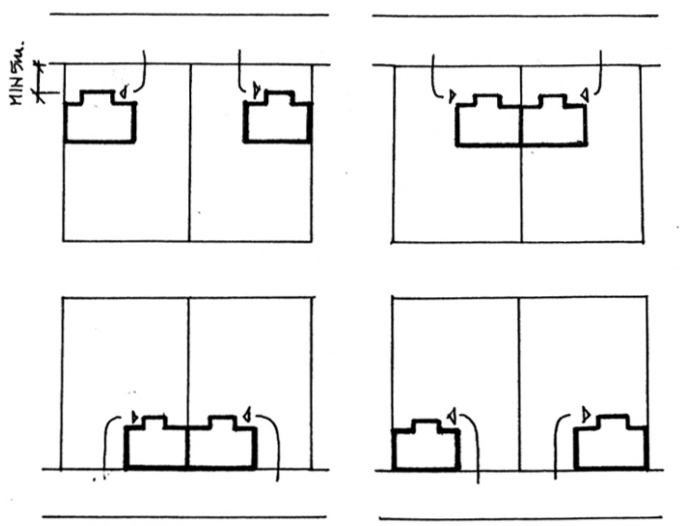


* Configurations for dwellings in the plot with northern frontage are the same as with southern frontage except for the adjacency of S_1, S_1' types to the rear side because the main space—living room—directly faces the neighbouring plot

** Adjacency to rear side is limited only by permission of neighbor for opening windows of service spaces such as kitchen and bathroom. No opening to rear side from living room and bedrooms

Figure 8.16 Possible location of two dwellings in adjacent plots in type S detached dwellings (S_1, S_1', S_2, S_2', and S_3)

D_4 in the plot with southern and northern frontages
General features:
1. Both detached and attached forms
2. No location on the middle of the plot or on the frontage
3. Dwelling block in the lateral is only possible when another dwelling in the next plot is situated adjacently
4. When multi-storeyed dwelling is off the street, minimum front setback is 5 m in order to make possible the location of the closed depot closer to the entrance of the plot



D_5 in the plot with southern and northern frontages
General features:
1. Only in attached form without adjacency to the lateral sides
2. When multi-storeyed dwelling is off the street, minimum front setback is 5 m in order to make possible the location of the closed depot closer to the entrance of the plot
3. Minimum lateral setback for the entrance façade (east façade) is 5 m in order to permit easy vehicular access to the *saya*, car park and/or garden in the backyard
4. Minimum lateral setback for the western façade is 8 m in order to secure the privacy in bedrooms facing east

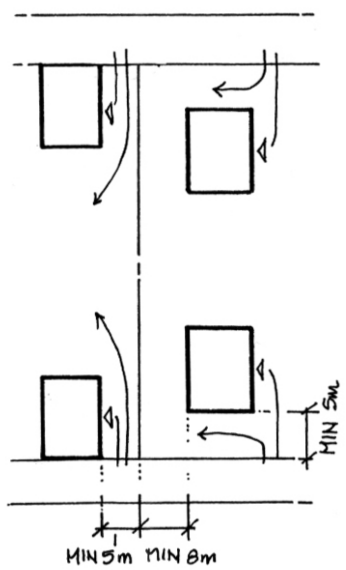
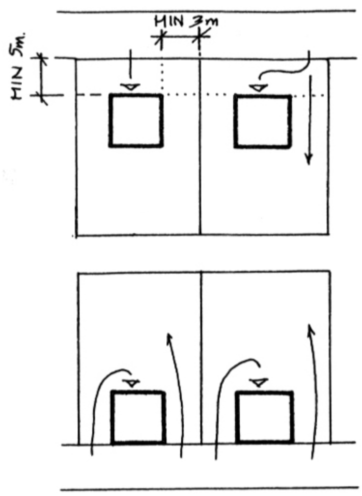


Figure 8.17 Possible location of two dwelling blocks in adjacent plots in type D multi-storeyed dwellings (D_4 and D_5)

S_4 in the plot with southern and northern frontages
General features:
1. Only in detached form without adjacency to the lateral sides: minimum lateral set back is 3 m
2. Dwelling block bounded to street is only for the plot with southern frontage
3. When multi-storeyed dwelling is off the street, minimum front setback is 5 m in order to make possible the location of the closed depot closer to the entrance of the plot



S_5 in the plot with southern and northern frontages
General features:
1. Only in attached form without adjacency to the lateral sides
2. When multi-storeyed dwelling is off the street, minimum front setback is 5 m in order to make possible the location of the closed depot closer to the entrance of the plot
3. Minimum lateral setback for the entrance façade (west façade) is 8 m in order both to permit easy vehicular access to the *saya*, car park and/or garden at the backyard, and to secure the privacy of living room and bedrooms facing west
4. The lateral setback on the east side is min 3m

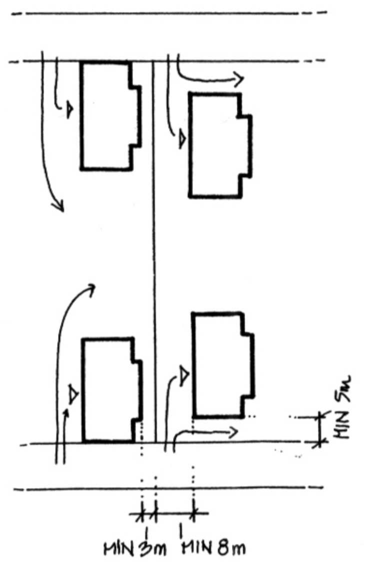


Figure 8.18 Possible location of two dwelling blocks in adjacent plots in type S multi-storeyed dwellings (S_4 and S_5)

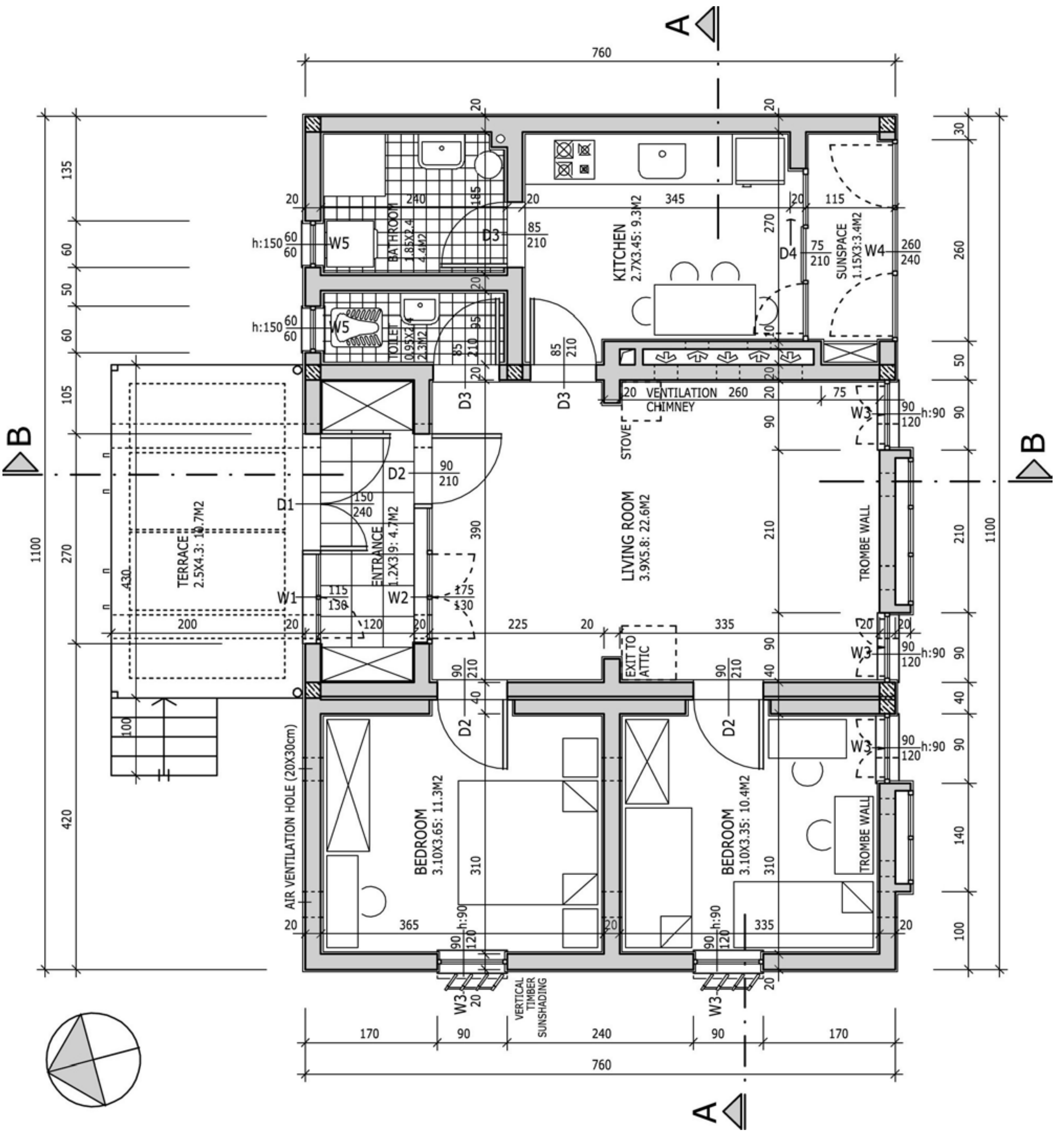


Figure 8.19 Plan of sample dwelling— type D_1'—of load bearing construction system, made of brick; Scale 1/80

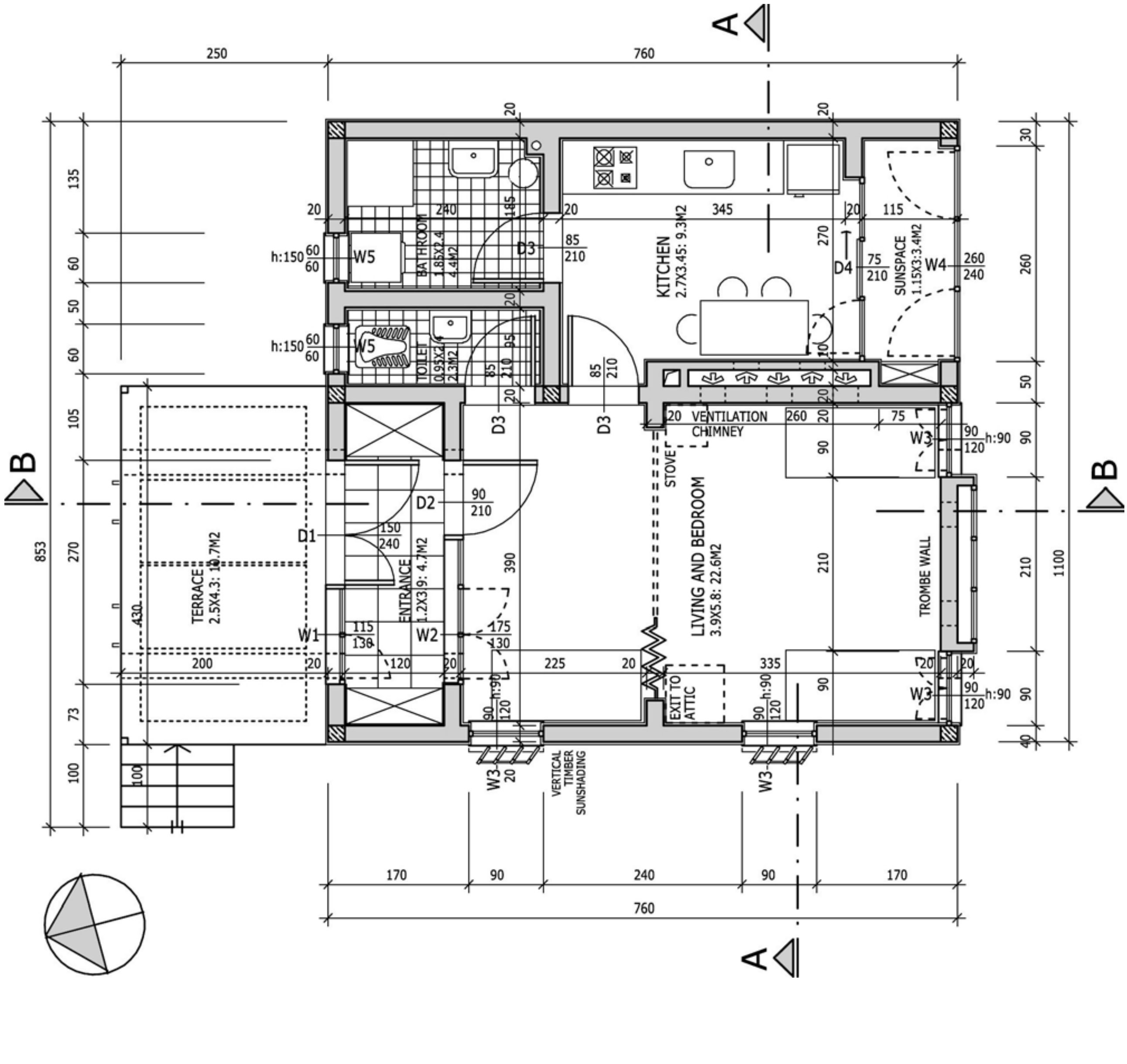


Figure 8.20 Plan of type D_1 dwelling: first phase in the construction process before the addition of bedrooms; Scale 1/80

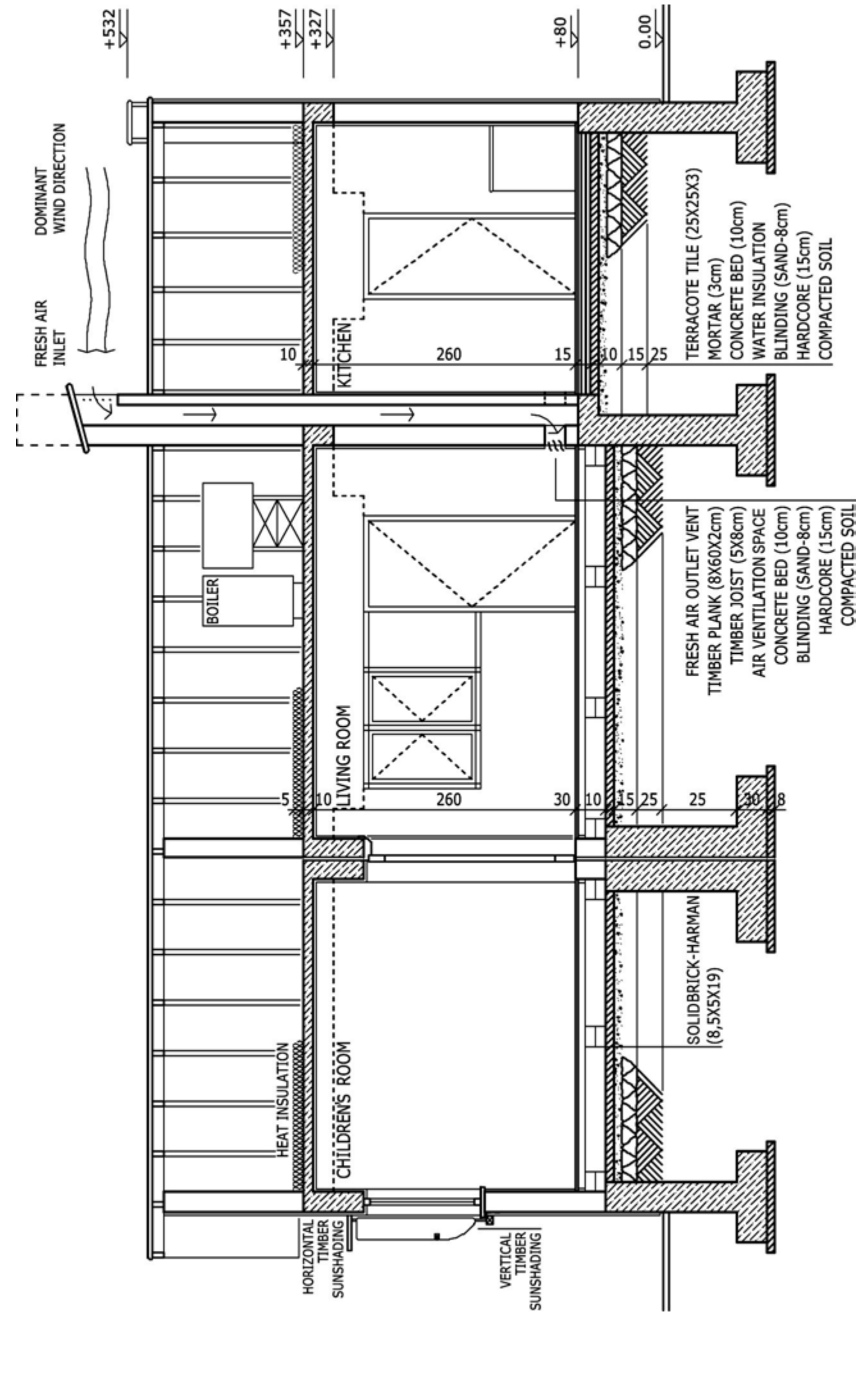


Figure 8.21 Section A-A of type D_1' dwelling; Scale 1/80

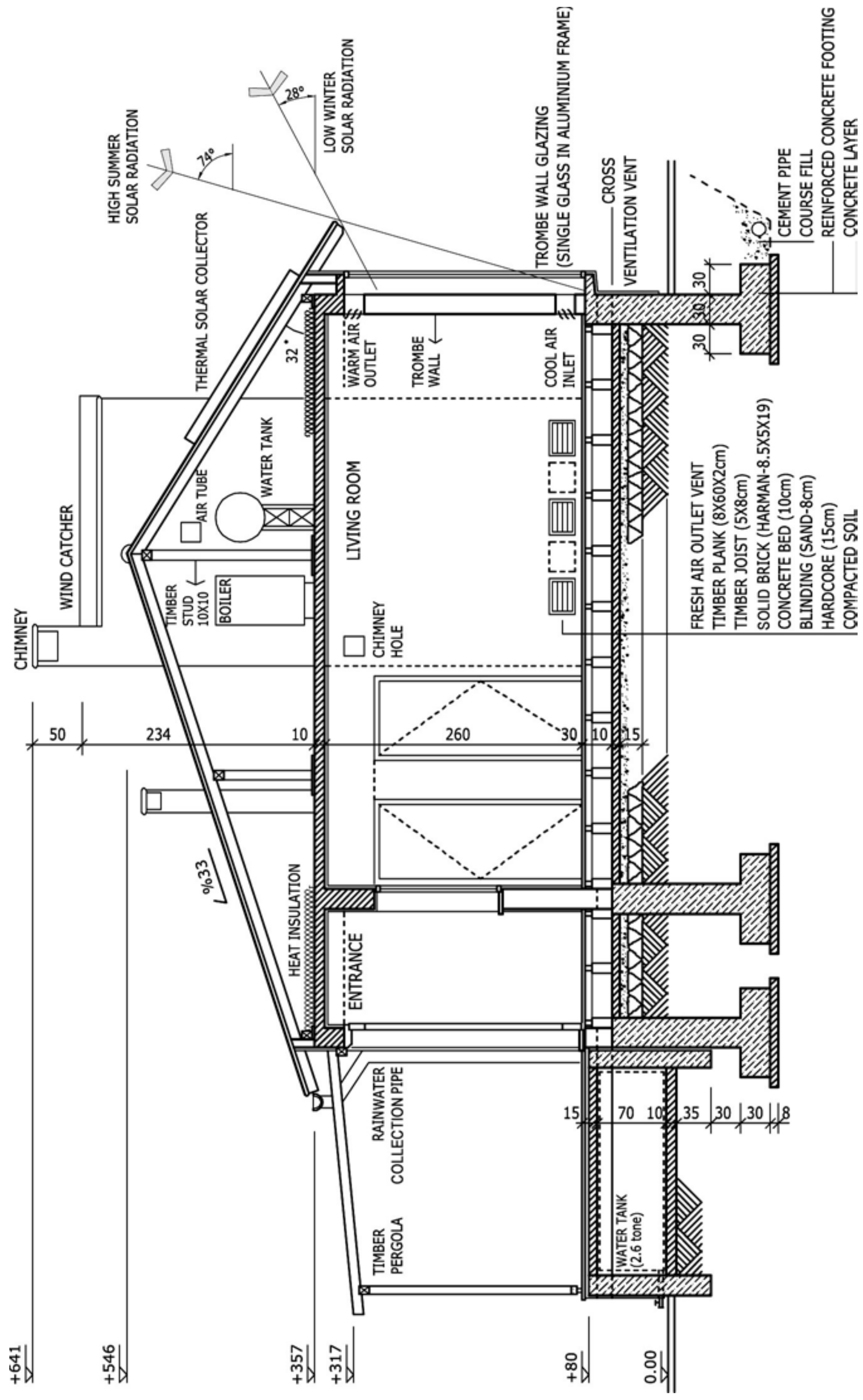


Figure 8.22 Section B-B of type D$_1$’ dwelling; Scale 1/80

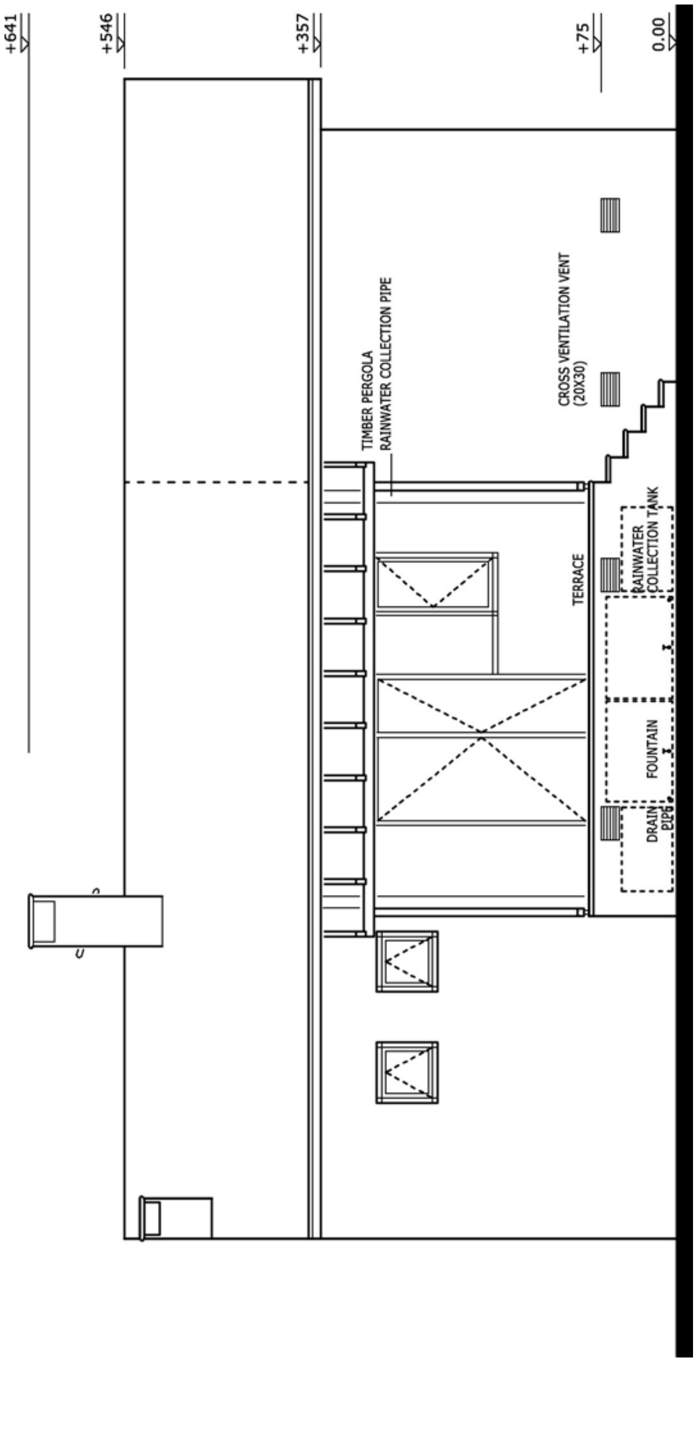


Figure 8.23 Northern—entrance—façade of type D_1’ dwelling; Scale 1/80

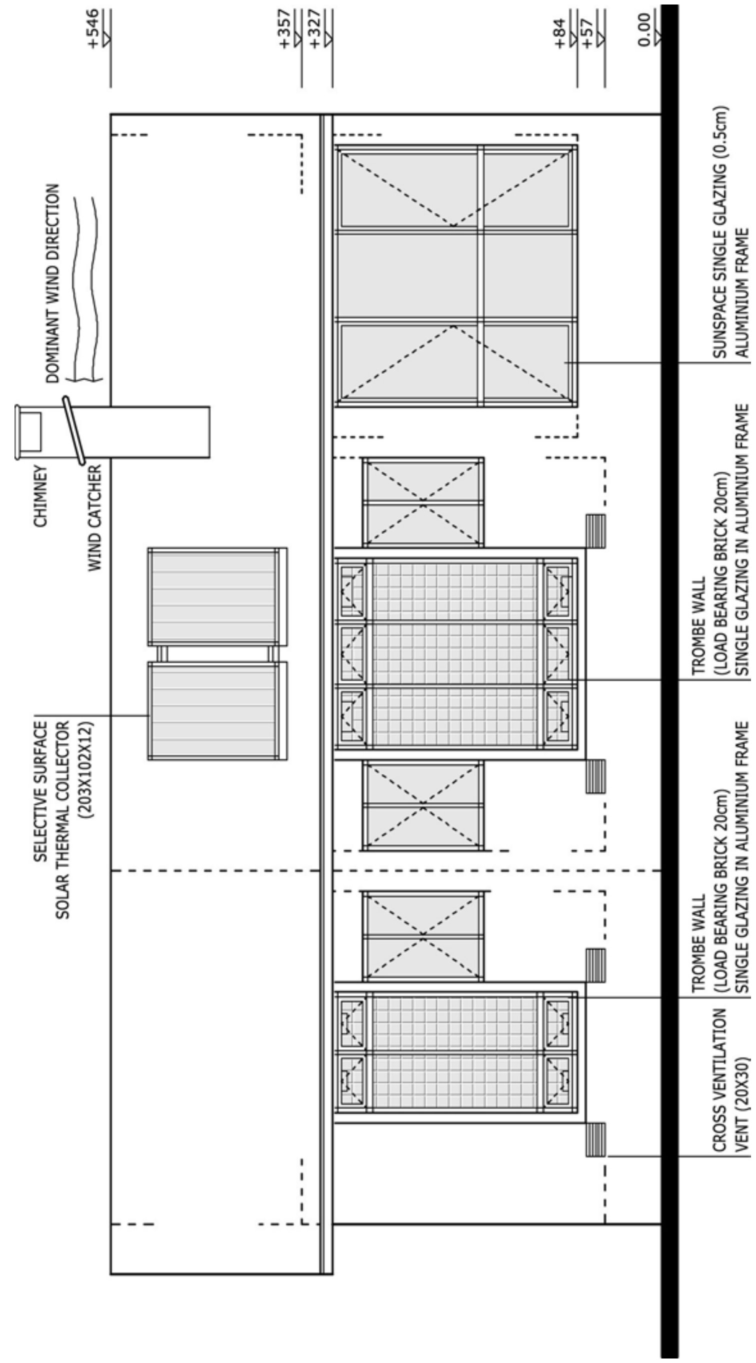


Figure 8.24 Southern façade of type D_1’ dwelling; Scale 1/80

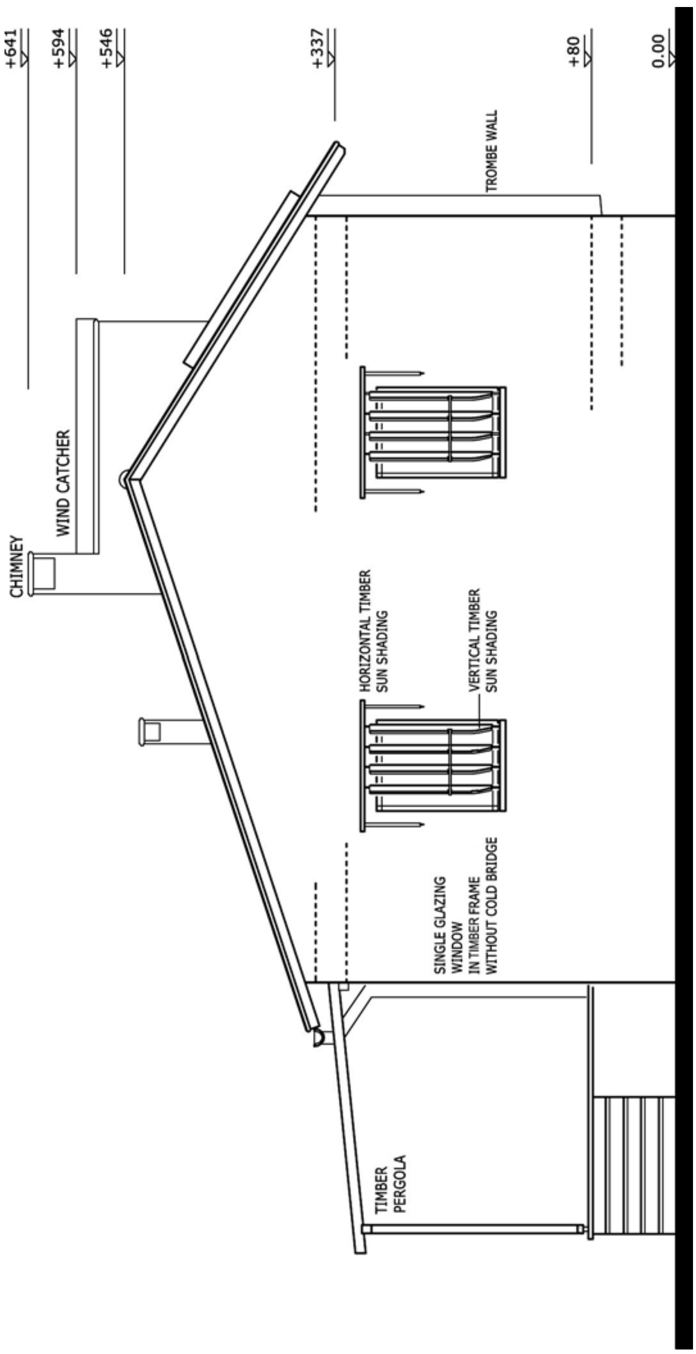


Figure 8.25 Western façade of type D_1' dwelling; Scale 1/80

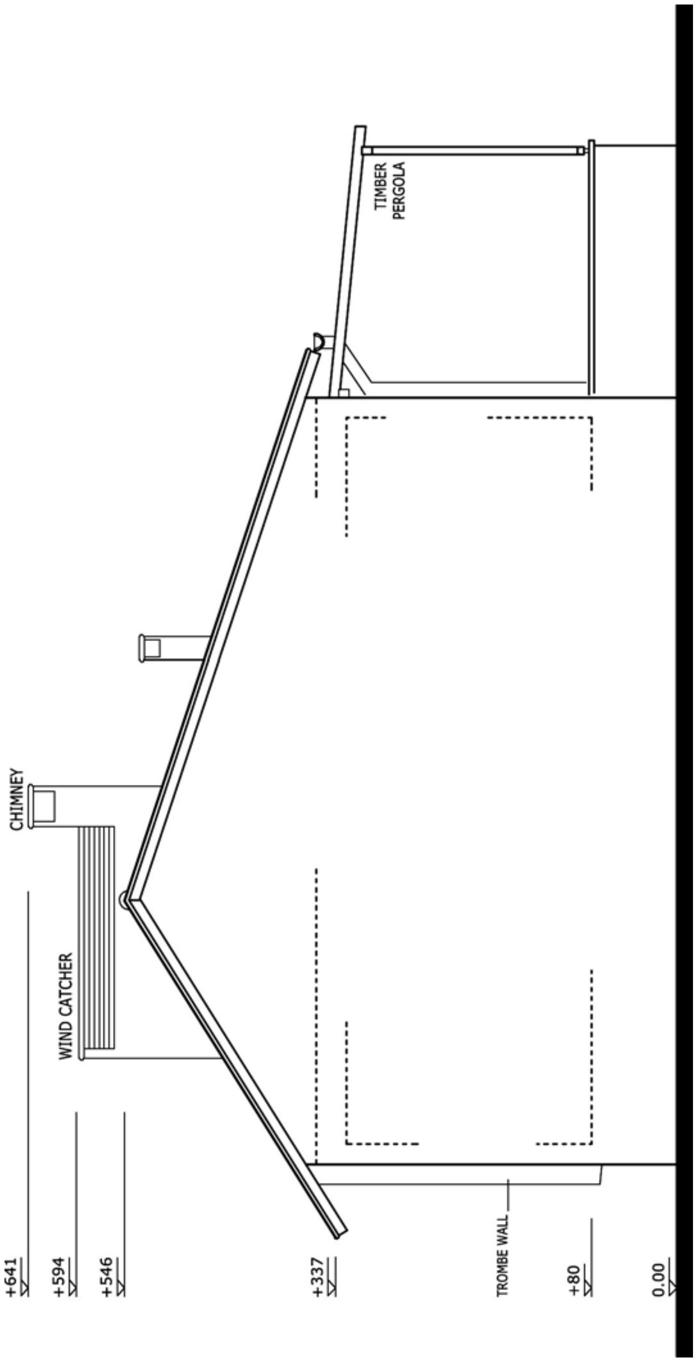


Figure 8.26 Eastern façade of type D_1' dwelling; Scale 1/80

8.2. Desire for a Sustainable Residential Environment: Presentation of Design Tools

The new housing design in Seyrek addresses such difficult issues as *social exclusion* and *cultural continuity* as well as *energy efficiency* and *environmental performance*. This project prioritizes the sense of community and cultural tolerance while recognizing ecological concerns such as solar energy utilization, waste and water management, locally available or locally produced materials, and locally appropriate construction technique. The resultant architectural interpretation, based on the social, economic and ecological conditions of Seyrek, responds to the climate and bears responsibility toward local resource management. Here, information about the inhabitants of Seyrek is implemented primarily in a case-specific site organization and dwelling layout. To discover and recognize the residents' intent and wish are taken as an important aspect of orienting the design and achieving its positive cultural reception.

However, the present Seyrek project does not follow a *participatory* design strategy. Ideally, in most sustainable housing projects, the householders participate in defining the development goals and the designing process. This is outside the scope of the present dissertation for reasons already explicated. Instead, the data gathered from the social analysis, interviews and the personal observations compensate for the need for mutual dialogue and active involvement of residents through the implementation of design process. In other words, the user involvement in the housing development is purposely treated by the indirect participation in the process of design by means of determining user needs in the capacity framework study. The active involvement is deliberately limited to the participation in the construction, and the management and maintenance issues of the buildings. Because, we can infer from the social survey and the interviews that user participation in determining building size, material and construction technique, and site organization may give rise to demands that may prove adverse to sustainable objectives.

The following part expresses case-specific items, i.e. design tools for the designated area. Each item presents the context-specific sub-strategies covered by the main strategies mentioned above, and articulates inevitable tasks derived from scrutinizing the case. The design tools will sometimes be introduced within figures when the tool needs to be illustrated by sketches and photographs.

In terms of *ownership pattern*, tenure may take on three different forms:

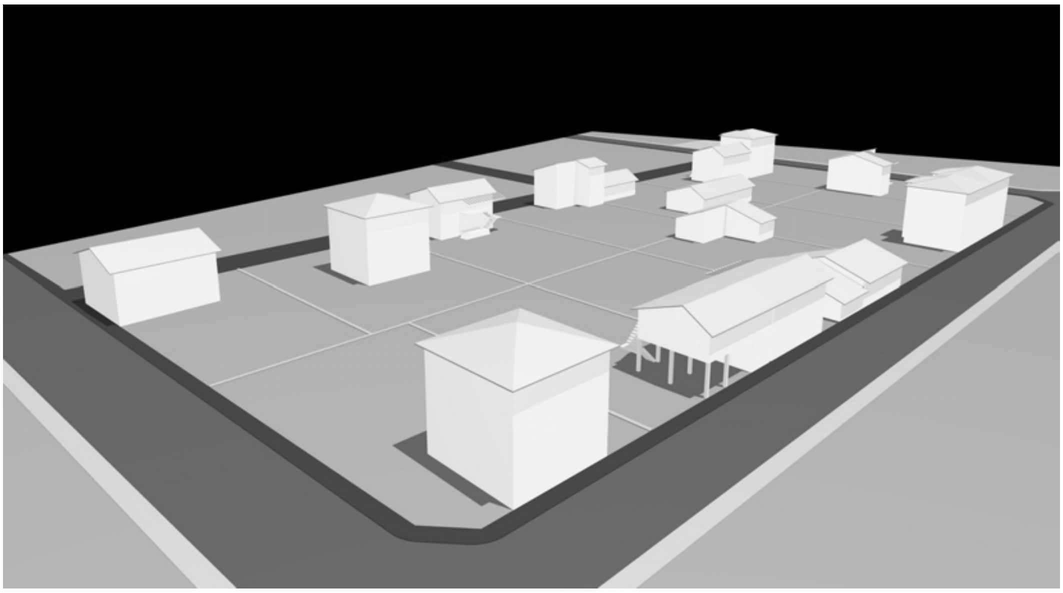
1. ‘Condominium’, meaning a cooperative, refers to either detached or multi-storeyed dwellings which are individually owned while sharing in joint ownership of any common grounds;
2. ‘Private’ refers to detached houses belonging to some particular person;
3. ‘Rental’ indicates that private, non-profit housing developers own the dwelling which is given out for rent

This dissertation develops two different approaches to tenure. The dual approach is based on the current landownership pattern: the building block comprises 14 plots, 13 of which are occupied by one person.

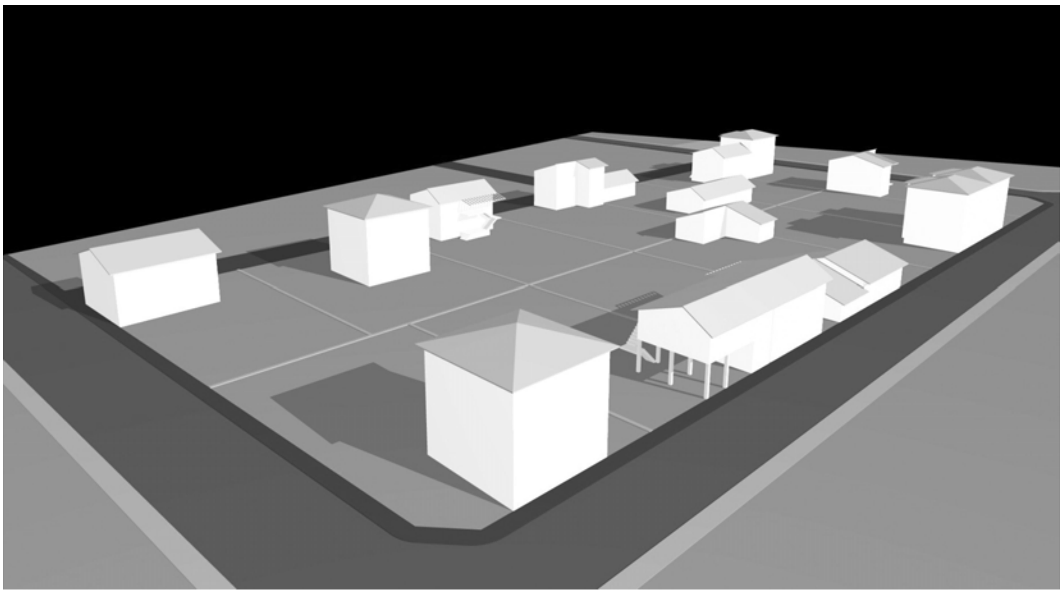
The first proposal acknowledges the ownership of plots in two forms: private or rental. It accepts the size and location of each plot in the building block even though the author knows that the shape of the building block and the forms of the plots are entirely in contradiction with those of the traditional settlement pattern. Here, the intention is to find the most feasible and optimal sustainable solutions in the current situation (Figures 8.27-8.30).

The second option, on the other hand, tends to bring about a solution as an intermediary between the unsustainable street and landownership pattern offered by the development plan of 1997 and the current layout of the Seyrek settlement. Here, the shape of the building block is kept, the shares of two owners set aside, yet the 13 plots owned by the one person, Mümin Karaman, are treated as one plot. The tenure of the smallest-sized plot owned by Meryem Güngör may be private or rental. For the remaining property that comprises one extensive plot, the suggested ownership system is the cooperative.

One noticeable point in this framework is that the size of one of the 13 plots is taken as a portion of the total, yet the location and the form of that plot may be differentiated. The reader is reminded to note that there may be three types of users in this larger-sized accumulation of plots: the spatial needs of the first group, as pointed out, depended on the agricultural facilities and this may seem to contradict the ownership pattern based on joint ownership. However, the proposition of this dissertation is to keep the ownership rights of people living in detached dwellings to own individually both the dwelling and the land, yet giving up at most 10% of the plot size for public use. If this needs to be clarified further,

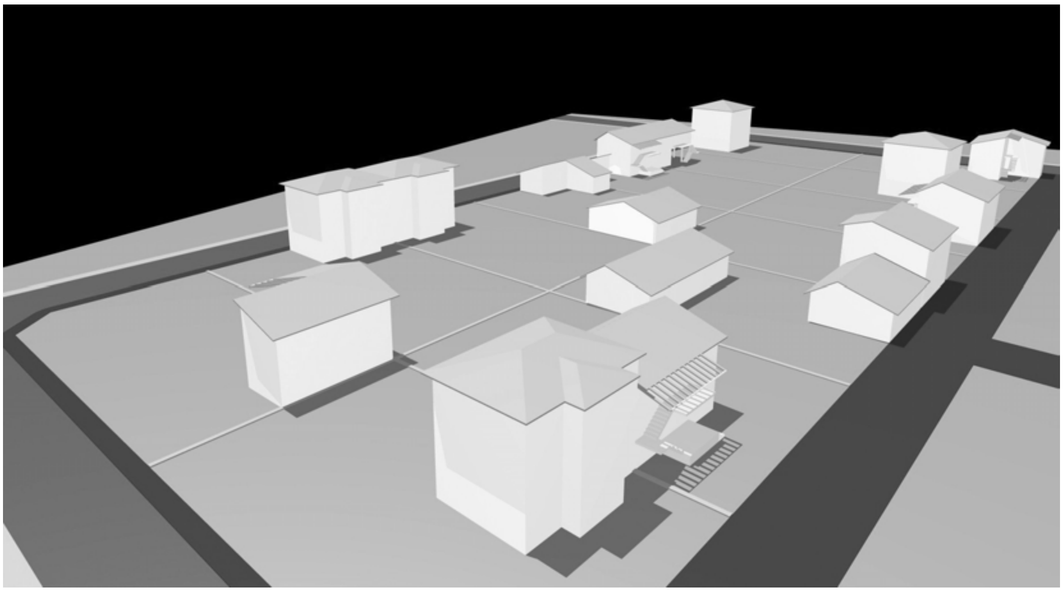


21 June, 12^{00}

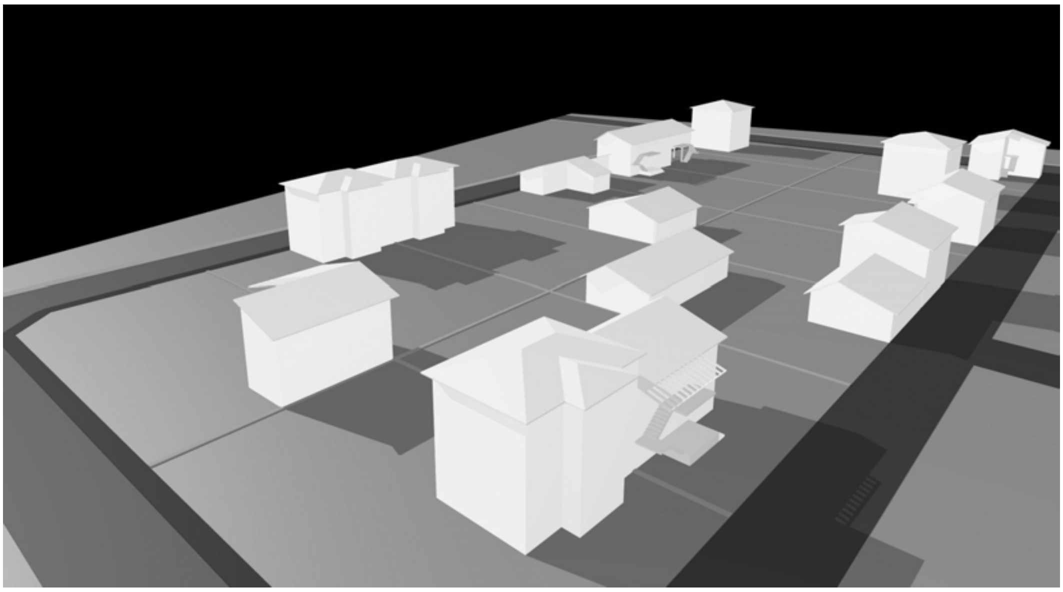


21 December, 12^{00}

Figure 8.27 Site plan proposal of the first approach to tenure: perspective view from the south-west corner of the plot indicates one of the possible combinations of proposed dwelling types aiming at the most feasible and optimal sustainable site organization by accepting the current size and location of each plot in the building block



21 June, 12^{00}



21December, 12^{00}

Figure 8.28 Site plan proposal of the first approach to tenure: perspective view from the northeast corner of the plot

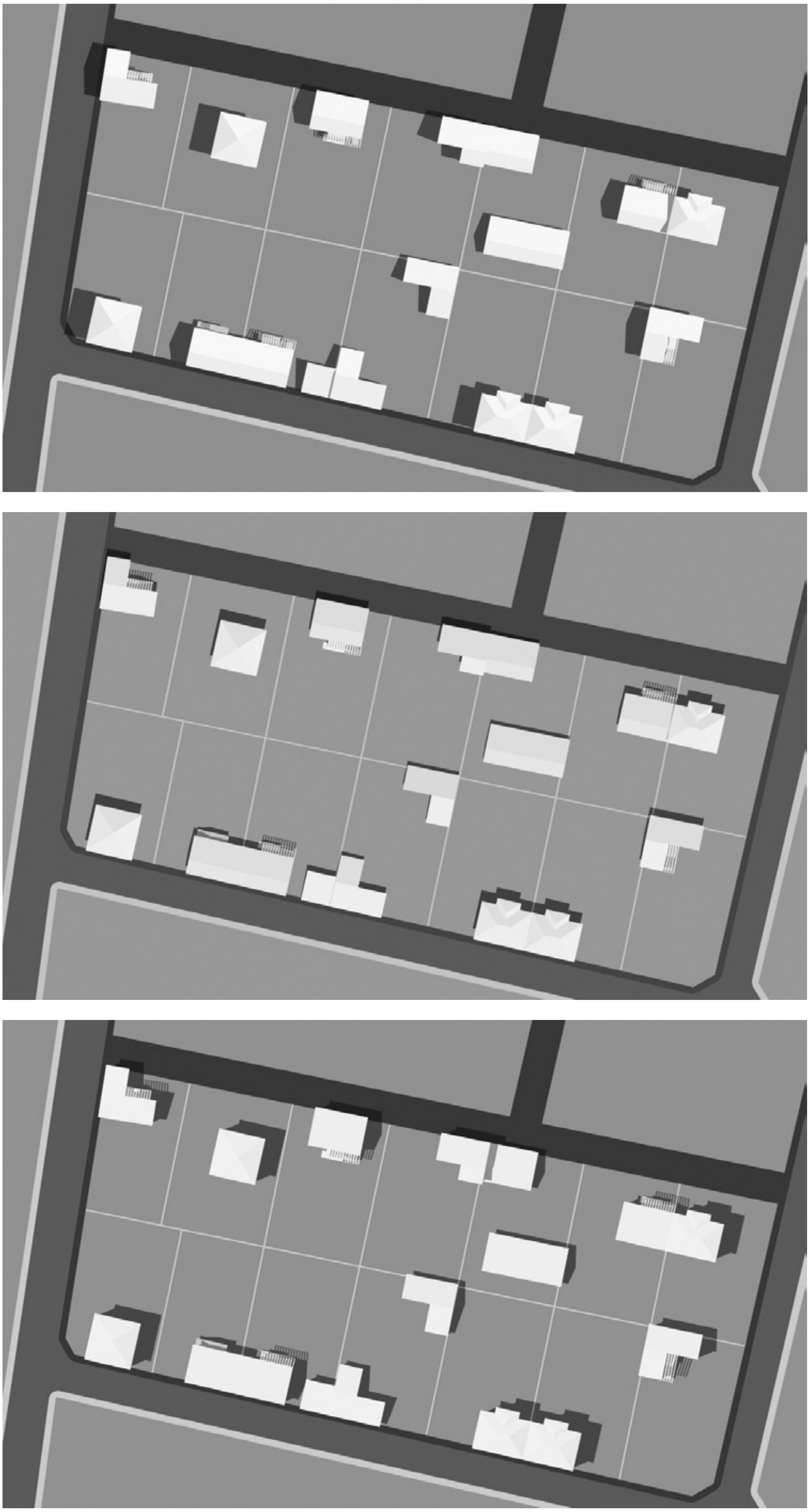


Figure 8.29 Top view of proposed site plan indicating the shading of each dwelling on 21st of June, at 10.00 am, 12.00 and 02.00 pm; Scale 1/1000

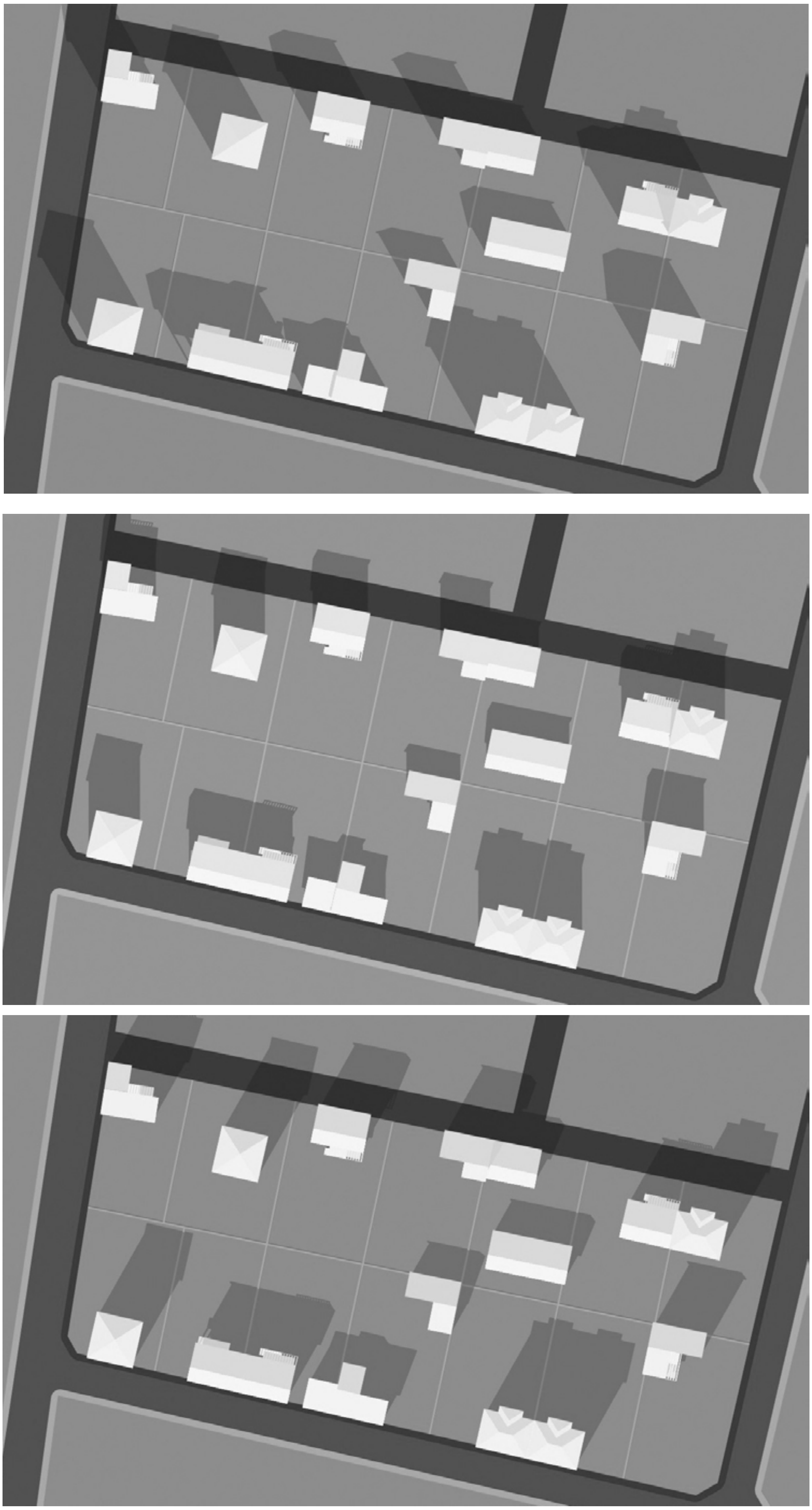


Figure 8.30 Top view of proposed site plan indicating the shading of each dwelling on 21st of December, at 10.00 am, 12.00 and 02.00 pm; Scale 1/1000

suffice it to say that a householder living in a multi-storeyed dwelling, for example, only individually owns the dwelling of 90 m^2, while the other householder living in a detached house owns 600 m^2 land , 60 m^2 of which he or she shares with the others in the same cooperative. Here, 10% of the shared plot may function as the public vegetable garden, purification pool, composting nodes, gathering points of recycled material, pedestrian paths, playground areas and small enclaves for gathering of neighbors. The integration of detached dwellings into the condominium system derives from the provision of public areas for shared functions. Such allocation is an inseparable aspect of, and factor facilitating of, sustainable notions of the building block and the endowment of detached dwellings with the advantages of sharing in terms of building costs, waste treatment, building construction and maintenance, and of course social and cultural cohesion. Finally, this second proposal intends to convey the message of sustainability in the scale of the building block by keeping the privacy of local inhabitants, by enabling the fulfilment of related functions for livelihood, by allowing for both a private and shared ownership pattern, by proposing a more organic layout, the syntax generative of social relationship, and by offering opportunities to minimize building costs.

These two different approaches to the structure of tenure are based on the same configuration of user and dwelling types. It is accepted that the newcomers will settle in one-third of the plots available. The other plots are for the local inhabitants regardless of whether or not they rely on agricultural activity for livelihood. The distribution of dwelling types for Seyrek inhabitants is derived from social analysis that informs about preferences for new dwellings. The analysis indicates that 68% of local inhabitants prefer living in detached houses, 20% in a house with the depot on the ground floor, and 13% in a multi-storeyed dwelling. On this basis, the proposed user - dwelling pattern may be listed as follows:

1. Detached houses in 9 plots for local inhabitants of Seyrek: two of them are for a house each with the depot on the ground floor, and the remainder have at most two units. Thus there are 16 units of detached dwellings, each housing 64 persons.

2. Multi-storeyed dwellings in 5 plots: there are 15 units with 60 people living in multi-storeyed dwellings; only the 12 people of 3 units are local inhabitants of Seyrek.

3. The total number of units in the building block, therefore, is 31 while the maximum number is 41. There are 124 people inhabitants while the maximum may be 164, 48 of whom are newcomers and 76 locals.

4. Two of those proposed have all types of dwellings except the D_5 and S_5 because of insufficiency of plot sizes.

In terms of the *main housing policy*, the relatively small dwellings in varying sizes between 56 and 88 m^2 are emphasized so that they can be easily modified and added to as needed. Dwelling units may be enlarged by vertical and horizontal additions. A small house capable of later expansion is preferred: the goal is to create a basic core plan that could be added to, subtracted from, or otherwise adjusted to meet a variety of household requirements. Although using the same design for all houses will reduce the construction costs, one building type will not compromise the ability to accommodate households of different family sizes, incomes and living habits.

One joint fact in site organization is the sustenance of *the privacy of the dwelling.* Attention is paid to persons' concerns for protecting privacy; entrances, therefore, are prioritized by designing an individual entrance to each dwelling from the inner garden or courtyard. In addition, the high garden walls above eye level offer a private realm in the boundaries of the detached house. The multi-storeyed dwellings have relatively lower garden walls to surround their semi-public open courtyard.

Grouping the dwellings is another vital tool in the site organization since clustered housing uses land and energy more economically than detached houses: in Seyrek, with its semi-rural character, clustered housing helps preserve the open space. The concept of open area is a sensitive issue in the latest development plan for Seyrek, because the plan's high-density settlement pattern conflicts with the agricultural basis of the life style. This design tool seeks to illustrate how clustering the dwellings preserves much of the land. A further advantage of this grouping is to create larger, more functional open space for various functions in the plot, specifically for the most required facility, the storing. Besides, it minimizes the area of building surface exposed to weather conditions. For example, it promotes natural cooling by providing more shading in summers that reduces the area of surface exposed to direct hot summer radiation. Additionally, a cluster advances the mass effect of the construction. Therefore, the grouping keeps heated air inside in winters.

In terms of *storage need in the plot*, separate sheds, *sayas,* and/or depot(s)—*dam*—in the plot may fulfil storage needs. In the project area, the space for storage may differ according to the source of income and living habits of the users. However, one common point is that it locates the outside of the dwelling as a separate unit. The limited size of proposed dwellings already restricts storing in the dwelling. Besides, the humidity problem by the groundwater penetration prevents placing the storage space in the basement. Rather, the semi-open and/or closed storage space(s) may separately be placed in an adjacent or far corner of the dwelling according to the requirement of items stored therein.

Construction with indigenous material, i.e. raw earth or rammed earth, may need to be emphasized by encouraging local inhabitants to revitalize their use in the wall systems. For some of the householders, especially for the younger ones, this material may not seem worthy of use as the primary means of construction. Its widespread acceptance and implementation are limited in the settlement by the perception that earth does not look 'modern' enough. Despite the fact that the adobe construction technique is being abandoned for higher technological solutions or more well-known conventional systems in Seyrek, there is much interest in earthen construction by the relatively older householders, and the construction skill and knowledge has not yet been lost. In fact, people in Seyrek are already familiar with such material in the form of adobe bricks, and aware of its advantages and disadvantages. They appreciate how the bricks function, interacting with nature, sun, heat, humidity, and rain. The experience with the earth may ease the construction process, and thus, at the same time, decrease the cost.

The rammed earth building system may be preferred because of its simple and low cost construction process by keeping the house modest in size and form. It presents simple answers rather than complicated high-tech solutions for this semi-rural settlement. Employing this method, it is possible to build affordable houses for low and middle-income families by utilizing the local labor, for example the local craftsmen and the owner himself. This is also a way to build houses with ecological and natural systems that require less heating and cooling, thereby reducing utility bills (Figure 8.31).

In terms of affordability, unique to rammed earth, low water content allows for quick curing and rapid construction sequencing. Simplicity in construction and the consequent possibility of investment of one's own labor enables low-cost, affordable housing. Dependence on readily available low-cost material, i.e. local soil, encourages the low construction cost. In addition, the formwork, once constructed, can be used repeatedly. In terms of the benefits of rammed earth for ecological sustainability, the earth is regional, unprocessed, low-cost, heat-storing, of acoustic quality, load bearing, durable and recyclable. Lastly, the thermal benefits of thermal mass walls empower natural heating and cooling, quiet interior spaces and a healthy living environment.

Actually, in order to attain a more desirable material, there is a need to further the quality of earthen construction that minimizes the user's complaints as well as facilitating the construction process. The latest rammed earth construction technique may fit into the load bearing dwellings and non-load bearing infill walls of reinforced concrete present in the case area. The process of building rammed earth may combine the local resources of Seyrek with industrialized technology: the system is based on sliding the formwork through the walls *in situ* rather than earlier preparation of adobe bricks at the work site. It utilizes bulk material compacted into the formwork, which is set directly on the foundation. Besides, the combination with the industrialized materials such as cement and steel may enhance safety. In this case, the concern for earthquake resistance in the Gediz Plain may be addressed by the reinforcement in locations where this is necessary regarding the local codes for load bearing construction in Turkey.[2]

Rammed earth construction involves the compaction of soil in formwork to produce walls that are durable, resistant to fire and termites, require little maintenance, and offer quiet and cool interior spaces. The soil is obtained from a nearby quarry at the west of the settlement. The raw material may be stabilized with cement to achieve the required erosion standard, compressive strength and

[2] The design of the all load bearing dwellings in this project are based on the local codes valid for the Seyrek settlement which is located in the first degree earthquake zone of Turkey: see *Afet Bölgelerinde Yapılacak Yapılar Hakkında Yönetmelik: Bölüm 10, Yığma Kargir Binalar için Depreme Dayanıklı Tasarım Kuralları-RG [Official Gazette], 02.09.1997-23098* (1997).

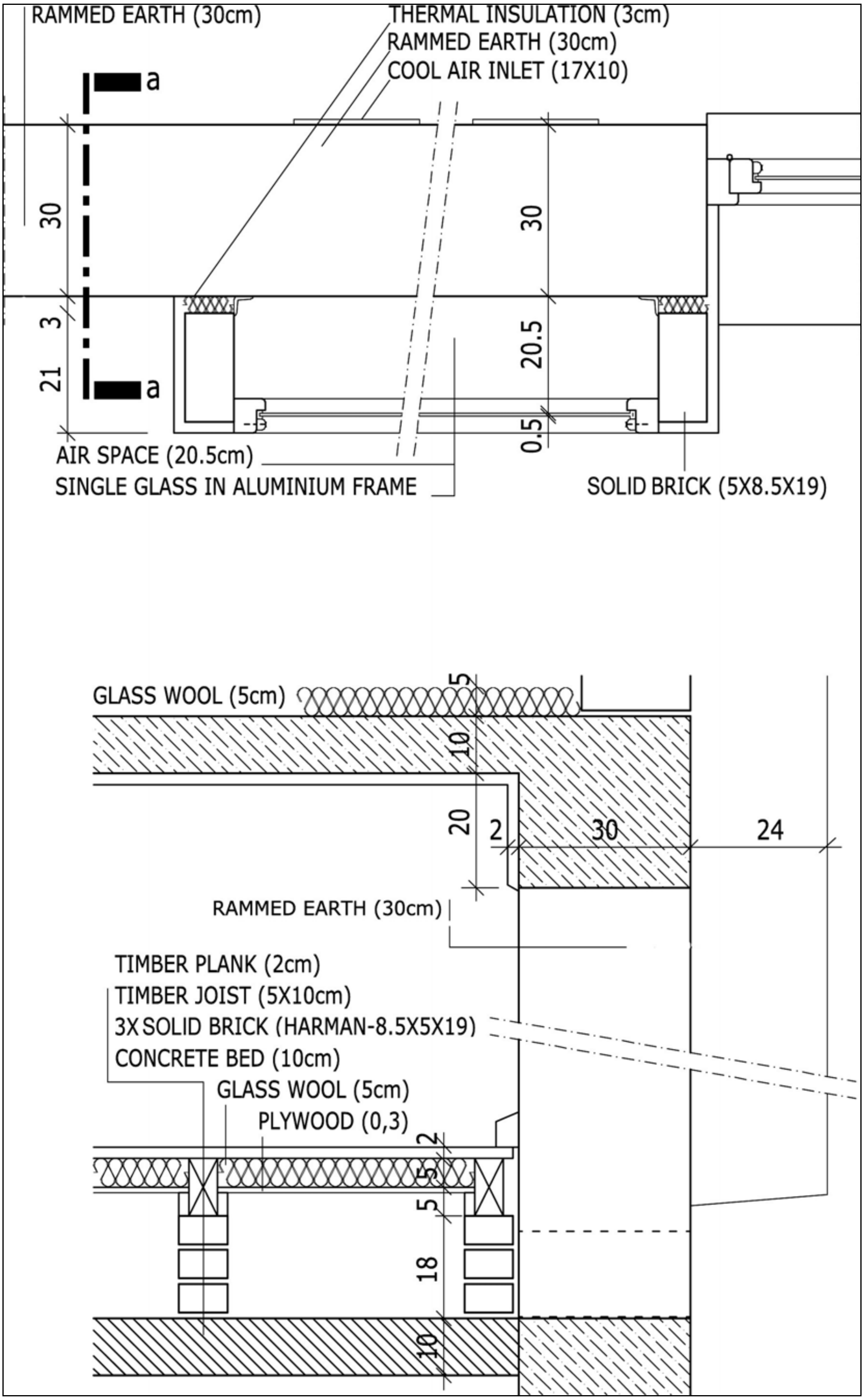


Figure 8.31 Construction with indigenous material—rammed earth: plan indicates the detail of rammed earth Trombe Wall of the sample dwelling. Wall section in the second detail explains how the earth wall combines with the suspended ground floor and the reinforced concrete beam of the floor of the roof; Scale 1/10

dry density. In the load bearing dwellings, walls support the reinforced concrete slabs at the ceiling, and take the roof loads.

In terms of a *decline in building cost*, the greater the standardization of elements, such as interior finishes, windows, doors, and kitchen fixtures, the less expensive the construction will be. Besides, the greater the use of locally available natural materials such as earth, or ones manufactured in the peripheries such as brick or gas concrete, the less expensive the construction will be. The other strategies include voluntary labor of the resident for his own house, use of local labor, design of small-sized houses enabling further additions, and utilization of natural conditioning, i.e. passive systems.

Considering the *provision of opportunities for local employment*, it is important for local artisans to work in the construction so that the tradition is kept up. In this way, local people have the benefit of keeping their money within the local economy. This is a key factor in the well-being of a community. Moreover, the construction and maintenance facilities can supply job opportunities for local people, especially the younger ones. The resident-built option helps create a sustainable community that finds ways to provide for most of its needs through the services and goods provided by its own members. Therefore, in order to systemize the studies for local employment, the community-based organizations (CBO) may be activated. First may be the organization committee whose tasks are as follows:

1. arrange training courses for the lay people who are willing to work in the construction process;

2. allow the utilization of newly obtained construction skills in the subsequent dwelling constructions in the village, thus ensure the continuation of this construction process.

Especially for the proposed rammed earth technology transfer to succeed, it must be well and widely absorbed into the community. One facilitating factor to move the construction technique ahead may be the training of new local laborers. The work force, after a brief training period, may be mobilized to build new earthen dwellings as well as others using the brick and gas concrete of the case area. Besides, among the owners willing to become actively involved in the construction process, there may be those who will attain this training course in order to further the construction skills when they work with the local artisan.

Secondly, a maintenance group may be organized in the scale of the building block in order that the completed dwellings may be regularly repaired, or just maintained, by the collective work—*imece*—method. Generating a resident-built working group enables the residents to do some of the maintenance themselves. At the same time, the resident-built option for the maintenance process may reduce maintenance costs.

The construction of several houses in early stages may also encourage the inhabitants toward conviction regarding the several types, materials, and sizes of the dwellings. The households may compare the advantages of types for energy performance, affordability opportunities, comfort conditions, and functionality of the dwellings.

In terms of *building material and construction system***,** the use of local materials and the application of local conventional construction techniques with which inhabitants are familiar provide work opportunities to citizens with less talent and knowledge. Therefore, the dwellings are made up with the locally available and cheaper construction materials among the natural ones, e.g. earth, or the manufactured ones from the peripheries, e.g. brick, gas concrete, and those in favor of the conventional techniques, e.g. load bearing and reinforced concrete skeleton systems by avoiding more costly and technologically sophisticated construction systems which, in fact, require skilled labor.

Even if the choice for the reinforced concrete system in one-storey dwellings seems unreasonable, there are two major bases behind this proposition: the first and the foremost is to consider the inclination of inhabitants. The social analysis indicates that the expectancy of the user of the construction technique weighs much more on the side of the reinforced concrete skeleton system. Besides, this choice is an obligation and a need if the householder is willing to undertake the further addition of a second storey.

As a result, the combination of materials and construction techniques according to the type of dwellings may be grouped as in Table 8.6. Besides, Figures 8.32, 8.33, and 8.34 exemplify the implementation of these materials in the load bearing sample dwelling. Drawings present the section of the walls made of two materials, brick and gas concrete, and the plan of the Trombe Wall made of solid brick—*harman tuğlası*. Here, a special wall type, the cavity wall, is designed to increase the thermal performance of the material of brick, specifically solid

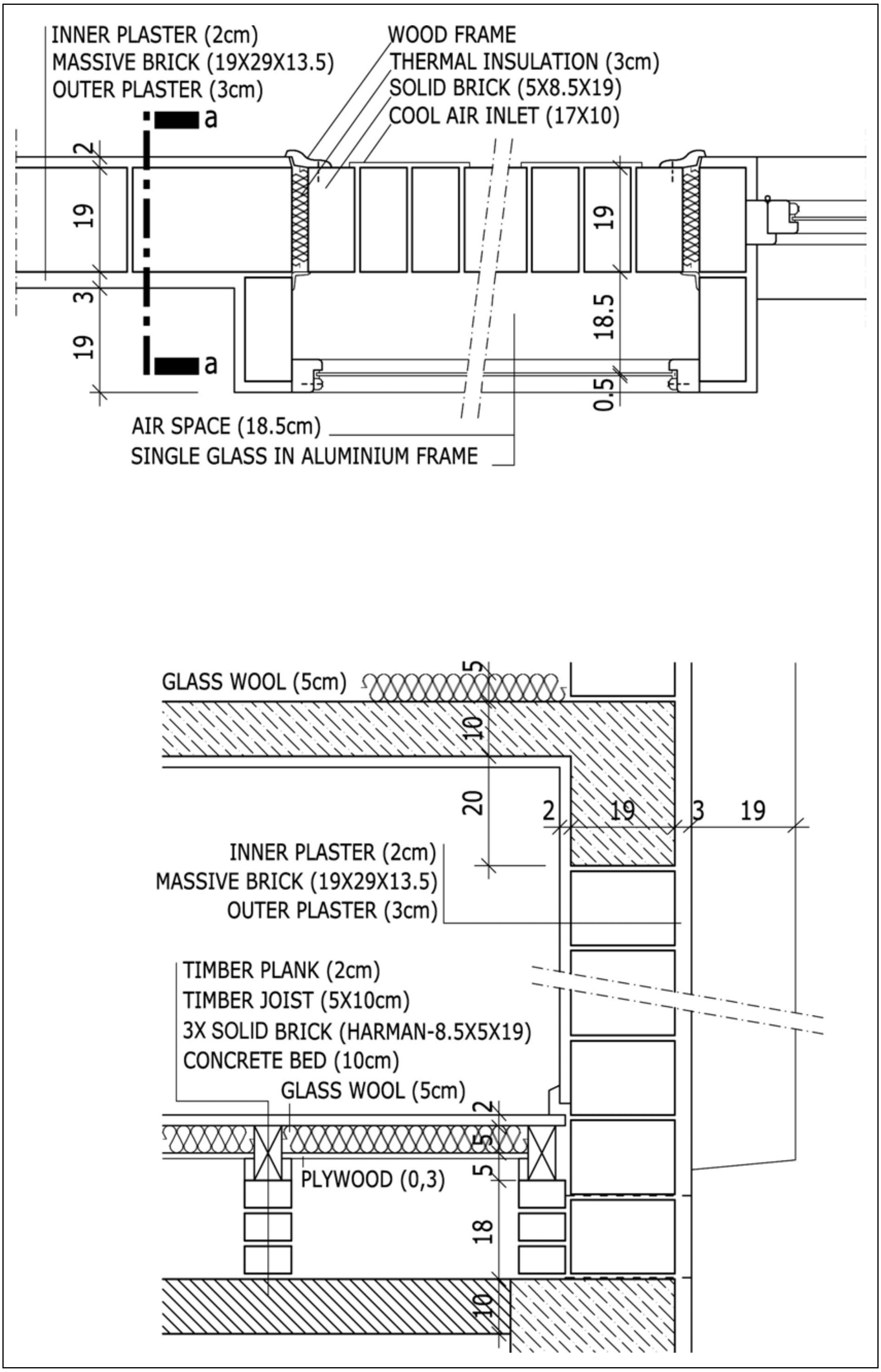


Figure 8.32 Two details specific to the sample dwelling made of load bearing (massive) brick: plan of the Trombe Wall and the system section including the suspended ground floor and the roof floor, and the outer wall; Scale 1/10

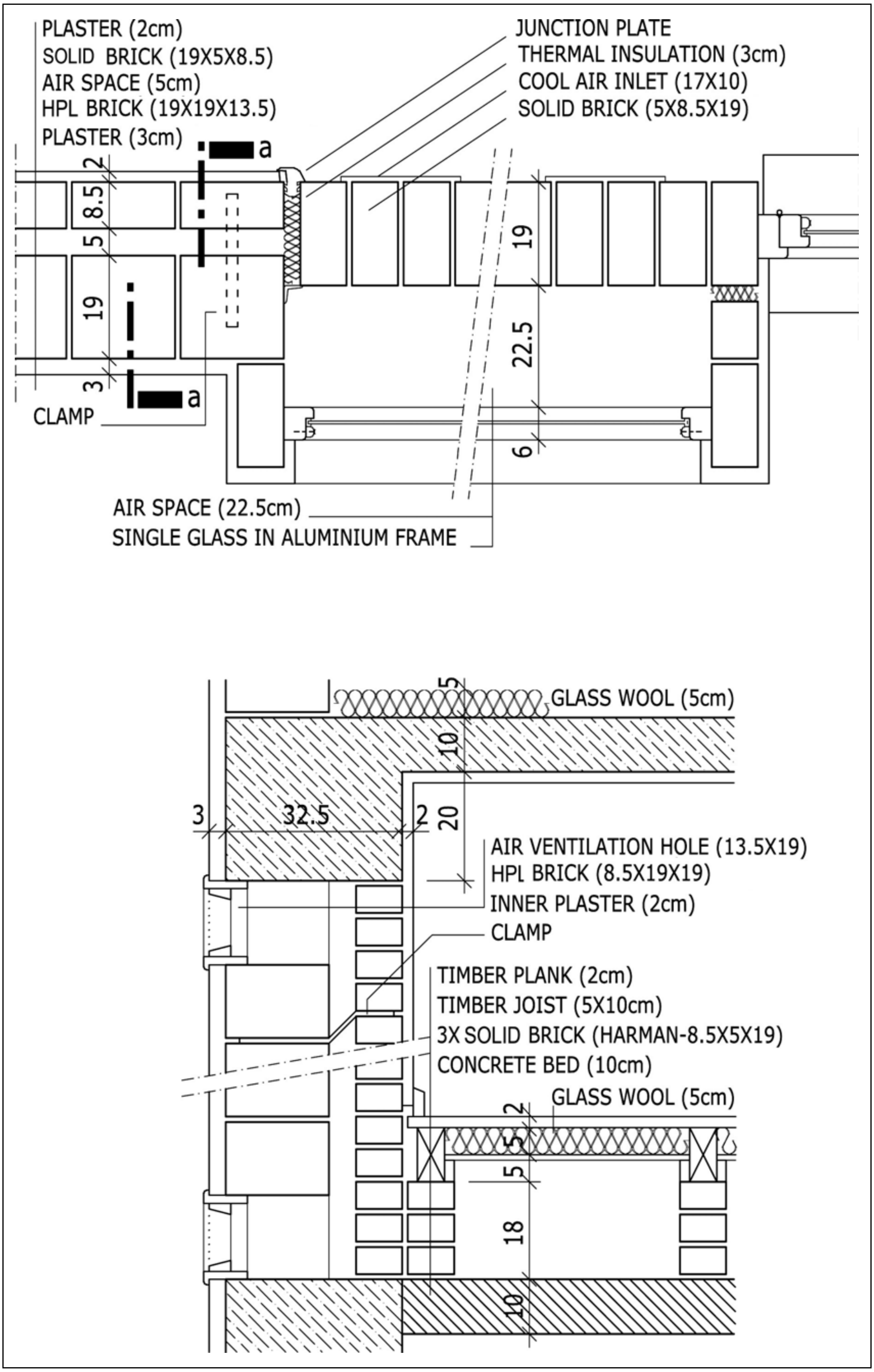


Figure 8.33 Two details specific to the sample dwelling with cavity walls: plan of the Trombe Wall and the system section including the suspended ground floor, the roof floor, and the outer wall; Scale 1/10

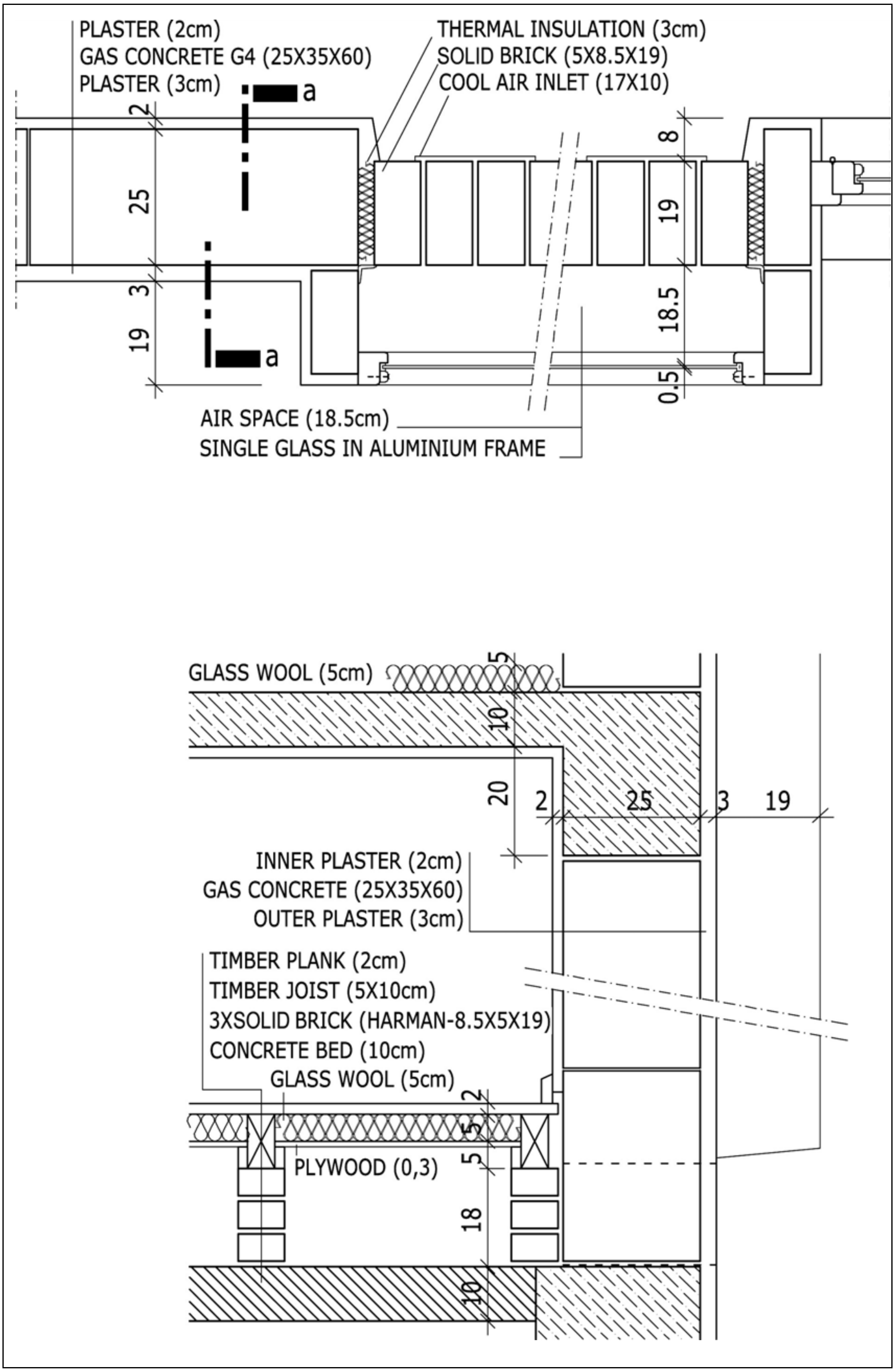


Figure 8.34 Two details specific to the sample dwelling made of gas concrete: plan of the Trombe Wall and the system section including the suspended ground floor, the roof floor, and the outer wall; Scale 1/10

brick and horizontally perforated lightweight brick, used in two layers in the outer wall.

Table 8.6 Combination of materials and construction techniques according to type of dwelling

One-storey buildings:	*Dolma* type:	Load bearing system	Load bearing (massive) brick Cavity wall Gas concrete Rammed earth
		Reinforced concrete skeleton system	Brick* Cavity wall Gas concrete Rammed earth infill walls
	Sakız type:	Load bearing system	Load bearing (massive) brick Cavity brick wall Gas concrete Rammed earth
		Reinforced concrete skeleton system	Brick* Cavity brick wall Gas concrete Rammed earth infill walls
Two and three-storeyed dwellings:	*Dolma* type:	Reinforced concrete skeleton system	Brick * Cavity wall Gas concrete Rammed earth infill walls
	Sakız type:	Reinforced concrete skeleton system	Brick* Cavity wall Gas concrete Rammed earth infill walls

* Brick having a higher coefficient of heat insulation

The cost factor of these varying materials in terms of affordability by inhabitants may be examined through the sample dwelling. Table 8.7 shows the cost of material and transportation to Seyrek per m^2 of building material when the cost of structural components made of reinforced concrete, the expense of workmanship and the rate of required mortar type are excluded. Here, one noticeable feature is that the cheapest material is rammed earth because the transportation cost is the least as it is produced from the local soil in the plain. Expenses for processing it for use as building material are incomparably less: rammed earth is built in place and thus the required production energy is lower. The only noteworthy cost is accrued by the same formal moulding sliding alongside the wall, and the Portland cement added to the mix for increasing durability and strength. The ratio of cement needs to be determined first by the testing of the soil in keeping with the strength and resistance to weathering. Yet, it is "typically between 5 and 10 percent by volume" (Easton 2000, p. 168).

Table 8.7 Comparative cost chart of building materials used in the sample dwelling

Type of construction material	**Cost (TL) per m^2 (November 2003) (KDV excluded)**
Load bearing brick (massive) (19 cm)	Material cost (Mc): 22 units/m^2 x 260,000 TL= 5,720,000 TL Transportation cost (Tc): (22 units/m^2 x 8.5 kg) x 9,000 TL/kg= 1,683,000 TL Total: 7,403,000 TL+KDV
Horizontally perforated lightweight (HPL) and solid brick for cavity wall (32,5 cm)	Mc of HPL: 35 units/m^2 x 75,000 TL= 2,625,000 TL Tc: (35 units/m^2 x 3 kg) x 9,000 TL/kg= 945,000 TL Mc of solid brick: 85 units/m^2 x 60,000 TL= 5,100,000 TL Tc: (35 units/m^2 x 1.2 kg) x 9,000 TL/kg= 378,000 TL Total: 9,048,000 TL+KDV
Gas concrete (25 cm)	Mc: 13,625,000 TL Tc: 875,000 TL Total: 14,500,000 TL+KDV[3]
Rammed earth (30 cm) (0.3 m^3)	1 m^3 earth in Seyrek (transportation cost included)= 20,000,000 TL x 0.3 m^3=6,000,000 TL

Another comparison may be conducted for the thermal performance of dwellings in heating and cooling seasons. The choice of material directly influences the heating or cooling loads of dwellings, and inevitably the comfort conditions and expenditures. The inhabitants of Seyrek pay considerable amounts for heating, yet not for cooling, by electricity and/or solid fossil fuels. The social analysis indicates that the function of building material is not taken into consideration in this context. Therefore the choice for materials with higher thermal performance becomes one of the primary strategies of the sustainable housing project. Table 8.8 elucidates heat gains and losses of the sample dwelling and variations thereof according to four types of building materials. One premise is that the walls are not covered with any insulation foam and the openings are single glazed. For detailed information about the measurement of heat loss and gain of the dwelling made of load bearing brick, the reader may turn to Appendix G.

[3] I would like to thank Mr Soner Kızılcan for his assistance in computation of cost for gas concrete.

Table 8.8 Thermal performance of sample dwelling according to type of construction material

Building materials of walls	**Total heat loss in heating season (Kcal/h)**	**Total heat gain in cooling season (Kcal/h)**
Load bearing brick (massive) (19 cm)	10314.54	9574.2
Horizontally perforated lightweight (HPL) and solid brick for cavity wall (32,5 cm)	8193.27	9285.8
Gas concrete (25 cm)	7538.00	9150.5
Rammed earth (30 cm)	7742.99	9122.5

Table 8.8 points at how the thermal performance of materials affects the cooling need in summer, and heating need in winter. The values generated by 25 cm of gas concrete and 30 cm of rammed earth are nearly identical. More thickness of earth wall will bring higher performance than by the wall made of gas concrete. The results indicate that, indeed, no wall type alone offers an ideal insulation for both cooling and heating, and there is need for an extra insulation layer on the surface, especially for the walls made of these brick types. However, this will bring a considerable amount of extra cost that may not be affordable to the occupants. Therefore, the author thinks that rather than the standardization in use of insulation on the outer walls of each dwelling, this may be presented as optional. The negotiations with the users may be more determinant while the decision about use of secondary insulation depends on affordability.

In terms of *energy strategy*, the first strategy is to realize energy conserving design; in other words, minimum energy consumption through planning and design. This needs the consideration of minimization of energy requirements and choice of building material having good insulation quality to avoid as much as possible a second skin for insulation. Since the national electricity network unsurprisingly provides electricity for the dwellings' main energy needs, the use of locally produced ambient energy sources may decrease both the energy costs and reduce environmental deterioration through the production process of electricity. Thus, the utilization of passive heating and cooling techniques, natural lighting and ventilation systems may be the more correct decision in determining the energy system of dwellings than dependency on active ones (Figures 8.35; 8.36; 8.37).

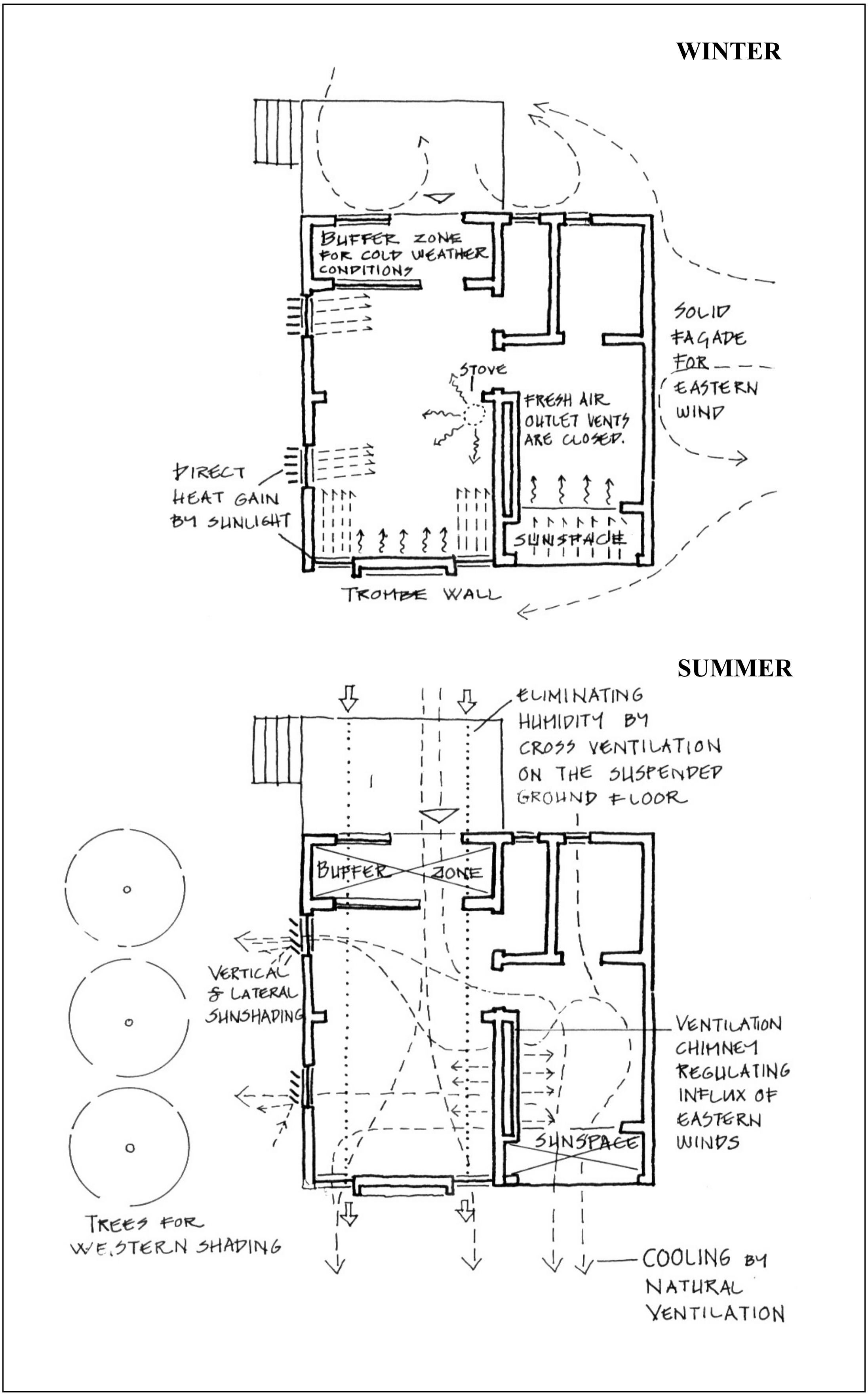


Figure 8.35 Illustration of energy strategy of the sustainable housing project in Seyrek: design solutions for winter and summer seasons over the plan of sample dwelling

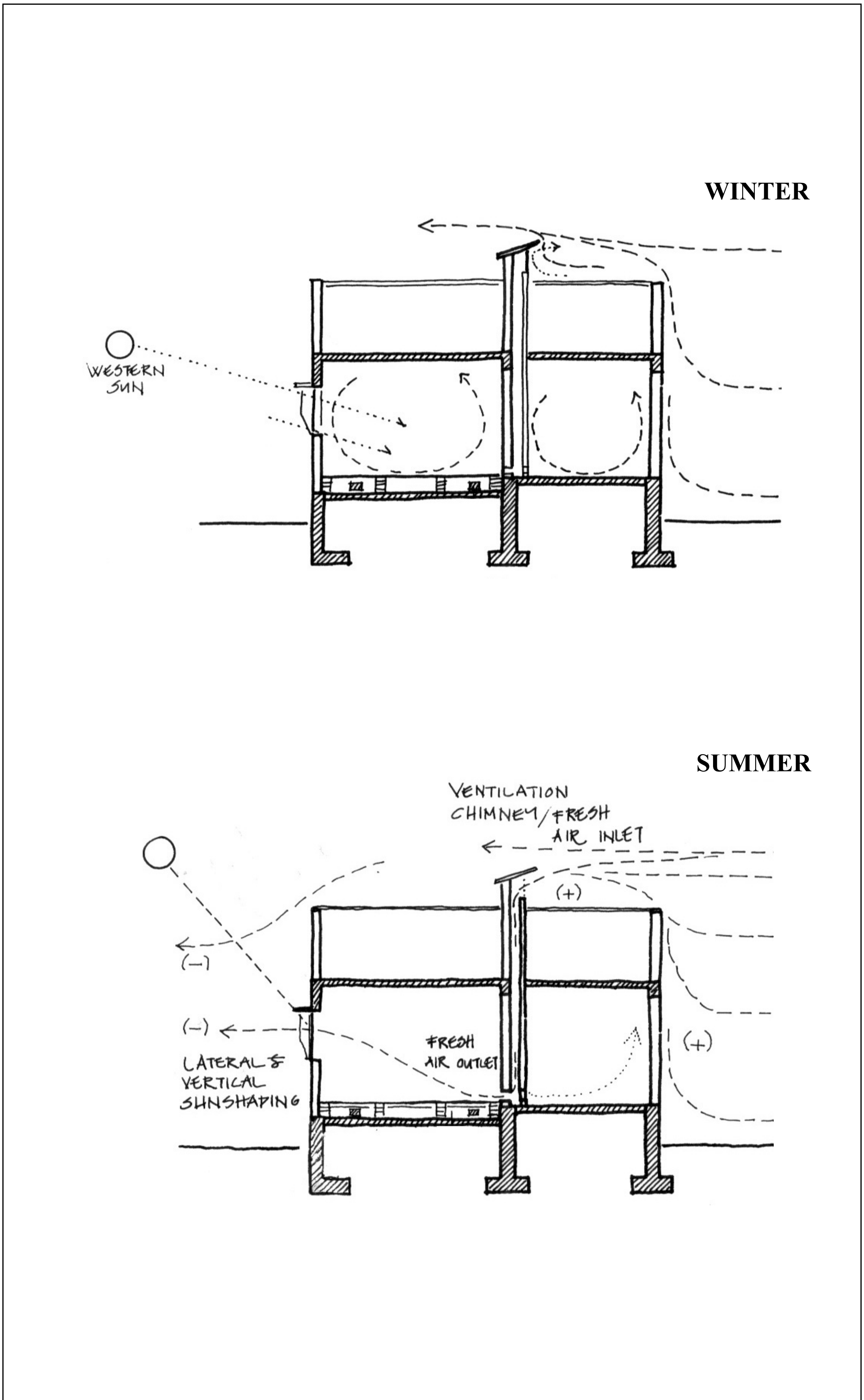


Figure 8.36 Illustration of energy strategy of the sustainable housing project in Seyrek: design solutions for winter and summer seasons over A-A section of the sample dwelling

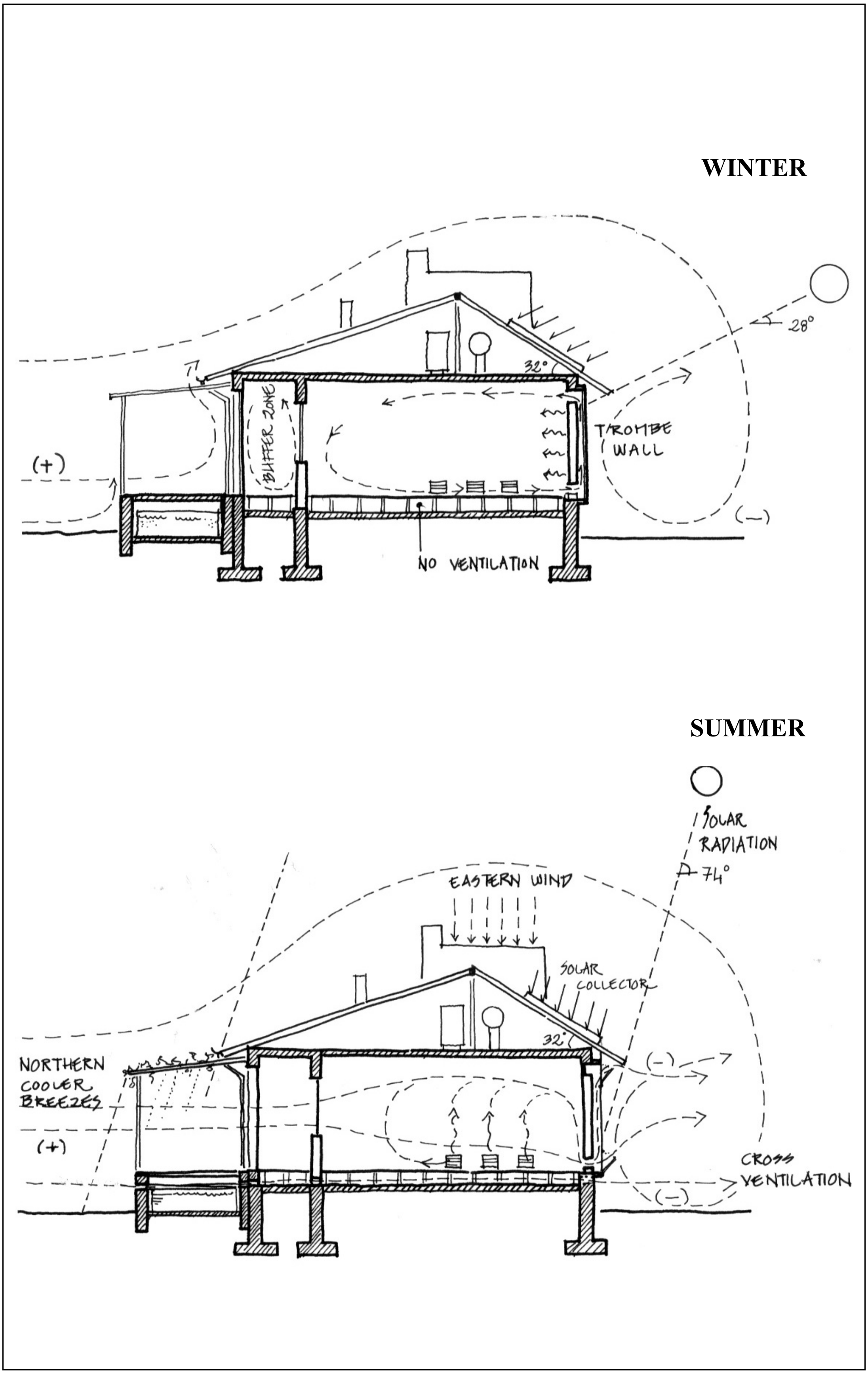


Figure 8.37 Illustration of energy strategy of the sustainable housing project in Seyrek: design solutions for winter and summer seasons over the B-B section of the sample dwelling

In terms of *passive building design features,* the initial concern is the performance of the building envelope designed in reference to local temperature variations. The skin aims at attaining maximum efficiency in keeping inside the warm air in winter and the cool air in summer. The key features devised for stabilizing internal conditions to comfort levels by passive systems are indicated in Figures 8.38 and 8.39.

The climatic conditions of Seyrek necessitate cooling in summers because of high levels of humidity and the excessive heat levels of the flat topography. Passive cooling by empowering air movement is, therefore, highlighted in the design. Importance is given to admit fresh air and to exhaust heat and humidity. Passive cooling features may be listed as follows:

1. The humidity, causing to feel hotter in summers, is eliminated by cross-ventilation at suspended floor on the ground floor (Figure 8.40).

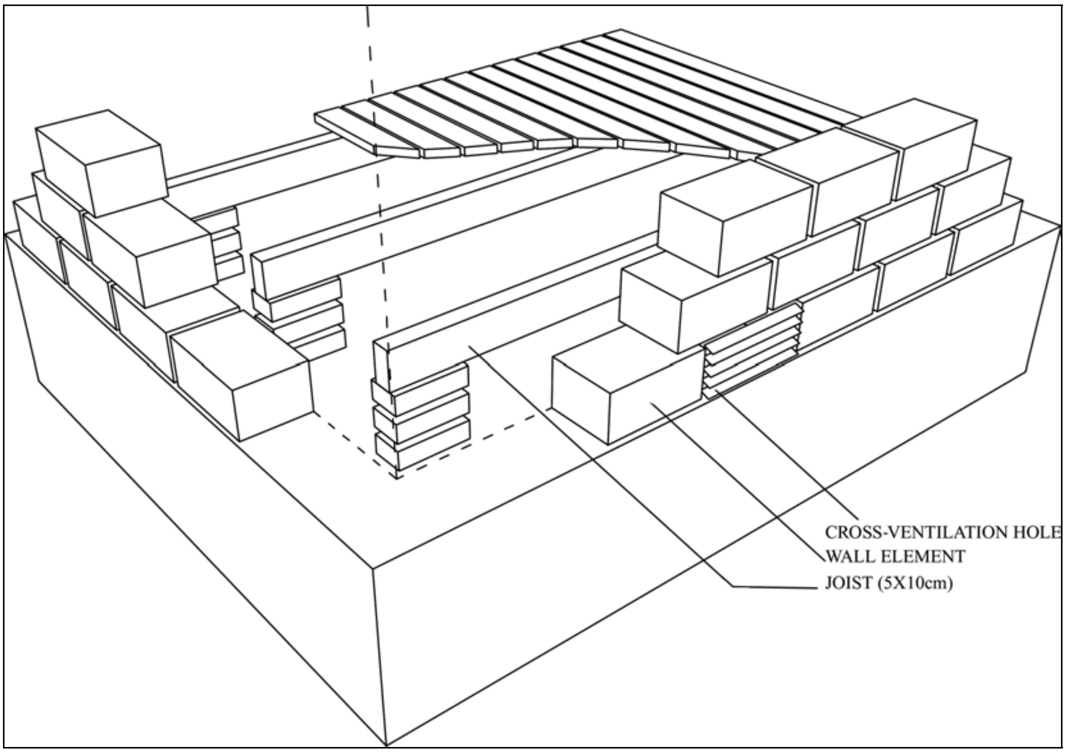


Figure 8.40 Utilization of natural ventilation at suspended ground floor of the sample dwelling for eliminating humidity in summer

2. Inner natural air movement may mainly be operated by a manually controllable ventilation chimney at the roof which is located near the living-sleeping room. The chimney assists cross-ventilation through the stack effect (Figure 8.41).

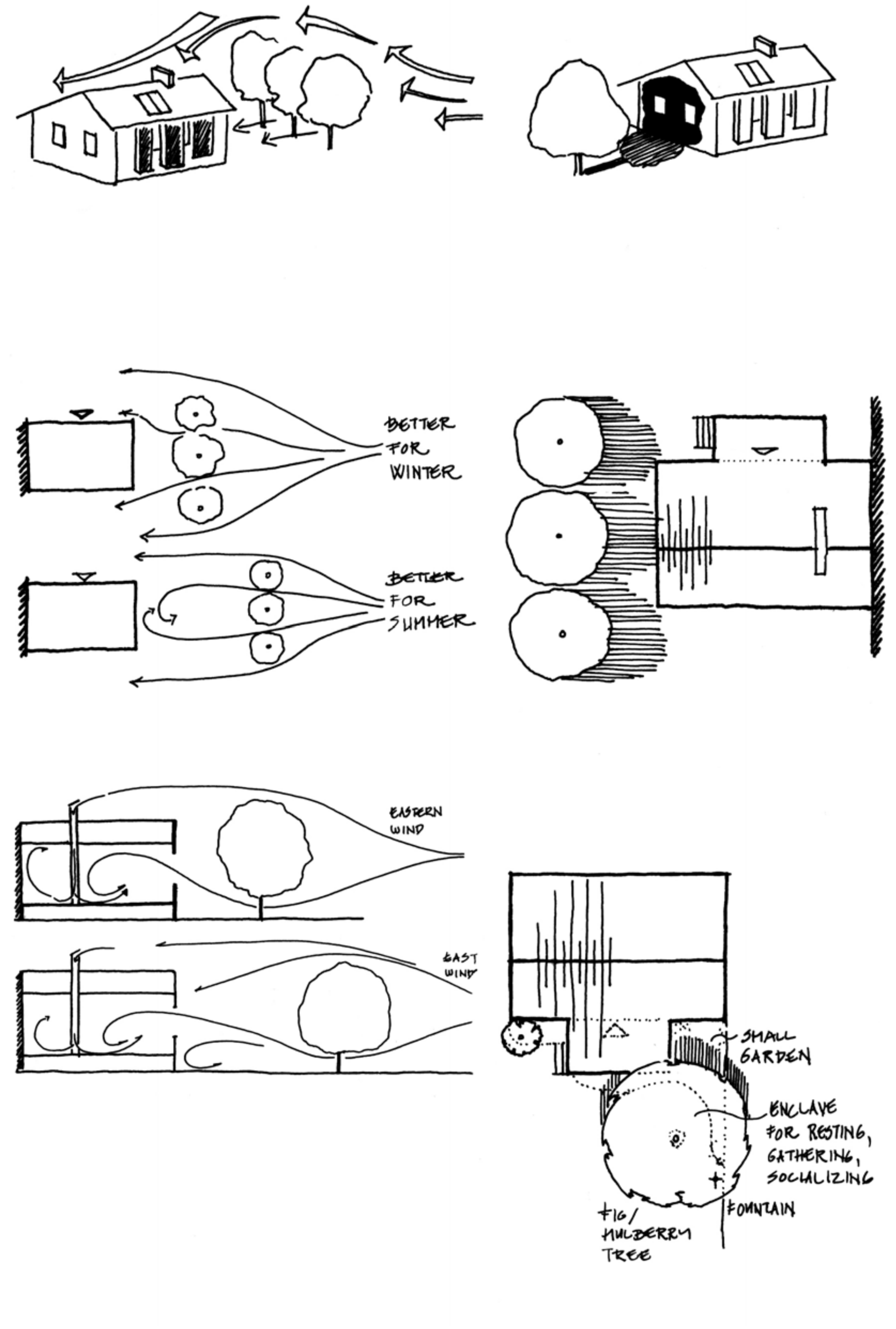


Figure 8.38 Encouragement of planting of local trees (mulberry and fig having large crown) in filtering of high solar radiation in summer and re-directing permanent eastern wind in winter

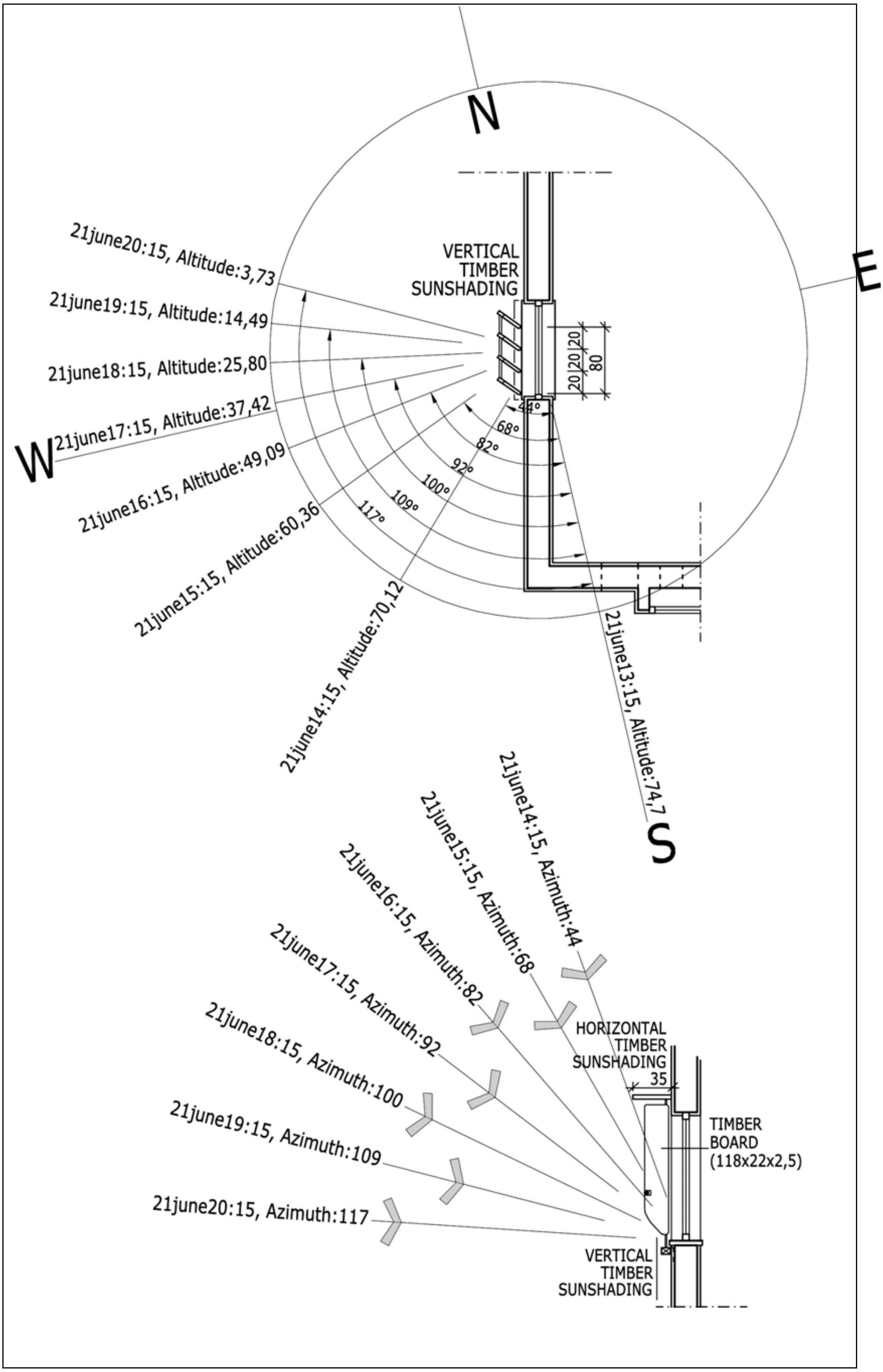


Figure 8.39 Adjustable vertical and lateral sunshading element of the sample dwelling breaking western sun in summer

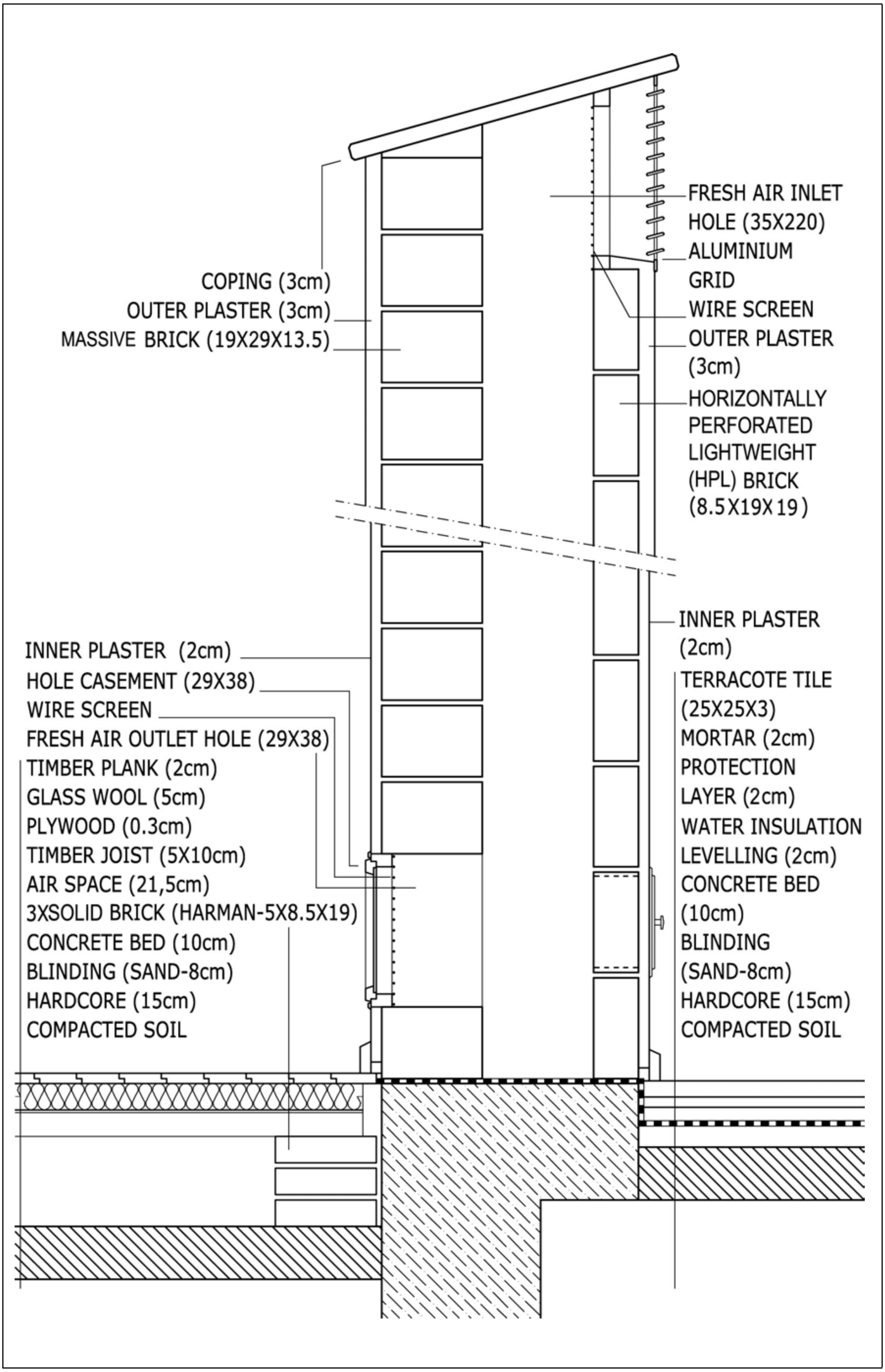


Figure 8.41 Ventilation chimney of the sample dwelling forcing inner natural air movement; Scale 1/10

In terms of utilization of active heating systems in the dwelling, supplemental backup heating may be needed in winters: a solid source (coal, wood) stove, located in the middle of the living-sleeping room, may provide supplemental heat when the passive heating is insufficient. Furthermore, 4.1 m^2 of liquid filled solar collector system may provide domestic hot water for the bathroom and kitchen of each house. They are placed directly on the surface of the roof facing south. The heat accumulation tanks totaling 200-lt capacity are located in the attic of the dwellings. 32º of roofs is the optimum angle for solar collector panels at this latitude.

The design strategy for eliminating *waste material produced in the building block* is to replace the current linear process based on use and throwaway by cyclical processes that imply reprocessing or reassembling the waste material (Figure 8.42). Therefore, the project proposes a composting system for the utilization of organic waste from the dwellings as fertilizer, and determines recycling gathering points for the reuse of plastic, glass, can, and paper. Besides, it is an essential design criterion to minimize the loss of material by measuring the dwelling.

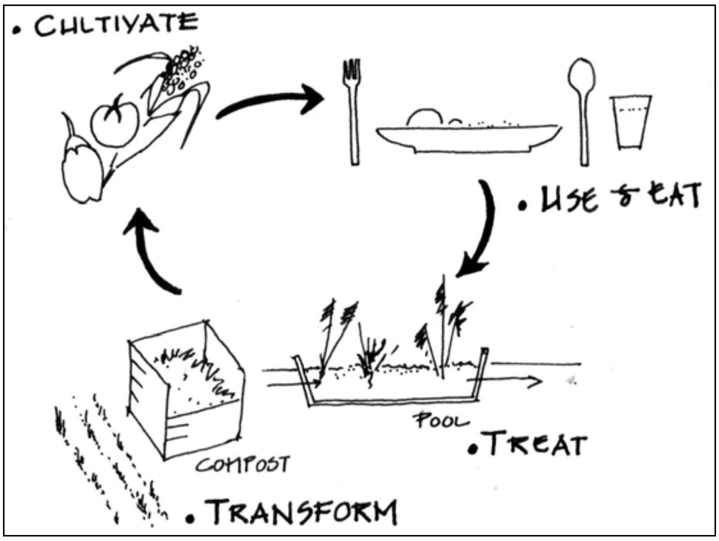


Figure 8.42 Waste strategy of the sustainable housing project proposing cyclical rather than linear processes: human nutrient cycle for the case area

In terms of *waste management*, two basic tasks may be implemented: on-site sewage treatment system in an economical manner, and a composting system for organic waste (Figure 8.43). The first system may be implemented contingent on desire in each plot since it brings extra cost by separating the sewage system into two lines: the first line, including the toilet waste, runs directly to the public

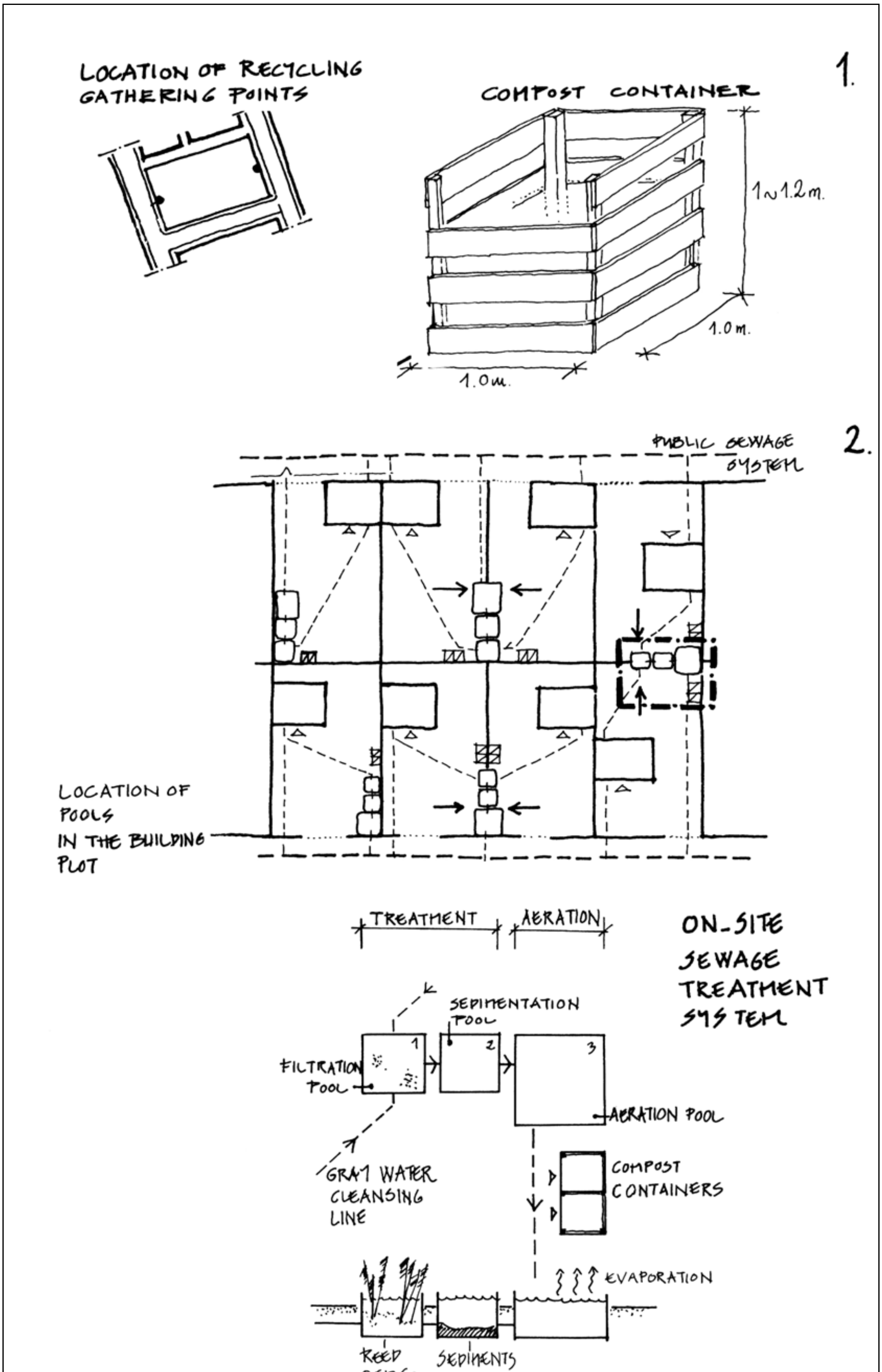


Figure 8.43 Two main tasks for waste strategy of Seyrek project: composting system for organic waste and gathering recyclable waste; on-site sewage treatment system

sewage system. The second line, which is the gray water cleansing line, uses artificial wetland for treatment and aeration, and then lets the cleaned water into the public sewer system. Here, a piped drainage system collects the gray water which is generated by washbasins, showers, bath and kitchen sinks and washing machines. Then, the gray water flows through a grease trap and is treated in intermittently loaded, gravel based, artificial wetland planted with native reed beds. This system of pools may be located at the far corner of the plot, or closer to the entrance of the main public sewage unit.

The wetland provides aeration by dropping the water over rocks, sedimentation and filtration through reed beds. The rain water from the rainwater tanks and available ground water may feed the pool if necessary. The constant re-circulation of water keeps the system alive and prevents the creation of mosquito breeding grounds. A windmill may utilize local wind to pump the treated water that may be used for irrigation of vegetable gardens and landscape.

Eventually, the pool empties into evaporation mounds for final disposal. The disposal including silt is removed through the waste disposal vehicles of the settlement. The treated water is either directly released into the sewer system of Seyrek or may be utilized for irrigation of orchards or vegetable gardens.

There is a conventional toilet system using potable water. Every dwelling, including the multi-storeyed ones, may have a composting system to transform organic material into the fertilized soil.

In terms of *water management*, the minimization of potable water demand is the first priority. Thus, three basic tasks may be implemented: stimulation of households to use less water and detergents, accumulation of rain water, and use of rain water and/or treated gray water for irrigation of landscape and vegetable garden (Figure 8.44).

Rain water is collected from the roof of dwellings and transferred by pipes. It is stored in tanks located mostly under the entrance terrace of the dwelling. The smooth area obtained by the rain water collection tanks, therefore, functions as a transitional space for socializing and cohesiveness supporting community life and relationships among people.

The rain water may be exploited for the grey water treatment unit, and irrigation of vegetable gardens and landscape. When the rainwater reservoirs are depleted, the local water network enters.

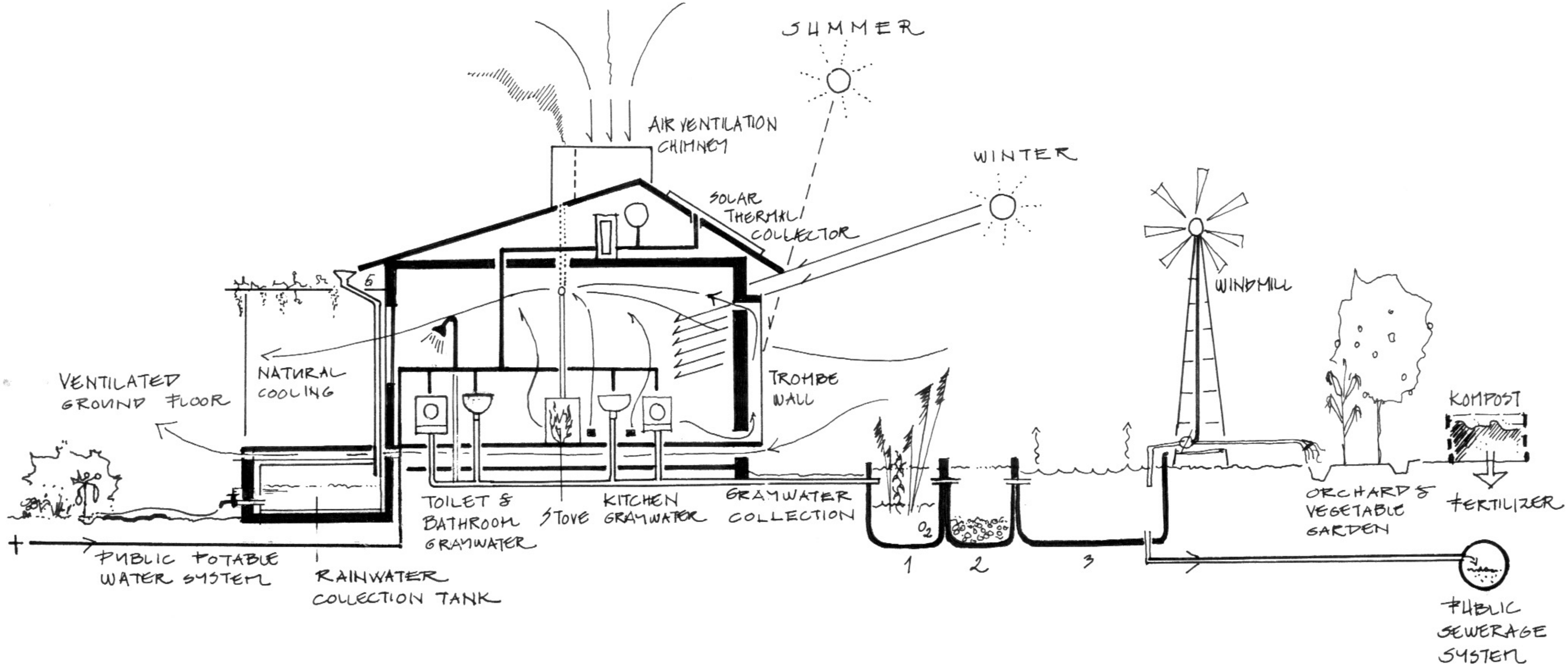


Figure 8.44 Scheme indicating water, waste, and energy strategies of the sustainable housing project in the Seyrek settlement

Furthermore, there is a need for installing a drainage system surrounding the dwelling to minimize the generation of humidity. An overland flow drainage system harvests the high level of ground water and rainwater runoff, and then directly transfers to the sewage system of the town.

The potable water network of Seyrek supplies every building for drinking, cooking, toilets, showering, and washing. The potable water demand of dwellings in the case area will be less than other dwellings in Seyrek, because of the utilization of rainwater for irrigation purposes.

In terms of *healthy building features*, the choice of building materials is a case in point: it is essential to decrease the use of polyvinyl chloride (PVC) by using timber frames for windows and doors. Yet the cost differentiation of these two materials should be carefully considered. The clay or cement pipes are the natural and, considerably recyclable products. Therefore they may be preferred over asbestos or plastic ones in the sewage system.

All of the about demonstrate that the attainment of sustainable solutions are indeed possible in Turkey, albeit at times with concessions, without however altering the fact that ultimately sustainable architecture is possible.

CHAPTER 9
CONCLUSION

This dissertation has primarily scrutinized the question of realizing sustainable architecture in Turkey. However, it has done so with an eye aware of simple, unique, uncomplicated, immature, autochthonous, albeit local, practices of the countries of the South trapped in a process of industrialization, and has moved the hegemonic debates of sustainable architecture beyond the North. It has contemplated the misconceptions about what constitutes the concept of sustainability in architectural practice today and alerted to numerous projects which have been deliberately kept outside the popular sphere of architectural attention.

While this study has shown awareness of the political and ideological issues sustainable development shelters, and of the dilemmas implied in the role the very idea of sustainable development plays in affirming and contributing to the reconciliation of growth and environment, such critique positions the concept of sustainability in a different context that re-locates its definition to a more *circumstantial* and *local*, at the same time *real,* plane than that of the clichéd, hegemonic and global conception. The latter, this study has shown, is in the service of the industrialized powers that seek to export their own solutions, and products aiming at obtaining these solutions, to all localities.

On the basis of the evaluation of the history of sustainable architecture, the critique of present and past practices and the findings of the specific case study, we may conclude that the idea of sustainability entails more than the pursuit of a luxurious trend for the architectural practice of Turkey: it is rather a necessity that must be encountered, encouraged, and implemented, and valued as an imperative, rather than an intention and a deplorably remote wish, for building practice in Turkey. The prioritization of sustainability for the architecture of Turkey is not necessary only because of the measurable numerical profits accruable through lesser energy consumption, decreased ozone depletion, and environmentally friendly, climatically responsive, ecologically healing qualities of sustainable buildings, nor simply on account of the morphological attractiveness of technologically advanced skin, superficial surface, provocative form, stylistic expression, environmental messages, but also the sustainable viewpoint's holistic vision deriving from the social, cultural, spiritual, aesthetic, and economic problems of a society. On this basis, this study has acknowledged what it means to build in a sustainable manner with a perspective that goes beyond the material pragmatism, does not limit the practice of sustainability within the confines of urban life, and supports modest life forms including local ecosystems as well as human habitats. The objective is to achieve a more sustainable life and the architecture of this life.

Here, the Seyrek settlement in local focus and Turkey in general may be considered, in some respects, fortunate in sustainable social, cultural, and ecological development, because it already has, we may surmise, a social structure within which cultural and ecological values may be oriented toward a more sustainable way of life. The problem, however, is that too many citizens among the 70 million that comprise this country, are unaware of the sustainable things they have, and do not attempt to protect or demand to regain these things in building and settlement scales. Thus some identify the trendy, widespread term of sustainability with the sense the term carries in the northern countries, and put their efforts into attaining the 'modern' way of life and living standard. Accordingly, most societies have been losing much of their identity precisely through the pursuit of sustainable features such as still partially survive in Seyrek, and a whole way of life by adopting the industrialization process. Fortunately, there is a consciousness and wish among inhabitants of Seyrek to continue to live in homes like the ones they currently inhabit.

On the one hand, realizing sustainable buildings in Turkey seems not possible or unattainable. It seems too intractable a goal to be implemented under the conditions of a southern country where the economic targets often conflict with the maintenance of the social, cultural, ecologic, aesthetic and spiritual values of an area, where the local building codes and national building regulations mostly counteract the propositions of sustainability, where there is an insufficient number of NGOs supporting sustainable design, where there are few pioneering examples of sustainable architecture, where the precepts posed by the conception of sustainability have not been comprehended and thus are not properly promoted by professionals in the discipline of design. The latter, moreover, include architects, city planners, urban designers, restoration specialists, interior designers, and industrial designers.

Yet, on the other hand, the accumulated examples of Turkey indicate the unique fact of private enterprise by individuals and communities who set modest yet well-designed, experimental yet well-functioning, practical solutions for solving immediate local problems, which demonstrate the applicability of ideas of sustainability in this country. In addition, the results of studies of completed buildings in the world at large and an extensive review of the literature contained in books, articles and reports covering issues related to sustainable, environmental, ecological or green buildings point to the fact that countries that display developmental problems similar to those of Turkey were in fact capable of and successful in the realization of effective, feasible, operative, and low cost practices.

This dissertation proposes a design process and many applicable design tools specific for Seyrek in order to overcome some of the difficulties faced in the realization of sustainable projects in Turkey. These solutions openly convey that arriving at a localized definition of sustainability is the most important dynamic enabling the design and construction. Therefore, the study firstly has proposed a decisive strategy, namely to attain the correct definition of the design problem so as to enable the optimization of goals within the limitations, instead of reaching for maximum performance for sustainability. In fact, the approach advocated here also points out this author's own conception of sustainability based on understanding the strengths and potentials of the case area whereby the project continues to move beyond current practices toward finding optimum solutions.

At this point, the most potent aspect of this dissertation that needs to be underlined is this modest, objective, and humble design approach advocated for circumventing sterile projects in Turkey. While this dissertation has highlighted the conceptual challenges of the others involved in defining which buildings may be designated as sustainable, it has not abstained from conveying its own definition, conception, and interpretation regarding what it means to build in the sustainable mode. The design tools proposed for the sustainable housing development project in Seyrek are evident indicators of this design approach prioritizing locality and its sustainable design strategy promoting to be the better one among a series of bad options.

The prime question of this study has been to develop a 'design process proposal'. Here the study defines this question as rooted not only in the sustainable quality of the building at the end but also in the pre-building stages, and thus claims the need for the definition of another design process embracing sustainable issues through the design and construction processes. The author believes that the real implementation of that kind of design process is the only way to cope with the misunderstandings on sustainable building mentioned below.

Misunderstandings on what is sustainable architecture?: In the architectural practice of Turkey, where there are no broad-based conceptual discussions on sustainability, and unsurprisingly there is no consensual definition about what it means to call a building sustainable, it is not unexpected to encounter numerous misapprehensions about sustainable architecture. On an architectural platform isolated from the actual architectural agenda of the world, one of the easy ways to clarify the definition advocated by this dissertation may be to articulate certain misunderstandings.

The reader treating sustainability in terms of the morphological and technological aspects alone, or with the numerical benefits may infer misconceptions about sustainability by looking simply for the optimum, modest-scale, practical and realistic tools of the sustainable housing development project in Seyrek. He/she may fall into a real, simplistic mistake on what it means to build in a sustainable manner. In other words, he/she may be misled to think that these features are too simple to help categorize a building as sustainable. In addition, he/she may claim that 'almost all buildings may be included in the category of sustainable building. A building merely considering the solar orientation, for example, can easily be called sustainable within this approach of the dissertation. Therefore all these buildings are already sustainable'.

This study does not aim at developing a systematic life cycle assessment method scrutinizing what extent and how successfully a building in Turkey or abroad has achieved sustainability. Rather, it bases the question of sustainable building, as somewhat underlined before, on the *correct definition* of the sustainable design problem prioritizing locality in social, cultural, ecological, political, economic, technological, legalistic, and architectural terms. To take only one of these aspects into consideration is not to prevent a building from being identified as sustainable. However, this qualifies the building as a sterile sustainable building, and *that* comprises the most contradictory focus which this dissertation already rejects and criticizes. The study concludes that the real activity of making sustainable buildings consists of formulating a project which defines the design problem of sustainability by responding to all of these aspects together, and which engages with the integrated design approach by considering sustainability in design *and* construction.

While opposing to the superficial and reductionist views of those who perceive realizing the sustainable way of architecture merely as stylistic expression, who identify it with the measurable advantages, this study has aimed at exemplifying its approach through solutions devised in the Seyrek project. The secret target behind these proposed design tools is to maintain social, cultural, and economic responsibilities beyond their measurable materialistic profits of a sustainable building designed for a specific purpose. In this respect, every solar building, for instance, may not be identified as sustainable.

Yet another misconception may consist of identifying the notion of locality underscored in this study, simply with use of local material, technique, and energy. This dissertation strongly proposes the choice of locally available materials and construction techniques especially for the rural and semi-rural parts of Turkey, as seen in the design tools of sustainable housing project for Seyrek, in order to achieve sustainable architecture at the local level, i.e. locality. One may interpret this attitude as a conservative approach in the sustainable way of design and construction that only the methods of traditional construction and its materials should be used when erecting a building in a sustainable manner. However, it is a big mistake to comment the mission of locality underlined by the sustainable architecture as the rejection of modern, latest materials and construction techniques.

The author believes that the locality does not only imply to construct in traditional ways with traditional materials. Rather it advises the contextualism, in other words the strong reverence to the extent of the place where the sustainable building is realized. In this context, the urban sphere is the human's built environment where the new materials and latest technologies are tested. The resistance of this dissertation is to the policy encouraged both by the northern countries and some circles, including architects in Turkey, which have been implemented in countries like Turkey in the struggle for industrialization and especially in the rural and semi-rural areas which were already sustaining their traditional life style and building habits.

The case study undertaken in this dissertation signifies another fact that should be bravely acknowledged: the official planning activities in Turkey themselves mostly damage the extant spatial organization, landownership pattern, social relations, and living habits of Seyrek inhabitants. If it is thought that the architectural design solutions are only attainable when they fit into the planning decisions of larger scale policies, the planning practice disregarding sustainability constitutes an important barrier for the improvement in sustainable architecture in Turkey. The decentralization process and authority of planning given to small village municipalities like Seyrek inevitably advance the transformation toward urbanization. Under these struggles for illicit game, concern for popular votes and pressure from the city of Izmir, local planning authorities do not object to a great deal of reconstruction providing decent living conditions as well as maintaining the social and cultural structure to which local inhabitants are accustomed—not to mention their present economic situation and fundamental economic activity for livelihood.

Indeed, studies of rural development, urban upgrading programs, and re-housing and affordable housing projects are the most commonly treated issues of sustainable development policies in architecture. However, in the case of Turkey, the critical analysis of sustainable architectural practices identifies a vital gap bearing upon a wide range of concerns: the absence of practices, either designed or constructed, respecting the future development of an existing settlement toward sustainable development goals. The second deficiency is more crucial: the lack of interest of central governmental authorities on the developing and implementing broader development plans and programs in local, regional or national scales.

Therefore the unique attempt of this dissertation has been to pioneer the constitution of these strategies for Seyrek, Izmir, Turkey. Furthermore it has attempted to iterate the path enabling the preservation of the already sustainable living habits of inhabitants and building systems in the Seyrek settlement, while arriving at design solutions that will fulfil newly arising current needs. The path leading to this goal is regulated by the creation of culturally grounded, locally-produced, small-scale architectural projects that do not require big investment and respect current means of livelihood of citizens. To avoid making a sterile project, the two inter-connected concerns were clarified: 'what to sustain in Seyrek' and ‘how to sustain them’. Here, affordability, citizen involvement, and energy efficiency were the principally considered strategies.

Actually, the findings of the housing development project in the Seyrek settlement symbolize one evident fact: the ability to develop similar projects in other similar cases in Turkey. One further step is the presentation of projects and thereby the negotiation with the occupants in order to mark out the workable solutions, advance the project and fulfil user requirements. The final part of the process is the construction. Indeed after all these, it is believed that practicing sustainability is a more problematic subject than designing a project of sustainable issues in a southern country, as is the case in Turkey. The provision of financial sources, obtaining building permits, facilitating active involvement of all actors, and organization of a do-it-yourself system in construction seem needed to devise various approaches and further the struggle for increasing accessibility and applicability of the design. In sustainable housing projects such as experienced in Seyrek, which is an area with many landowners, one recommended solution may be to build an examplar house for occupants to become more interested in the project, to become convinced about the efficiency, affordability, functionality, and advantages of the house designs offered, and to demonstrate to them their own ability to participate in the construction process.

To simplify building material and construction techniques to offer opportunities for local employment of citizens with less talent and knowledge may seem a dangerous attempt for Turkey to those who may think that will accelerate the illegal urbanization. On the other hand, by this way, many people are able to build their own houses just for creating more sustainable living environments. The facilitation of resident built-option for the construction and maintenance of building is a vital tool and an attempt for new residential areas next to the existent ones as in the Seyrek project and the revitalization of old districts.

One further step which we may project for the future and which derives from where this dissertation leaves, is perhaps best represented by the author’s intention to involve both research and design teams so that she may test first-hand the applicability and accessibility of sustainable design in practice. The prime concerns there may be the development of appropriate and alternative ecological technologies and low cost materials based on data derived from the rural, local, natural materials and construction techniques which are slowly but certainly disappearing in the current development process of Turkey.

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APPENDIX A
SURVEY OF THESES AND DISSERTATIONS

Within the scope of this dissertation about sustainable architecture in Turkey, theses and dissertations completed at Turkish universities between January 1988 and October 2001 have been surveyed. The survey aimed at determining academic research areas in the disciplines of design at universities nation-wide, with an eye to taking stock of those post-graduate level studies that directly or indirectly deploy the point of view of sustainability. The investigation has been based on data obtained from the thesis and dissertation database of the Council of Higher Education of the Republic of Turkey—*T.C. Yükseköğretim Kurulu* (YÖK).

The complete bibliography of the theses and dissertations surveyed may be found in segment B of the Bibliography section above.

In this respect, sustainable design is treated within its broadening scope in theory and practice, and limited to the three design branches related only to the creation of a built environment, namely architecture, city and regional planning, and interior design. It should be noted that this investigation excludes the theses and dissertations belonging to the discipline of industrial design because of its focus on the design of an object, rather than built environment. 'Sustainable', 'energy-efficient', 'energy-conscious', 'green', 'ecological', 'intelligent', 'smart', 'environmentally friendly' and 'climatic', as the prefix for design, were the pre-determined keywords of this exploration. The results, grouped according to the completion years and interest areas, are itemized in Table A.1 and A.2.

The critical analysis of concluded studies indicates that there were 48 relevant theses written in the specified period; 37 of them at the master's level. The studies concentrate mostly on technical issues: priority is given to the design of the building envelope, its shape and orientation for optimizing the energy demand of building(s). In a second step, investigations focus on the passive building design and planning issues that are subject to energy efficiency and energy saving by design, especially in housing estates. Technical aspects of creating a sustainable built environment are also interrelated with climatic comfort studies mostly in the building scale. All these topics constitute exactly half of the theses realized on sustainable design.

A smaller number of theses concerning the concept of sustainability, on the other hand, are directly integrated into design fields with issues ranging from the larger scale sustainable planning projects or urban development studies, to the more specific and individual concerns such as sustainable building materials or construction industry. The studies also concentrate on the re-evaluation of the existing traditional building stock and settlement pattern in Turkey that already have sustainable features. They re-invent the sustainable values by scientific methods, and then re-value them by integrating them into new designs.

The 1980s' primary concern for green architecture in the world, furthermore, becomes popular in the theses with the rising interest in the concept of environmentalism in Turkey in the 1990s. Most green issues were interrelated with the search for nature-oriented design approaches, seeking to place the architectural creation as a part of natural ecosystems, investigating relationships between human and nature or those of dwelling-ecology-environment. Yet some of them encouraged the unilateral comprehension of the natural environment as an entity that should be protected and/or regenerated exclusively for the sake of humanity. Greening the existing living environments, e.g. by roof gardening, and creating artificial green environments, or by concern for urban ecology in cities, also number among the subjects of these.

Ecological thinking may be one of the least treated concerns in the scope of sustainable design. Ecological design studies in the theses more often highlight the relations within the systems designed (as in the case of buildings, neighborhoods, and so on), as a crucial point in ecological thinking. Hence, the investigations tend to evaluate current design practices from the ecological perspective, and then to develop design strategies for new ecologically-balanced built environments.

With the rising number of examples in the industrialized North, the use of sophisticated technology in sustainable buildings has also come to focus in recent years. In spite of its limited number, especially the intelligent buildings and smart design or as it is generally termed, technologically sophisticated sustainable architecture, similarly has become the leading subject of theses. Indeed, technological aspects of the sustainable built environment are compatible with the economic resources of the northern countries, and thus the theses, based on international architectural sources and media, indicate the popularity of sustainable design using PV panels, automation systems, intelligent façades, high technology materials, and so on. This preference in the theses is also one of the indicators of the recent understanding—albeit a partial and erroneous one—of what sustainable design means.

Table A.1 Correlation between the number of theses in Turkey deploying the concept of sustainability in disciplines of design and the completion years of theses between 1988 and 2000

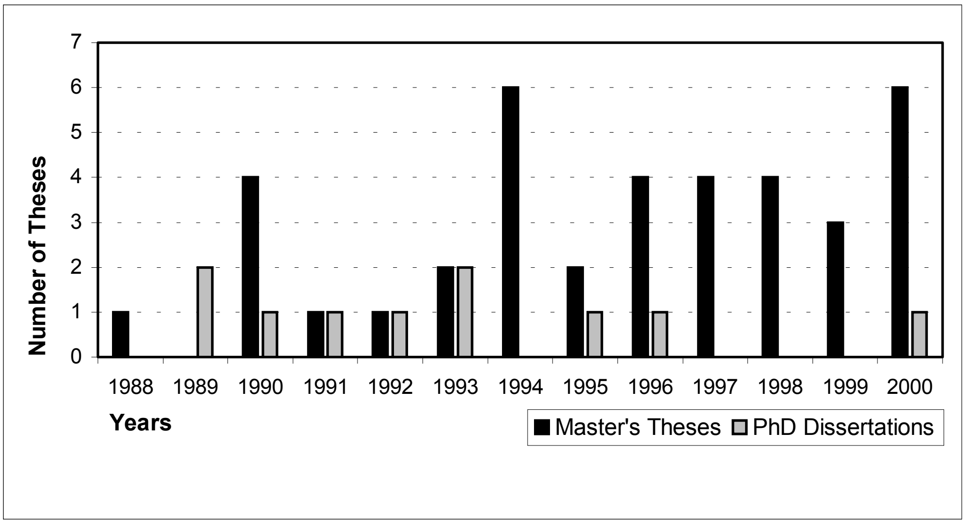

Table A.2 Number of completed theses at master's and doctoral levels concerning sustainable discourse directly or implicitly by related design discipline: architecture, city and regional planning, interior architecture

	Master's Theses in Architecture	Master's Theses in City and Regional Planning	Master's Theses in Interior Architecture	Dissertations in Architecture	Dissertations in City and Regional Planning	TOTAL
A	9	2	-	4	1	16
B	5	3	1	1	-	10
C	2	1	1	4	-	8
D	7	1	-	-	1	9
E	2	1	-	-	-	3
F	2	-	-	-	-	2
TOTAL	27	8	2	9	2	48

A. Energy Conserving Design, Energy-Conscious Design, Energy Saving Design, Energy-Efficient Design, Solar Design, Optimization of Energy Use by Design
B. Green Design, Environmental Design, Environmentally Friendly Design, Environmentally Sensitive Design, Nature and Building Relationship, Environmental Interaction by Design
C. Climatic Design, Climatic Comfort Conditions in Design
D. Sustainable Architectural Design, Sustainable Planning
E. Ecological Design
F. Intelligent Building Design, Technologically Sophisticated Ecological Design

APPENDIX B
RATIONALE OF THE SOCIAL SURVEY SHEET

The social survey sheet is composed of 46 questions. It has two types of queries, viz. closed and open-ended questions. There are 34 closed questions; 14 of them are dichotomic questions with answers yes-no or existent–nonexistent. The rest of them are multiple-choice questions. There are also 12 open-ended questions so that the users are not oriented by preferred answers.[1]

The social survey sheet has been organized to obtain three sets of information that directly or indirectly relate to the concept of sustainable development:

1. Information on user–dwelling relationship
2. Information on inhabitants' potentials and tendencies toward sustainability
3. Descriptive information about the social structure of dwellers

For the first set, the information was gathered from questions concerning inner and outer spaces in the building lot. The queries to gather data about the interiors may be itemized under the following five main subjects:

1. The sheet examined the inner spaces, their functions and functional overlaps in spaces. It investigated the relationship of source of income and inner space organization.

2. The sheet conveyed the building conditions from the viewpoint of the user. The alterations, material and usage problems, besides the repair and maintenance necessity, were checked for spaces and inhabitants.

3. The sheet investigated the sufficiency of the building and the necessity of new spaces considering the close relationship between the size and households.

4. The sheet asked questions about ownership pattern and the building construction process of the dwelling unit.

5. The sheet looked for interest in and action to obtain a new dwelling in Seyrek. It measured the house type that the inhabitants are willing to live in and the choice of construction material and technique.

The questions for exteriors were also prepared according to the following issues:

[1] The specialist on statistical issues who guided the preparation phase of the question is Professor Halis Püskülcü of the Department of Computer Engineering at the Izmir Institute of Technology. He supervised the preparation of the questions, the determination of types, the election of proper ones, and the design of the inquiry sheet.

1. The sheet surveyed the organization of exterior spaces and the functions in the building plot. It assessed the relationship between the source of income and outer space organization, and researched the items and equipment stored in the exterior spaces.

2. The sheet revealed the existence of garden or courtyard by examining the name of semi-private open space.

3. The sheet looked for the use habits of open space. Therefore, it assessed the sequence of public, semi-private / public, and private spaces.

4. The sheet determined the existence of dwelling units—the *hane* or 'house'—sharing an exterior space and/or its particular items in the same building plot.

For the second set of information,

1. The sheet measured the response and relationship to environmental problems.[2]

2. It inquired about the consumption patterns of inhabitants relative to electricity, water, lighting, heating, sewage and garbage.

3. The sheet analyzed the inhabitants' own food production and fertilizer use.

4. It asked questions concerning the complaints and suggestions about environmental concerns and lack of functions and infrastructure in land use of Seyrek.

The last set of data was related to the following concerns:

1. The sheet investigated the conditions of residents staying intermittently, the state of tenure and the ratio of private–rental type of ownership.

2. The sheet asked questions about the family type and size, the former and current migration tendency and the source of income.

[2] It is unreasonable to expect that the inhabitants of Seyrek have been informed about the concept of sustainability. However, considering the former observations in the Gediz Delta, it is possible that they could be aware. Furthermore, they may be assumed to have a potential for observing the sources of environmental pollution in Gediz Plain. The popularity of environmental concerns in daily newspapers and televised news in recent years has too encouraged awareness of environmental problems of the site. Detailed questions with respect to the assessment of environmental awareness were prepared for this reason.

APPENDIX C

SOCIAL SURVEY SHEET

GÖRÜŞMEYİ YAPAN: .... GÖRÜŞME TARİHİ: ....
GÖRÜŞÜLEN KİŞİ:...

I. KONUTTAKİ MEKÂN KULLANIMI, MEVCUT KONFOR DURUMU, İHTİYAÇ VE İSTEKLER

1.a Konut tipi: ( ) Müstakil Ev ( ) Apartman Dairesi
1.b .... Katlı, 1.c .... Daireli, 1.d Malzemesi (*sadece evin*):
1.e Yapının yapıldığı yıl: ....( ) Mübadele öncesi
1.f Yapı tipolojisi

( ) Kule tipi ev	( ) Rum evi	( ) Sakız tipi ev
( ) Dolma tipi ev	( ) Bilinmiyor	( ) Hiçbiri

2. Evinizin içinde (bahçesinde değil) hangi mekânlar vardır?

a) Salon	f) Mutfak	j) Banyo + Tuvalet
b) Oturma odası	g) Kiler	k) Hol
c) Yatak odası	h) Depo / Sandık odası	l) Diğer: ....
d) Oturma + yatak odası	ı) Banyo	
e) Çocuk odası	i) Tuvalet	

3. Gelen misafirlerin konaklaması için sadece onlara ayrılmış bir odanız var mıdır?
( ) VAR ( ) YOK ....

4. Evinizin bahçesi ya da avlusu var mıdır?
( ) a) Bahçesi var ( ) b) Avlusu var ( ) c) Hem bahçesi hem avlusu var
( ) d) Yok

5. Bahçede ya da avluda hangi mekânlar vardır?

a) Müştemilat	f) Tuvalet	j) Araç park yeri (saya)
b) Depo	g) Banyo	k) Dam
c) Mutfak	h) Tuvalet + Banyo	l) İşçi evi
d) Ocak / Fırın	ı) Ahır	
e) Odunluk	i) Kümes	

6.Evinizin bahçesinde depolama yapar mısınız?
( ) a) EVET ( ) b) HAYIR
Cevap "EVET" ise: Aşağıdakilerden hangileridir?

( ) a) Tarım aletleri	( ) f) Hayvan yemi
( ) b) Yakacak	( ) g) Zirai ilaç
( ) c) Traktör	( ) h) Gübre
( ) d) Araba	( ) h) Mazot
( ) e) Tarım ürünü	

7.a Bahçeyi ya da avluyu en çok hangi mevsimde kullanırsınız?

( ) Yaz	( ) Kış	( ) Her mevsim
( ) Sonbahar	( ) İlkbahar	( ) Kullanılmıyor

7.b ve gün içinde en çok ne zamanlar kullanırsınız?

( ) Sabah	( ) Akşam üstü	( ) Kullanılmıyor
( ) Öğle vakti	( ) Akşam	
( ) İkindi	( ) Her saat	

8. Halen oturduğunuz konutta <u>başka bir konutla</u> ortak olarak kullandığınız şeyler var mıdır?
( ) VAR ( ) YOK
Cevap "VAR" ise: Aşağıdakilerden hangileridir?

( ) a) Tuvalet	( ) d) Mutfak	( ) g) Konut dışı çeşme
( ) b) Banyo	( ) e) Elektrik sayacı	( ) h) Konut içi ya da dışı depo
( ) c) Tuvalet ve banyo	( ) f) Su sayacı	

( ) ı) Konut içi ya da dışı kömürlük ( ) i) Araba / Traktör / Tarım aleti garajı ( ) j) Diğer: ....

9. Halen oturduğunuz bu ev, hane halkına yeterli büyüklükte mi? *(ihtiyaca göre olduğunu vurgulayınız!)*
( ) a) EVET ( ) b) HAYIR ( ) c) KISMEN
Cevap "HAYIR" ve "KISMEN" ise: Nedenini belirtiniz? ....

10. Şu an yeni konut edinme girişiminiz var mıdır?
( ) a) VAR ( ) b) YOK ( ) c) Niyet var ancak imkan yok
Cevap "VAR" ise: Nerede?.............................. ....
Ne tipte bir konut?
( ) a) Apartman dairesi ( ) b) Müstakil konut ( ) C) Toplu konutta bir daire
( ) d) Diğer ....
Malzemesi: ....

11. Evinizin mevcut durumundan memnun musunuz?
( ) a) EVET ( ) b) HAYIR ( ) c) KISMEN
A. Şikâyetiniz var mıdır? ( ) a) VAR ( ) b) YOK
Rutubet sorunu var mıdır? ( ) a) VAR ( ) b) YOK
Memnun olduğunuz şeyler var mıdır? ( ) a) VAR ( ) b) YOK
....
B. Bu konutun, sizce eskimiş, bozulmuş ve onarılması gereken yerleri var mıdır?
( ) a) VAR ( ) b) YOK
....
C. Bu konutta, mevcut mekânlara ilâveten yeni mekânlara ihtiyacınız var mıdır?
( ) a) VAR ( ) b) YOK
Nasıl (*hangi malzeme ile)* yapılmasını isterdiniz?...

12. Seyrek'de yeni bir konuta taşınma durumu söz konusu olsa, nasıl bir konutta yaşamak istersiniz? (*Müstakil ev mi, apartman dairesi mi? büyük arazi içinde tek mi, yoksa komşularla yakın mı? kaç katlı?)*
( ) Müstakil, bahçeli, çok odalı, rahat ( ) Altı depo üstü ev
( ) Apartman dairesi ( ) Düşünmüyor
Evin malzemesi ne olurdu?
( ) Bilmiyor ( ) Tuğla ( ) Betonarme

II. ÇEVRE BİLİNCİ VE TÜKETİM ALIŞKANLIKLARININ TESPİTİ
13. Son yıllarda Seyrek içinde ve yakın civarında, çevrenin kirlendiğini gözlemliyor musunuz? *(hava kirliliği, su kirliliği, toprak kirliliği, yaşadığı sokakların kirliliği, vs.)*
Kirliliğin nereden geldiğini (*neden kaynaklandığını*) düşünüyorsunuz?
....

TEMEL TÜKETİM
14. Son elektrik faturasındaki tüketim miktarı (ayı belirtmek şartıyla para da yazabilirsiniz):
....
Son su faturasındaki tüketim miktarı (kaç ton/iki aylık): ....

ELEKTRİKLİ EŞYA KULLANIMI
15. Evinizde aşağıda sayılan elektrikli ev âletlerinden hangileri vardır?
( ) a) Televizyon
( ) b) Müzik seti – küçük ( ) büyük ( )
( ) c) Video
( ) d) Fırın – Ocak altı ( ) Set üstü ( )
( ) e) Buzdolabı
( ) f) Derin dondurucu – küçük ( ) büyük ( )
( ) g) Elektrikli Soba
( ) h) Küçük ev aletleri
( ) ı) Çamaşır makinesi
( ) i) Elektrik süpürgesi
( ) j) Elektrikli şofben
( ) k) Klima
( ) l) Bilgisayar
( ) m) Dikiş makinesi
( ) n) Ütü
( ) o) Vantilatör

AYDINLATMA

16. Evinizin içi size yeterince aydınlık geliyor mu? (*doğal ışıkla aydınlanma açısından)*
( ) a) EVET ( ) b) HAYIR
Gündüz de lamba yakmak zorunda kalıyor musunuz? ( ) a) EVET ( ) b) HAYIR
İhtiyaç olmadığında gereksiz yanan ışıkları söndürmeye dikkat eder misiniz?
( ) a) EVET ( ) b) HAYIR ( ) c) BAZEN

ISINMA

17. Evinizi nasıl ısıtıyorsunuz?

( ) a) Ocakla	( ) e) Elektrikli soba	( ) h) Merkezi kalorifer ile
( ) c) Odun Sobası ile	( ) f) Gaz Sobası ile	( ) ı) Kat kaloriferi ile
( ) d) Kömür Sobası ile	( ) g) Tüplü Soba ile	( ) j) Klima

18. Evinizin hangi mekânlarını ısıtırsınız?

( ) a) Yaşama	( ) e) Mutfak
( ) b) Yatma	( ) f) Ahır
( ) c) Yaşama + yatmanın beraber olduğu oda	( ) g) Evin her yerini
( ) d) Banyo	( ) h) Diğer:.................................

19. Yıkanmak için kullandığınız suyu nasıl ısıtırsınız?

( ) a) Termosifon ile	( ) e) Tüplü ocakta
( ) b) Güneş kolektörü ile	( ) f) Elektrikli ısıtıcı
( ) c) Elektrikli şofben ile	( ) g) Güneşte bırakarak
( ) d) Ateş ocağında	( ) h) Diğer: ....

20. Isınmak için en çok ne tür yakıtlar kullanıyorsunuz?

( ) a) Odun	
( ) b) Kömür	( ) g) Odun + kömür + tezek
( ) c) Talaş	( ) h) Odun ve kömür
( ) d) Sıvı yakıt	( ) ı) Elektrik
( ) e) Tezek	
( ) f) Tüp	

SU TÜKETİMİ

21. Evinizin içinde çeşme var mı? ( ) a) EVET ( ) b) HAYIR
Cevap "HAYIR" ise: İçeri almayı düşünür müsünüz? ( ) a) EVET ( ) b) HAYIR

22. Evde su tasarrufu yapar mısınız?
( ) a) EVET ( ) b) HAYIR ( ) BİLMİYORUM

23. Evinizdeki pis sular ve tuvalet atıkları genellikle nereye akıyor?

( ) a) Şehir kanalizasyonuna	( ) g) Dereye
( ) b) Sokağa	( ) h) Sokağa ve fosseptik çukuruna
( ) c) Bahçedeki fosseptik çukuruna	( ) ı) Bahçeye ve fosseptik çukuruna
( ) d) Bahçeye ya da avluya	
( ) e) Açık araziye	
( ) f) Kanala	

ÇÖP ÜRETİMİ

24. Çöpe aşağıdakilerden hangilerini atarsınız?

( ) a) Yemek artıkları	( ) e) Ambalaj kağıtları
( ) b) Soba külü	( ) f) Hepsi
( ) c) Plastik kaplar	( ) g) a ve b dışı hepsi
( ) d) Cam kaplar	( ) h) a dışında hepsi

25. Alışverişlerinizde ambalaj paketi olan yiyecekleri almamaya dikkat ediyor musunuz?
( ) a) EVET ( ) b) HAYIR ( ) c) BAZEN

26. Çöplerinizi değerlendirir misiniz?
( ) a) EVET ( ) b) HAYIR

Cevap “EVET” ise: Nasıl değerlendirirsiniz?
....

ULAŞIM
27. Sahip olduğunuz araçlar nelerdir? ( ) a) VAR ( ) b) YOK
Cevap “EVET” ise
( ) a) Otomobil
( ) b) Minibüs veya kamyonet
( ) c) Traktör
( ) d) Motosiklet
( ) e) Bisiklet
( ) f) Diğer:.............

28. Kendi ulaşımınız için tercih ettiğiniz araçlar nelerdir?
( ) a) Belediye otobüsü
( ) b) Özel Araba
( ) c) Traktör
( ) d) Motosiklet
( ) e) Bisiklet
( ) f) Binek hayvanı
( ) g) At arabası

BESİN ÜRETİMİ - TARIM
29. Evinizin arazisi içinde kendiniz için yiyecek yetiştirir misiniz? ( ) a) EVET ( ) b) HAYIR
Evinizde kendi ihtiyacınız için yazlık ya da kışlık yiyecek hazırlar mısınız?
( ) a) EVET ( ) b) HAYIR
Örnek verir misiniz? ....

30. Tarlanıza ne tür gübreler atarsınız? ....
Kendi gübrenizi kendiniz yapar mısınız? (*Tarladaki bitki ve evdeki sebze atıklarından yapıp yapmadığını öğrenelim*) ....
Tarlanızda böcek öldürücü ilaçlama yapar mısınız? ( ) a) EVET ( ) b) HAYIR

III. MÜLKİYET DURUMU
31. Bu evin mülkiyeti kime aittir?
( ) a) Kendime
( ) b) Eşime
( ) c) Anneme – Babama
( ) d) Akrabalarıma
( ) e) Bu evde kiracıyız
( ) f) Mirastan pay
( ) g) Diğer: ....

Kiracı ise Soru 35’e geçiniz...
KİRACI OLMAYANLAR İÇİN
32. Bu evde ne kadar zamandır oturuyorsunuz? ....
Bu evin bulunduğu arsada ne zamandır oturuyorsunuz? ....
Bu evin bulunduğu arsada oturma uzunluğunuz nedir?
( ) Doğduğumdan beri ( ) Evlendiğimden beri ( ) Belli değil

33. Bu eve nasıl sahip oldunuz?
( ) a) Miras kaldı
( ) b) Satın aldım
( ) c) Yaptırdım
( ) d) Kendim yaptım
( ) e) Akraba / hemşeri yardımı ile yaptım

34. Evinizin planını kim yaptı?
( ) a) Kendim tarif ettim
( ) b) Aile büyüklerim belirlemiş
( ) c) Benden önceki mal sahibi yaptırmış
( ) d) Bir kalfaya / ustaya yaptırdım
( ) e) Başka bir evin planını uyguladık
( ) f) Mühendis – mimara yaptırdım
( ) g) Bilmiyorum
( ) h) Diğer: ....

KİRACI İÇİN
35. Bu evde ne kadar süredir oturuyorsunuz? ....

36. Ev sahibiniz de Seyrek’de mi yaşıyor? ( ) a) EVET ( ) b) HAYIR

37. Bu ev için ne kadar kira ödüyorsunuz (Elektrik – su gibi genel giderler hariç)?
....

IV. ÇEVRE İLE İLİŞKİLER

38. Seyrek'de sürekli mi yaşıyorsunuz?
( ) a) EVET ( ) b) HAYIR
Cevap "HAYIR" ise: **(Seyrek'ten dışarı göç edenler için)**
Kaç yıldan beri Seyrek dışında yaşıyorsunuz?......................
Nerede ? ....
Nedeni? ....

Soru 38'nin cevabı EVET ise, 41'e geçiniz
Soru 38'nin cevabı HAYIR ise, 39 ve 40 cevaplandırılacak:

39. Seyrek dışında nasıl bir konutta yaşıyorsunuz?
( ) Müstakil Ev ( ) Apartman
Malzemesi: ....

40. Bu konutta kiracı mı, ev sahibi misiniz? ( ) Kiracı ( ) Ev sahibi

41. Seyrek'de eksikliğini gördüğünüz ve giderilmesini istediğiniz hususlardan en önemli üç tanesini belirtiniz?

( ) a) Yol	( ) f) Pazar yeri	( ) j) Eğlence merkezi
( ) b) Su	( ) g) İşyeri / Atölye / Fabrika	( ) k) Çocuklara park-oyun yeri
( ) c) Elektrik kesintisi	( ) h) Sağlık hizmetleri	( ) l) Alışveriş yeri
( ) d) Kanalizasyon	( ) ı) Çeşme	( ) m) Yok
( ) e) Okul	( ) i) Cami	( ) n) Diğer: ....

ANKETÖRÜN TAMAMLAYACAĞI SORULAR

1. Bahçeyi ya da avluyu kullanma alışkanlıkları sizce:

( ) a) Çok sık	( ) c) Arada sırada	( ) e) Bilinmiyor
( ) b) Orta	( ) d) Hiç	

2. Konutun alanı:
( ) a) 50 – 75 m2 (bir oda + bir salon)
( ) b) 75 - 90 m2 (iki oda + bir salon)
( ) c) 90 – 110 m2 (üç oda + bir salon)
( ) d) 110 m2 ve üstü

3. Arsanın alanı: ....

YAPININ KONFOR DURUMU

4. Güneşlenme miktarı ( ) ÇOK İYİ ( ) İYİ ( ) ORTA ( ) KÖTÜ ( ) ÇOK KÖTÜ

V. HANE HALKI İLE İLGİLİ BİLGİLER

42. Hanenizde kaç aile yaşıyor?......................... Hanenizde kaç kişi yaşıyor? ....

Evinizin arazisi içinde başka bir hane var mıdır? ( ) a) VAR ( ) b) YOK Cevap "VAR" ise: Sayısı: ....

43. Ailenizin birinci derece akrabalarından Seyrek dışında yaşayan var mıdır?

( ) a) EVET ( ) b) HAYIR Cevap "EVET" ise: Nerede?...............................

44. Aile reisinden başlayarak bu konutta yaşayanları bize tanıtır mısınız?

Cinsiyet: ( ) a) Erkek ( ) b) Kadın

NO	HANE HALKI REİSİNE YAKINLIĞI	DOĞUM YERİ	YAŞI	ŞU ANKİ ÇALIŞMA DURUMU													ŞU AN YAPTIĞI İŞ
				ÇALIŞMIYOR: ÇALIŞMAMA NEDENİ						ÇALIŞIYOR: İŞİNDEKİ KONUMU							
				İŞSİZ	ÇALIŞAMAZ HALDE	EMEKLİ	YAŞLI	EV HANIMI	ÖĞRENCİ	İŞVEREN	KENDİ HESABINA	ÜCRETSİZ AİLE İŞÇİSİ	YEVMİYELİ ÜCRETLİ	MEVSİMLİK ÜCRETLİ	SÜREKLİ ÜCRETLİ		

Konuşulan kişi Seyrek dışından gelmişse: Kaç yıldan beri Seyrek'de oturuyorsunuz? ....

45. Hanenizin başlıca gelir kaynakları *(maaşlı işler dışında)* nelerdir? ( ) a) VAR ( ) b) YOK

( ) a) Tarım Geliri
( ) b) Hayvancılık Geliri
( ) c) Ticaret Geliri ( )
( ) d) Hizmet Geliri ( )
( ) e) Faiz Geliri
( ) f) Kira Geliri
g) Memleketten Nakdi Gelir
h) Memleketten Ayni Gelir
( ) ı) Yurtdışından Gelir
( ) j) El Sanatları
( ) k) Diğer: ....

46. Evinizde ya da evinizin bahçesinde <u>gelir getirmek amacı</u> ile herhangi bir üretim yapılıyor mu?

( ) a) EVET ( ) b) HAYIR Cevap "EVET" ise: Ne üretiyorsunuz? .... Üretildiği Mekân? ....

47. Hanenizin ortalama aylık net geliri toplam olarak ne kadardır? ....

APPENDIX D

STATISTICAL COMPILATION OF SURVEY RESULTS

These are the results of the social survey held over 17 days in August and September 2001.

Analysis in Micro Scale

Settlement in General: Physical Character

In terms of *land use*

Existence of felt lack and dissatisfaction issues in Seyrek

	Number of persons	%
Nonexistent	15	15,2
Existent	84	84,8
Total	99	100,0

Lack whereof felt in land use

	Factory, Workshop (%)	Multipurpose Hall for Entertainment (%)	Common Market Place (%)	Park Areas for Children (%)	Shopping (%)
Nonexistent	40,0	48,2	63,5	72,3	74,1
Existent	60,0	51,8	36,5	27,7	25,9
Total	100,0	100,0	100,0	100,0	100,0
Grading	1	2	3	4	5

	Health Services (%)	Education (%)
Nonexistent	92,9	95,3
Existent	7,1	4,7
Total	100,0	100,0
Grading	6	7

In terms of *infrastructure*

Sewer system of dwellings

	Number of persons	%
Public sewerage system	70	71,4
Public sewerage system and septic pit	14	14,3
Septic pit	8	8,2
Public sewerage system and to the garden	2	2
To the garden	2	2
Septic pit and to the garden	1	1

Septic pit and to the street	1	1
Total	99	100,0

Satisfaction with the sewer system in Seyrek

	Number of persons	%
Satisfactory	55	64,7
Unsatisfactory	30	35,3
Total	85	100,0

Existence of running water inside dwelling

	Number of persons	%
Nonexistent	15	15,0
Existent	85	85,0
Total	100	100,0

Ownership of vehicle(s)

	Number of persons	%
Nonexistent	31	31,0
Existent	69	69,0
Total	100	100,0

Type of vehicle(s)

	Tractor (%)	Car (%)	Motorcycle (%)	Bicycle (%)
Nonexistent	39,1	59,4	75,4	85,5
Existent	60,9	40,6	24,6	14,5
Total	100,0	100,0	100,0	100,0
Grading	1	2	3	4

Settlement in General: Socio-Economic Character

In terms of *demographic form*

Distribution of sex in the surveyed households

	Number of persons	%
Male	32	31,7
Female	69	68,3
Total	101	100,0

Place of birth

	Number of persons	%
Seyrek	72	72,7
Izmir (districts)	14	14,1
Marmara region	5	5,1
Central Anatolia	2	2
Aegean region	2	2
Black sea region	2	2
Izmir (villages)	1	1
Eastern Anatolia	1	1
Total	99	100,0

Existence of close relatives living outside Seyrek

	Number of persons	%
Nonexistent	4	4,2
Existent	92	95,8
Total	96	100,0

Residence of close relatives living outside Seyrek

	Number of persons	%
Menemen	60	65,9
A[1]	28	30,8
Aliağa	2	2,2
B[2]	1	1,1
Total	91	100,

In terms of *number of person per unit*—hane

Household size

Person(s)	%
2	32,7
4	24,8
3	18,8
5	8,9
1	5,9
6	5,9
7	2,0
8	1,0
Total	100,0

Number of family per unit

Number of Families	Number of persons	%
1	93	92,1
2	8	7,9
Total	101	100,0

Existence of other units in the same plot

	Number of persons	%
Nonexistent	65	65,7
Existent	34	34,3
Total	99	100,0

Number of other units in the same plot

Number of Units	Number of persons	%
1	28	82,4
2	3	8,8
3	3	8,8
Total	34	100,0

[1] Hereafter designates location within the Greater Municipality of Izmir

[2] Hereafter designates location outside the boundaries of province of Izmir

In terms of *distribution of income* and *the source of income*

Current occupation

	Number of persons	%
Not occupied	55	54,5
Occupied	46	45,5
Total	100	100,0

Reason for no occupation

	Number of persons	%
Homemaker	41	74,5
Aged	5	9,1
Retired	4	7,3
Unemployed	2	3,6
Student	2	3,6
Unable to work	1	1,8
Total	46	100,0

Types of occupation

	Number of persons	%
Employer	2	4,3
Independent farmer	27	58,7
Unpaid family worker	2	4,3
Wage worker	3	6,5
Periodic pay-rolls	12	26,1
Total	46	100,0

Type of employment

	Number of persons	%
Agriculture	28	60,9
Government employee	11	23,9
Commerce	5	10,9
Transportation	1	2,2
Manufacture	1	2,2
Total	46	100,0

Existence of source of income except salaried employment

	Number of persons	%
Nonexistent	11	11
Existent	89	89
Total	100	100,0

Source of income except salaried employment

	Agricultural income (%)	Husbandry (%)	Share-farming (%)	Commercial (%)	Service (%)	Rental (%)
Nonexistent	36	76,4	83,5	89,9	92,1	95,5
Existent	64	23,6	16,5	10,1	7,9	4,5
Total	100,0	100,0	100,0	100,0	100,0	100,0
Grading	1	2	3	4	5	6

Existence of any kind of production activity in the building plot

	Number of persons	%
Nonexistent	83	83,0
Existent	17	17,0
Total	100	100,0

Type of production activity in the building lot

	Number of persons	%
Milk Production	13	76,5
Cotton Cultivation	2	11,8
Livestock (sheep)	1	5,9
Milk Production & Livestock (cattle)	1	5,9
Total	17	100,0

In terms of *ownership pattern*

Ownership of residence of local inhabitants who hold permanent household in Seyrek

	Number of persons	%
By parents	30	30,3
By household	26	26,3
By mate	21	21,2
Share from inherit	14	14,1
Tenant	4	4
By relatives	3	3
Subsidized housing	1	1
Total	99	100,0

Way of ownership

	Number of persons	%
Built by craftsmen	45	48,9
Inheritance	27	29,3
Purchasing	10	10,9
Self built	8	8,7
Built by help of relatives	1	1,1
Self-built with craftsman	1	1,1
Total	92	100,0

Person who determines the layout of dwelling

	Number of persons	%
Household	25	26,6
Parents	20	21,3
Craftsman	16	17
Previous owner	10	10,6
Architect / Engineer	6	6,4
Modelled on a known dwelling	3	3,2
Unknown	14	14,9
Total	94	100,0

In terms of *inner or outer migration*

Existence of local inhabitants who do not live in Seyrek continuously

	Number of persons	%
Existent	16	16,0
Nonexistent	84	84,0
Total	100	100,0

Accommodation place of local inhabitants who do not live in Seyrek continuously

	Number of persons	%
Menemen	8	61,5
A[3]	5	38,5
Total	13	100,0

Type of residence of local inhabitants who do not live in Seyrek continuously

	Number of persons	%
Apartment flat	10	76,9
Detached dwelling	3	23,1
Total	13	100,0

Material and construction technique of residence of local inhabitants who do not live in Seyrek continuously

	Number of persons	%
Skeleton (reinforced concrete)	9	90,0
Load bearing (brick)	1	10,0
Total	10	100,0

Ownership of residence of local inhabitants who do not live in Seyrek continuously

	Number of persons	%
Owned	12	92,3
Rental	1	7,7
Total	13	100,0

Reason move to Seyrek

	Number of persons	%
Marriage	10	55,6
Unknown	4	22,2
Job opportunity	2	11,1
Migration with family	1	5,6
Purchase of agricultural land	1	5,6
Total	18	100,0

[3] Hereafter designates location within the Greater Municipality of Izmir

In terms of *inhabitants' opinion on environmental problems*

Sensitivity to environmental problems in Seyrek and the periphery

	Number of persons	%
Nonexistent	24	27,6
Existent	63	72,4
Total	87	100,0

Types of environmental problems mentioned

	Pollution on the street (%)	Bad odor (%)	Water pollution (%)	Air pollution (%)	Soil pollution (%)
Nonexistent	33,9	57,1	82,3	90,3	93,5
Existent	66,1	42,9	17,7	9,7	6,5
Total	100,0	100,0	100,0	100,0	100,0
Grading	1	2	3	4	5

Reason for bad odor

	Number of persons	%
Menemen Leather Industry Free Region	21	80,8
Animal breeding	2	7,7
Polluted water from Gediz River	1	3,8
Harmandalı Solid-Waste Disposal Area	1	3,8
Chicken farms & Menemen Leather Industry Free Region	1	3,8
Total	26	100,0

Reason for pollution on the street

	Number of persons	%
Insufficiency of Municipal services	12	35,3
Seasonal workers	8	23,5
Animal breeding	6	17,6
Incapability of infrastructure	5	14,7
Inhabitants of Seyrek	2	5,9
Total	34	100,0

Reason for air pollution

	Number of persons	%
Aliağa Demirçelik Factory	3	75,0
Aliağa Refinery & Menemen Leather Industry Free Region	1	25,0
Total	4	100,0

Reason for soil pollution

	Number of persons	%
Irrigation by Gediz river	4	100,0
Total	4	100,0

Reason for water pollution

	Number of persons	%
Sewer pouring into potable water network of Seyrek	3	30,0
Industrial waste pouring into the Gediz River	7	70,0
Total	10	100,0

In terms of *consumption habits*

Use of electrical appliances

	Refrigerator (%)	TV set (%)	Iron (%)	Washing machine (%)	Vacuum cleaner (%)	Oven (%)
Nonexistent	3,1	6,1	12,2	25,5	28,6	30,6
Existent	96,9	93,9	87,8	74,5	71,4	69,4
Total	100,0	100,0	100,0	100,0	100,0	100,0
Grading	1	2	3	4	5	6

	Electrical stove (%)	Fan (%)	Electrical thermosyphon (%)	Hand tools (%)	Music player (%)	Dish washing machine (%)
Nonexistent	35,7	44,9	51,0	54,1	66,3	81,6
Existent	64,3	55,1	49,0	45,9	33,7	18,4
Total	100,0	100,0	100,0	100,0	100,0	100,0
Grading	7	8	9	10	11	12

	Video (%)	Freezer (%)	Computer (%)	Air conditioner (%)
Nonexistent	95,9	98,0	99,0	99,0
Existent	4,1	2,0	1,0	1,0
Total	100,0	100,0	100,0	100,0
Grading	13	14	15	16

In terms of *livelihood habits*

Existence of agricultural activities in the building plot

	Number of persons	%
Nonexistent	42	42,0
Existent	58	58,0
Total	100	100,0

In terms of *heating habits*

Heated spaces

	Number of persons	%
Living room	59	60,2
Room for both living and sleeping purposes	26	26,5
Living room and bedroom	8	8,2
All rooms	2	2,0
Living room and	2	2,0

kitchen		
Living room, bedroom, and kitchen	1	1,0
Total	98	100,0

In terms of *transportation habits*

Preference for own transportation

	Number of persons	%
Public transportation	67	67,7
Public transportation and private car	15	15,2
Private car	7	7,1
Public transportation and motorcycle	2	2,0
Others	8	8,0
Total	99	100,0

In terms of *agricultural habits and production of food*

Fulfilment of own food need by the fruit and/or vegetable garden in the plot

	Number of persons	%
Nonexistent	42	42,0
Existent	58	58,0
Total	100	100,0

Preparation for annual or seasonal food for own needs

	Number of persons	%
Nonexistent	7	8,2
Existent	78	91,8
Total	85	100,0

Type of fertilizer used

	Number of persons	%
Artificial fertilizer	39	70,9
Natural	1	1,8
Both of them	15	27,3
Total	55	100,0

Attention to use of composting system as fertilizer

	Number of persons	%
Nonexistent	37	63,8
Existent	21	36,2
Total	58	100,0

Habit of pesticide use

	Number of persons	%
Nonexistent	3	5,1
Existent	56	94,9
Total	59	100,0

Building Features: Organization on site

In terms of *general layout of dwellings in the neighborhood scale*

Existence of courtyard or garden

	Number of persons	%
Both garden and courtyard	62	61,4
Only courtyard	36	35,6
Only garden	3	3,0
Total	101	100,0

Existence of storage outside the building (within the boundaries of building plot)

	Number of persons	%
Nonexistent	18	18,0
Existent	82	82,0
Total	100	100,0

Items stored outside the building (within the boundaries of building plot)

	Agricultural equipment (%)	Fuel (%)	Tractor (%)	Car (%)	Agricultural crop (%)
Nonexistent	58,5	31,7	47,6	64,6	54,9
Existent	41,5	68,3	52,4	35,4	45,1
Total	100,0	100,0	100,0	100,0	100,0
Grading	1	2	3	4	5

	Pesticide (%)	Diesel oil (%)
Nonexistent	68,3	88,9
Existent	31,7	11,1
Total	100,0	100,0
Grading	6	7

In terms of *circulation realms*

Utilization habits of semi-private open space / Seasonal

	Number of persons	%
Summer	67	69,8
All seasons	17	17,7
Any season	8	8,3
Any season except winter	3	3,1
Spring	1	1,0
Total	96	100,0

Utilization habits of semi-private open space / Daily

	Number of persons	%
All day long	33	35,1
Toward evening	20	21,3
Morning and evening	8	8,5
No special time	8	8,5
Anytime	8	8,5
Morning	7	7,4
Evening	7	7,4
Afternoon	2	2,1
Noon	1	1,1
Total	94	100,0

Utilization habits of semi-private open space / surveyor's observations

	Number of persons	%
Most common	69	68,3
Medium	19	18,8
Never	6	5,9
Rarely	4	4,0
No data	3	3,0
Total	101	100,0

Building Features: Organization of the building

In terms of *inner layout of dwellings according to functions*

Functions inside the dwelling

	Kitchen (%)	Bedroom (%)	Family room (%)	Living room (%)	Bathroom used for bathing only (%)	Hall (%)	Guest room (%)
Nonexistent	10,0	19,0	29,0	33,0	36,0	59,0	67,0
Existent	90,0	81,0	71,0	67,0	64,0	41,0	33,0
Total	100,0	100,0	100,0	100,0	100,0	100,0	100,0
Grading	1	2	3	4	5	6	7

	Room for both living and sleeping purposes (%)	Room for children (%)	Room used as both bath and WC (%)	WC (%)	Depot (%)	Pantry (%)
Nonexistent	70,0	71,0	72,0	82,0	92,0	97,0
Existent	30,0	29,0	28,0	18,0	8,0	3,0
Total	100,0	100,0	100,0	100,0	100,0	100,0
Grading	8	9	10	11	12	13

Functions outside the dwelling

	WC (%)	Poultry (%)	*Saya* (semi-open car park) (%)	Depot (%)	Animal shed (%)	Depot for fuel (%)	Kitchen (%)
Nonexistent	19,8	58,4	58,4	64,4	74,3	74,3	84,2
Existent	80,2	41,6	41,6	35,6	25,7	25,7	15,8
Total	100,0	100,0	100,0	100,0	100,0	100,0	100,0
Grading	1	2	3	4	5	6	7

	Shed (%)	House for seasonal workers (%)	Fireplace (%)	Depot for equipment (%)	Bathroom used only for bathing (%)	Bathroom used as both bath and WC (%)
Nonexistent	84,2	87,1	89,1	95,0	97,0	97,0
Existent	15,8	12,9	10,9	5,0	3,0	3,0
Total	100,0	100,0	100,0	100,0	100,0	100,0
Grading	8	9	10	11	12	13

Multi-functional spaces

	Room for both living and sleeping purposes (%)
Nonexistent	70,0
Existent	30,0
Total	100,0

In terms of *size of the dwelling*

Building floor area

	Number of houses	%
75-90 m2	34	33,7
50-75 m2	26	25,7
90-110 m2	21	20,8
Above 110 m2	11	10,9
0-50 m2	9	8,9
Total	101	100,0

Building use area

	Number of houses	%
75-90 m2	35	35,0
90-110 m2	29	29,0
50-75 m2	19	19,0
Above 110 m2	12	12,0
0-50 m2	5	5,0
Total	100	100,0

In terms of *building materials and construction techniques*

Choice of material and construction technique for additions to the existent buildings

	Number of persons	%
Load bearing system (brick)	9	69,2
Skeleton system (reinforced concrete)	4	30,8
Total	13	100,0

Sustainable Characteristics in Site Organization and Dwellings

Energy Consumption in Dwellings: Current and Potential Possibilities for the Use of Alternative Energy Sources

In terms of *sources of energy*

Types of energy sources for space heating

	Number of Person	%
Wood & coal	59	60,8
Coal	11	11,3
Wood, coal & dried dung (*tezek)*	9	9,3
Electricity	8	8,2
Wood	2	2,1
Wood, coal & wood shaving	2	2,1
Gas	1	1,0
Wood & dried dung (*tezek)*	1	1,0
Wood, coal & gas	1	1,0
Fuel oil & electricity	1	1,0
Wood, coal & fuel oil	1	1,0
Gas & electricity	1	1,0
Total	97	100,0

Means of heating water for bathing purpose

	Number of Person	%
Thermosyphon (electricity)	43	44,3
Gas cooker	30	30,9
Thermosyphon (gas)	11	11,3
Hot water heater (solid fuel)	3	3,1
Electrical heater	3	3,1
Sun collector & Thermosyphon (electricity)	2	2,1
Sun & fireplace	2	2,1
fireplace	1	1,0
sun	1	1,0
Thermosyphon (electricity) & Gas cooker	1	1,0
Total	97	100,0

Major source of energy used for space heating

	Number of Person	%
Coal	34	66,7
No data	10	19,6
Wood	4	7,8
Electricity	2	3,9
Gas	1	2,0
Total	51	100,0

In terms of *heating and cooling systems*

Type of heating system

	Number of Person	%
Coal stove & Electrical heater	42	42,9
Coal stove	38	38,8
Electrical heater	8	8,2
Wooden stove & Electrical heater	4	4,1
Electrical heater & Gas stove	2	2,0
Wooden stove	1	1,0
Coal stove, gas stove & Electrical heater	1	1,0
Electrical heater & Gas stove	1	1,0
Coal stove, electrical heater & Gas stove	1	1,0
Total	98	100,0

Energy Consumption in Dwellings: Conservation and Minimization of Natural Sources

Attention to the consumption of electricity

	Number of Person	%
Yes	78	87,6
No	7	7,9
Sometimes	4	4,5
Total	89	100,0

Sufficiency of lighting in the dwelling

	Number of Person	%
Sufficient	87	92,6
Insufficient	7	7,4
Total	94	100,0

Need for daytime lighting in the dwelling

	Number of Person	%
Nonexistent	86	92,5
Existent	7	7,5
Total	93	100,0

Level of solar radiation of the dwelling / surveyor's observations

	Number of Person	%
Good	49	50,5
Very well	26	26,8
Medium	15	15,5
Bad	7	7,2
Total	97	100,0

Water: Conservation and Minimization of Water

Attention to the consumption of potable water

	Number of Person	%
Nonexistent	52	59,1
Existent	35	39,8
Sometimes	1	1,1
Total	88	100,0

Waste: Conservation and Minimization of Waste

Disposal of domestic waste material

	Number of Person	%
Except food	43	43,9
Everything	37	37,8
Except food and ash from the stove	13	13,3
Except the ash from stove	5	5,1
Total	98	100,0

Ways of reuse of waste material

	Number of Person	%
Food for domestic purposes	36	59,0
Food for domestic purposes & disposal of ash to the garden	12	19,7
Giving to the neighbourhood	7	11,5
Disposal of ash to the garden	5	8,2
Separation	1	1,6
Total	61	100,0

Attention to purchasing without packaging

	Number of Person	%
No	33	42,3
Sometimes	28	35,9
Yes	17	21,8
Total	78	100,0

Determination of User Needs: Evaluation of the Degree of Satisfaction with Buildings

In terms of *satisfaction with the existing building*

Sufficiency of building size

	Number of persons	%
Sufficient	73	73,0
Insufficient	20	20,0
Partly sufficient	7	7,0
Total	100	100,0

Satisfaction with the current conditions of the building lived in

	Number of persons	%
Satisfactory	57	57,6
Partially satisfactory	32	32,3
Unsatisfactory	10	10,1
Total	99	100,0

Existence of satisfaction issues for the building lived in

	Number of persons	%
Nonexistent	44	44,4
Existent	55	55,6
Total	99	100,0

Satisfaction issues for building lived in

	Spatial qualities of building (2)[4] (%)	Living in a private house (1) (%)	Living in the village and the building location (5) (%)	No humidity problem (6) (%)
Nonexistent	63,6	67,3	67,9	87,3
Existent	36,4	32,7	32,1	12,7
Total	100,0	100,0	100,0	100,0
Grading	1	2	3	4

	Satisfaction with construction material (3) (%)	Satisfaction with comfort conditions (4) (%)	Satisfaction with completion of infrastructure (7) (%)
Nonexistent	89,1	89,1	94,4
Existent	10,9	10,9	5,6
Total	100,0	100,0	100,0
Grading	5	6	7

In terms of *dissatisfaction with the existing building*

Existence of complaints about the current conditions of building lived in

	Number of persons	%
Nonexistent	55	55,6
Existent	44	44,4
Total	99	100,0

[4] The headings derive from the questionnaire and occur in original Turkish as follows: (1) evin müstakil olması; (2) evin mekansal nitelikleri; (3) evin yapı malzemesi üzerine memnuniyet; (4) evin konfor şartlarını sağlaması; (5) evin köyde yer alması ve konumu; (6) evin nem problemi taşımaması; (7) altyapının tamamlanması.

Complaints about the building lived in

	Spatial Insufficiency (2)[5] (%)	Impossibility of repairs due to economic constraints (1) (%)	Complaints about construction material (3) (%)	Drainage and humidity problems (5) (%)	Complaints about the comfort conditions (4) (%)
Nonexistent	50,0	70,5	75,0	77,3	95,5
Existent	50,0	29,5	25,0	22,7	4,5
Total	100,0	100,0	100,0	100,0	100,0
Grading	1	2	3	4	5

Existence of humidity problem in building lived in

	Number of persons	%
Nonexistent	42	42,9
Existent	56	57,1
Total	98	100,0

In terms of *new space requirement in the dwelling*

Existence of new space requirements

	Number of persons	%
Nonexistent	76	76,0
Existent	24	24,0
Total	100	100,0

Requirements for new space

	Wet space (1)[6] (%)	Bedroom or children's room (2) (%)	Living or sitting room (3) (%)
Nonexistent	41,7	54,2	54,2
Existent	58,3	45,8	45,8
Total	100,0	100,0	100,0
Grading	1	2	3

In terms of *attempt to attain a new dwelling*

Existence of an attempt to obtain a new dwelling

	Number of persons	%
Nonexistent	69	69,7
Only as an intention	21	21,2
Existent	9	9,1
Total	99	100,0

[5] The headings derive from the questionnaire and occur in original Turkish as follows: (1) ekonomik şartlar nedeniyle ihtiyacı olduğu halde inşaat yapamamak; (2) evin mekansal yetersizlikleri; (3) evin yapı malzemesi üzerine memnuniyetsizlik; (4) evin konfor şartları üzerine memnuniyetsizlik; (5) drenaj ve nem sorunu.

[6] The headings derive from the questionnaire and occur in original Turkish as follows: (1) yeni ıslak mekân; (2) çocuk veya yatak odası; (3) salon veya oturma odası

Location of new dwelling (existent)

	Number of persons	%
Seyrek	8	66,7
Menemen	3	25,0
Izmir	1	8,3
Total	12	100,0

Type of new dwelling (existent)

	Number of persons	%
Apartment flat	9	69,2
Private dwelling	4	30,8
Total	13	100,0

Construction system of new dwelling (existent)

	Number of persons	%
Reinforced concrete skeleton system	11	91,7
Load bearing system (brick)	1	8,3
Total	12	100,0

In terms of *demand for repairs in the dwelling*

Need for repairs in building components, spaces and/or elements

	Number of persons	%
Nonexistent	44	44,0
Existent	56	56,0
Total	100	100,0

Required repairs

	Wall and plaster (2) (%)[7]	Roof (3) (%)	Solid ground floor (7) (%)	Wet spaces (1) (%)	Building components (Window, door) (5) (%)
Nonexistent	27,3	72,7	80,0	90,9	94,5
Existent	72,7	27,3	20,0	9,1	5,5
Total	100,0	100,0	100,0	100,0	100,0
Grading	1	2	3	4	5

	Technical installation (6) (%)	Suspended floor (4) (%)
Nonexistent	94,5	96,4
Existent	5,5	3,6
Total	100,0	100,0
Grading	6	7

[7] The headings derive from the questionnaire and occur in original Turkish as follows: (1) ıslak mekân (mutfak, banyo, tuvalet); (2) duvar ve sıva; (3) çatı; (4) ara kat döşemesi; (5) yapı elemanları (kapı, pencere); (6) sıhhi tesisat; (7) zemin döşemesi.

Intention for transfer of fountain inside the dwelling (only for the inhabitants whose potable water system does not reach inside the dwelling)

	Number of persons	%
Nonexistent	3	30,0
Existent	7	70,0
Total	10	100,0

Period of repairs

	Number of person	%
Annual	19	86,4
Biannual	2	9,1
Semi-annual	1	4,5
Total	22	100,0

In terms of *preference for a new building and its qualities*

Type of dwelling in Seyrek

	Number of persons	%
Detached dwelling	57	60,7
Two-storeyed house with depot on the ground floor	17	18,1
Apartment flat	11	11,7
No preference	9	9,6
Total	94	100,0

Choice of construction technique for a new dwelling

Construction system	Number of houses	%
Reinforced concrete skeleton system	43	58,1
Load bearing system	28	40,5
Timber skeleton system	1	1,4
Total	74	100,0

Choice of major construction material for load bearing buildings

	Number of persons	%
Brick	21	75
Adobe brick	4	14,3
Gas concrete	2	7,1
Stone	1	3,6
Total	28	100,0

APPENDIX E
A RETROSPECTIVE VIEW OF SUSTAINABLE ARCHITECTURE

Sustainable architecture has become a widely treated concern in the architectural profession in recent years, comprising an arguable subject with all the complexities and implications of the sustainable approach to design. This favorite concept necessitates deeper analysis and recognition since it has been often given other names in headings, such as ‘environmental design’, ‘green architecture’, ‘ecological architecture’, ‘environmentally friendly architecture’, ‘energy design’, ‘energy-saving architecture’, ‘energy-efficient architecture’, ‘energy-conscious architecture’, ‘low energy building design’, ‘bio-architecture’, ‘bio-climatic architecture’, ‘climatic design’, and more recently, ‘smart design’ and ‘intelligent building design’. This Appendix presents a selective survey of the steady broadening scope in theory and practice.

The present study posits the two periods, before and after the 1990s, by which we contextualize relationships between humans and nature within particular phases, e.g. environmental movements, political distinctions, and development activities in the last three decades of the twentieth century. The importance which is given to these periods is based on their characteristics that reflect growing interest in development problems and their environmental consequences. Especially owing to the Earth Summit, held in Rio de Janeiro, Brazil, in 1992, which symbolizes the first global consensus on the blueprint for sustainable development, the early 1990s become an evident turning point for sustainable architectural practice. Indeed, these thresholds are used as key terms to explore different facets of sustainable architecture, and to evaluate the changing course of environmental design since the early 1970s.

The core of this Appendix consists of the survey of examples of sustainable architecture, ranging from high-technology, stereotypic buildings to modest, environmentally friendly, passive designs, from the medical to regional rhetoric. The samples selected below will present an inclusive spectrum of sustainable architectural approaches in the 1970s and the 1980s.

E.1. Environmental Design: The 1970s

The 1970s were the initial years when the development process of industrialized countries had reached a juncture, and a critical decision was required toward either continuity of the prevailing trend or toward a more sustainable way of development. The United Nations 1972 Stockholm Conference on Environment was a vital turning point for the evolution of sustainable development issues. It was the first sign of recognition on the international scene that environment and development were linked and must be considered together. In the wake of this event, the key concepts related to sustainability were introduced into global and national agendas not as obligatory legislation, but, at least, in the form of intentions.

By the early seventies, the environmentalism movement had come to the fore and begun to provide criticism of the validity of current development precepts. In the northern countries, where the national agendas and policies had begun to mature toward a more sustainable way of development, the environmentalism movement had a noticeable effect on the architectural profession. The popular term environmentalism was expressed in architecture in such phrases as 'environmental design', 'environmental psychology' and 'environmental control' (Gelernter 1995; Hawkes 1996). Moreover, ecological concerns became widely recognized among the architectural intelligentsia. Farmer (1996) points out that,

> through the 1970s publications such as Architectural Design in the UK tracked the environmentally aware experiments and prototypes. Other general publications such as *The Ecologist*, edited by Edward Goldsmith, and *Resurgence* spread the gospel of green to the converted. Schumacher's *Small is Beautiful* remained the seminal text for all greens (p. 173).

As a totally different discipline, ecology may have been first introduced into the architectural magazines by the ecologist Peter Hunt with his article "Ecology Primer" in *Architectural Design* (Hunt 1976). Hunt only explains the variable notions of affiliation that can be formed between the architecture and ecology. He starts with a brief account of the physical history of the world while defining ecology as the "key to landscape," the physical form of the environment, and states that, "a knowledge of the critical interactions that maintain an ecological balance is essential to understanding the forces that create landscape" (Hunt 1976, p. 526). Hunt presents, and emphasizes, the terms "ecological recycling" and "energy circle" by describing them from the perspective of the discipline of biology. He warns the reader about the interference of human beings and their technology with ecological recycling: "man's technology, initiated by whatever worthy social or political notions, upsets the recycling process by adding or subtracting excessive quantities at different stages in the recycling. This is what pollution is […] exceptional natural cataclysms aside, Humanity is at the root of all pollution" (Hunt 1976, p. 528).

Sustainability, on the other hand, was not yet a well-known and widespread word in the architectural discipline. Only in *Architectural Design Magazine,* with the sub-title of Energy, was the word encountered, to deal with possible interactions among topography, urban land use, and energy. Seed (1976) mentioned a new design approach for city planners, the sustainable urban structure, which took into account the problem of sustaining standards of living in urban scale with reduced energy supplies. Actually, the term sustainability was used in its pure meaning without implying its present scope. Nevertheless, this can be evaluated as a pioneer effort to use the sustainable view, considering that the idea emerged from research by the Rational Technology Unit at the Architectural Association School of Architecture, London, which was concerned with patterns of energy consumption in urban settlements.

In point of fact, environmental visions in architecture did not only originate in the environmental pollution problems of the decade. There was, rather, a reciprocal action between environmental design and the particular events of the 1970s: for instance, in the northern countries, the oil prices as a major issue in the energy crisis had led to an emphasis on environmental design. Accordingly, the provocative concern of 1960s' environmentalism combined with scientific methods and reliance on technical concepts toward energy-saving design. In addition, architecture was influenced by the power and popularity of scientific knowledge to develop an optimum building type and to create a high standard of built environment. The consideration of these noteworthy events is a crucial approach to understanding why building efforts in environmental design concentrated more on building typology and design methodologies or to realize why more and more scientific analysis were exploited to decrease energy consumption in buildings.

By the mid-1950s, various architectural practices located mostly in the northern countries had been dominated by the widespread use of mechanical air-conditioning, artificial lighting and cheap energy from fossil fuels, therefore sustainable building efforts were generally ignored until the energy crisis of 1973.[1] The scientifically dominated concern of the 1960s' design approach was related more to the idealization of built form or to the discovery of more elaborate order. Yet it relied on the mechanically air-conditioned building stereotype as a basis for architectural production. This attitude was pointed out by Reyner Banham (1969) in his book *The Architecture of the Well-Tempered Environment*. Banham presented a critical history of environmental design focusing on the progressive increase in energy consumption of buildings until the end of the 1960s.[2]

The clear recognition of the increase in energy demand influenced a redefinition of the nature of the modern movement. The progress in environmental control technologies, with the conventional reliance on technical concepts, and environmentalist visions of the late 1960s played an essential role in questioning the validity of the scientific mode in modern architecture. According to Hawkes (1996), apart from the structural and constructional changes, the modern movement also made explorations into the application of alternative technologies to the problem of controlling the physical environment.

In the 1960s, the pioneering buildings of solar design, for example, were conceived within the paradigm of the modern movement. The Trombe-Michel House at Odeillo in France, of 1967, for instance, exploited solar energy for inner thermal comfort in the form of a bonded glass apparatus on the wall (Figure E.1). The building using the Trombe Wall as an energy supply device was clearly

[1] Haggard et al. (2000, p. 39) represent the retrospective evolution of sustainable design in the USA in the last century. They point out that by the end of World War II, an intensive activity in environmental building design had begun, and picked up considerably between 1945 and 1955. This activity is named by the authors as the "Post-World War II Wave," characterized by the experimental studies and avant-garde research on solar applications in architecture. Yet, by the mid-1950s, energy from fossil fuels seemed cheap and inexhaustible, and urban sprawl was rapidly becoming the norm. Therefore, the applications took place at individual or institutional levels and were far from any overall policy.

[2] In fact, Banham's (1969) point made clear the predominant growth of reliance on mechanical service systems in buildings to create controlled and artificial environments rather than the use of renewable and local energy sources in creating natural environments. The central argument maintained by Banham was based on the idea that users were capable of exercising complex and effective control over the environment if they are given the opportunity. In the scope of the 1960s, this was possible with mechanical equipment. Thus it may be inferred that the quality of internal environment unavoidably necessitated the increase in energy use.

modernist with its explicit relationship between form and technical function.[3] Nevertheless, the environmental agenda of architecture in the 1960s was in general directed more toward mechanical environmental control systems, and thus the utilization of energy through passive means had only a small share in applications of the architectural profession overall.

Title of the Project:
Trombe-Michel House
Location: Odeillo, France
Completed: 1967
Architects: Felix Trombe and Jacques Michel

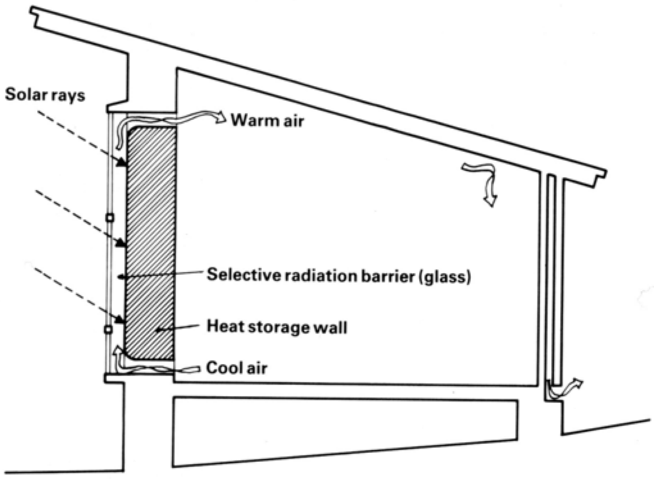

Figure E.1 Working scheme of Trombe Wall indicated in the initial experimental building, Trombe-Michel House in Odeillo, France. **Figure** unnotified.

In this phase of the 1960s, a unique analysis revising the utilization of climatic concerns in modern buildings was performed by Victor Olgyay. In his book, *Design with Climate: Bioclimatic Approach to Architectural Regionalism*, Olgyay (1963) recognized the process of transformation in the environmental scheme of modern buildings caused by technology and mechanical systems. Within the struggle for establishing a scientific synthesis between building science and architecture, he proposed a model for the environmental design process without eliminating technology. His concern for the application of technology to environmental control of buildings implied working with, rather than against, climate. Olgyay's exertion was important for those years due to his initiating the search for an appropriate design by way of new analytical systems and taxonomy of buildings types into basic forms and building shapes.

[3] Today, the Trombe Wall is a well-known system in passive building design. It is a solid masonry wall used as a thermal storage mass for passive solar heating. The Trombe-Michel House at Odeillo was an experimental building applying this system firstly as a result of research by Felix Trombe and Jacques Michel in France. See Moore (1993) for contemporary applications and design principles of Trombe Wall in solar buildings.

By the beginning of the 1970s, the rise of average life expectancy and living standards had inescapably led to a dramatic increase in energy consumption and demand of laypeople in the northern countries. At this point, "the major impact, that building design, construction and management has on national energy consumption, began to be widely recognized in the early seventies with the threat and subsequent rationing of oil supplies to the West by the OPEC countries" (Jones 1998, p. 12). First and foremost, the energy crisis of 1973 provoked a fundamental change in which all buildings were to some extent more energy-efficient mainly through improvements in the building regulations. The utilization of energy for heating, cooling and ventilation systems had become an economic concern in the building sector. As mentioned by Hawkes (1996, p. 113), the revolution was forced "by displacing the consumption of delivered energy by carefully designing the form and fabric of the building to reduce demand and to garner the benefits of ambient energy."

During the 1970s, explorations in the effective use of generated energy in buildings, the investigations for optimum building form and the best technology for environmental control of buildings, and the search for renewable forms of energy, in particular solar energy, became central themes for architects, engineers, and city planners.[4]

Even if exertion toward sustainable development world-wide has been demonstrated mostly in the last decade, some noticeable critiques date sustainable efforts back to the 1970s. It is possible to survey these critiques through the architectural magazines of those years which rapidly reflect the changing course of debates in the design field and also of critiques of the development process. Analysis of the actual architectural agendas indicates that the most evident items among the debates concerned, first, the new perception of nature in urban areas and, second, technological dependency in countries of different income levels.

During the 1970s, the urbanization of the world became a subject of popular debate in architecture, since the changing course of urbanization brought

[4] In this period, the problems about the lack of appropriate materials and an inability to quantify the use of such materials had been overcome with governmental support. New products and construction techniques were developed, publications on the subject increased, and thermal prediction models were improved. The first computer simulation model of a passively conditioned building, for instance, was created by Phil Niles in 1972, thereby achieving the original quantification of buildings (Haggard et al. 2000). However, the rising acceleration of energy concerns dropped with the cheaper oil prices, while decreasing interest in the subject on national levels.

accompanying problems varying with the conditions of the North and South. In reference to the 1970's environmental visions, these debates on the interrelations between nature and urban form, therefore, may be regarded as innovative efforts synchronizing with the critiques of the Modern Movement philosophy.

The question of urban space highlighted the critical interest in urban landscape, which was depicted in detail by the September 1976, issue of *Architectural Design* devoted to "A New View of Landscape." The context referred to here is how the environment began to be perceived. This special issue showed that the concern for the future of the environment was beginning to find a popular audience in the fields of urban design and architecture. Even the review of an exhibition, the Landscape of Industry Exhibition by Archives of Modern Architecture in Belgium, 1976, indicates the growing awareness of the importance of beauty in industry as a first step toward the popular acceptance of a new view of landscape. Actually, it is ironically stated that the hidden meaning behind this exhibition lay in rethinking many factors conditioning the options in city planning. Wieser-Benedetti (1976, p. 555) in his critique asserted that the awareness of beauty in industrial landscape means to "promote a new understanding of one of the most important expansions of our civilization." His idea expressed the tendency toward the acceptance of industrial areas, i.e. the primary source of environmental pollution, as a part of the urban landscape.

Furthermore, this Architectural Design profile of the mid-1970s specified an appreciation that the environmental crisis of the 1970s was, at the same time, the concern of architectural practice. This was, in fact, expressed as a part of criticism of the philosophy of Modernism to deal adequately with the environment. Bill Chaitkin in his article "Gardens of Delight" (1976) stressed the recent growing awareness of a new view of landscape, in other words a new idea of creating natural settings in both building and urban scale. This view was not the visual approach of an old European landscape design tradition to shape gardens to an idealized image of nature, but in favor of the total ecological approach initiated by Ian McHarg, the pioneer of the concept of urban ecology concept (McHarg 1969/1992). "In some ways, this is paralleled by the science-based determinism popular in architecture during the 60s" (Lyall 1976, p. 531). This new comprehension of the landscape may be interpreted as the preliminary sign of recognizing the changing course of urban environment toward sustainability.

In keeping with evolving perceptions of landscape, the 1970s' interest related to environmental issues in architecture can be evaluated as the initial symptom of an awareness of the need for an integrative approach in which planning and building design practices took account of the environmental impact of development. Indeed, there was a rising consciousness of the negative impacts of the development process in the 1970s, even though it was just in a regional scale.

For example, in the issue "Designing for Survival," of *Architectural Design Magazine* (1972), progress was introduced as a doubtful concept. The editor Colin Moorcroft (1972, p. 414) stated that,

> the values which sustain industrial technology (and which it in turn sustains) seems to be incompatible with the fulfillment of the promises which have always been held out to justify its continued expansion and development. Promises of food, health, work and consumer comforts for all have proved tragically false. The promise of social enlightenment and freedom due to abundance of material wealth and the growth of knowledge has proved equally elusive.

Likewise, the issue treats the polarization of poor and rich nations implying that the balance between the North and South had changed again for the worse both economically and socially. Moorcroft (1972, p. 416) explained that, "poor nations are placed at an increasing disadvantage because the rich nations control international trade and fix it to their own advantage." Moreover, he ironically criticized the development process of industrialized countries by using such expressions as "consumer consumed." He stated that, "it may come as no surprise that the poor nations have in many ways regressed as a result of technological 'progress'. It is possibly more surprising that even the industrialized countries, who derive many of the advantages of the poor's labor and resources, have started to experience some regression." The regression referred to here arose from the unpredictable social, ecological and technical failure of the technological myth. Technological advances caused overpopulation, the rise of heart disease and cancers, starvation, unemployment, social disruption and exploitation while providing the control of infectious diseases, the rise of agricultural production and a decrease in the mortality rate.

Moorcroft's critical view of technological dependency did not attract much attention in those years. The crucial importance of the subject was realized by individual or regional responses only in the architecture of the 1980s. Then, in the 1990s, making sense of environmental innovation in architecture brought about a great variety of different technologies and design approaches. On the one hand, in sharp contrast to incremental technical change, the concern for sustainability in architecture led to an environmentally friendly design approach founded on a radical configuration of values. On the other hand, the designation of sustainability in architecture was sometimes represented merely by technological supremacy to deal with energy-efficient architecture.

By the 1970s, the energy costs of mechanization and fossil fuel became a significant burden on construction and running costs of buildings. Especially the energy crisis of 1973 awakened designers and directed them toward designing buildings with low energy needs. The rising interest in how to create a high standard of environment economically led to four modes of design approach (Gelernter 1995; Hawkes 1996):

1. The design of stereotypes
2. The design of fully mechanized buildings
3. The design of passive buildings

The threefold mode in environmental design of the 1970s indicated a common tendency to seek the dream of optimum design. It was influenced by the potential of science and technology to solve all problems of occupant comfort, including those related to the built environment. New research, hence, attempted to accumulate data on two key features:

1. A body of scientific knowledge about how people use and are affected by building,
2. Methods for applying this knowledge to design problems.

After the establishment of Environmental Design Research Centre (EDRA) ("About EDRA" 2003), empirical studies were conducted to explore how people behave in certain environmental settings. At the core of these investigations, there was a belief that human and environment are separate entities acting on each other. Some studies placed individuals in controlled artificial settings; others studied people in carefully selected real spaces. The aim was to discover invariant relationships between human and environment and then utilize them to shape and construct the buildings.[5]

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[5] See Gelernter (1995) for the state of the Environmental Design Research Centre (EDRA) in studies searching for the relationship between space and human behavior.

In brief, the 1970s' research into human environmental comfort was directed by the quantitative method. The studies on design methodologies also influenced the design process of a building to employ more analytical design schemes and diagrams. Finally, building physics and science had become major concerns for the inner-environment control of a building.

E.1.1. Design of Stereotypes

The emergence of energy conservation as a major issue in the design field led to emphasis on conceptions of shape, or more accurately the optimum stereotype. This was a tendency for environmental design practice to be dominated by the influence of earlier norms which had evolved slowly by a kind of architectural natural selection. While considering the former building types, the approach developed to seek a balance with scientific analysis which attains an optimum relationship between built form and energy consumption.

The study of stereotype means to create a high standard of inner environment by finding a good solution to any recurrent design problem. According to this design approach, successful design in architecture rests on the establishment of an appropriate building shape. The critical relationships between plan forms, floor to ceiling, the size of window openings, the heating system and the other elements for environmental comfort were highly determined. The ratio between the surface area and the volume enclosed was resolved with great precision by a range of quantitative evidence. In brief, this approach particularly relied on a scientific basis.

Similar to this scientific approach, another important theoretical concept used in this mode of building design was the concept of the thermal balance point. This expressed a relationship between the form, building components and energy generated in the building. Since the careful control of these variables makes it possible to create a building with modest capital expenditure, decreasing the need for environmental control, it was argued that buildings derived from stereotypes fulfiled a precise definition of thermal comfort and measurement of satisfactoriness which would be constructed by definition of thermal comfort zones in summer and winter. Additionally, it was necessary to develop methods by which the performance of design could be checked. Thus detailed assessment methods of inner thermal environment were improved by considering the dynamic effects of the ever-changing external climate, the activities of the occupants, and the inputs of the mechanical equipment.

With the growth in quantitative expression of design objectives, the design of the stereotype attracted more attention, and then brought about an encouraging success in particular types of buildings. For instance, it has been best achieved in office building designs (Hawkes 1996). Here, the idea of type or stereotype in the initiation of the process of design was presented to designers as a starting point for creative design, and it even permitted further development and exploration in the design process.

The emphasis on the idea of stereotype in architecture has also been accompanied by debate. The point of discussion was the ready acceptance of an oversimplified model of the process of design for environmental architecture. Hawkes (1996, p. 54) claimed that the creation of norms in architecture made possible falling into the trap of oversimplification. “One possible simplification lies in the specification of design goals themselves and this is particularly the case in respect of most of the measures of environmental comfort.” Inflexibility of form, which is justified only by decided parameters, ignores the extremely complex nature of architectural design and real needs of people, or rather psychological needs as much as physiological ones, in the built environment.

Furthermore, in spite of some worthy knowledge, research on the analysis of the relationship between human and environment indicate that it is hard to state rules or to form an architectural determinism, since people do not seem to behave invariably the same in the same setting. They could adapt the same behavior to a different environment and other factors such as cultural background or personality seem to shape behavior as much as the physical factors. All these indicate to architects that, “thinking of man and nature as two objects in a system allows us to see how one might shape the other, but it does not easily allow us to see how the two sides might interactively shape each other” (Gelernter 1995, p. 262). These arguments directed the critiques about the validity of pure acceptance of the scientific basis in environmental design approaches of the 1970s.

E.1.2. Design of Fully Mechanized Buildings

Within the emphasis on the design of a stereotype, much practice in the early 1970s was built with mechanical climate control systems. Creation of a norm, in fact, was complemented by the use of mechanical plants in order to ensure the quality of internal environment and constant thermal comfort. Admiration for science and technology, realization of constant energy demand and the search for an optimum built environment together encouraged the 'technologically dependent mode of design'.

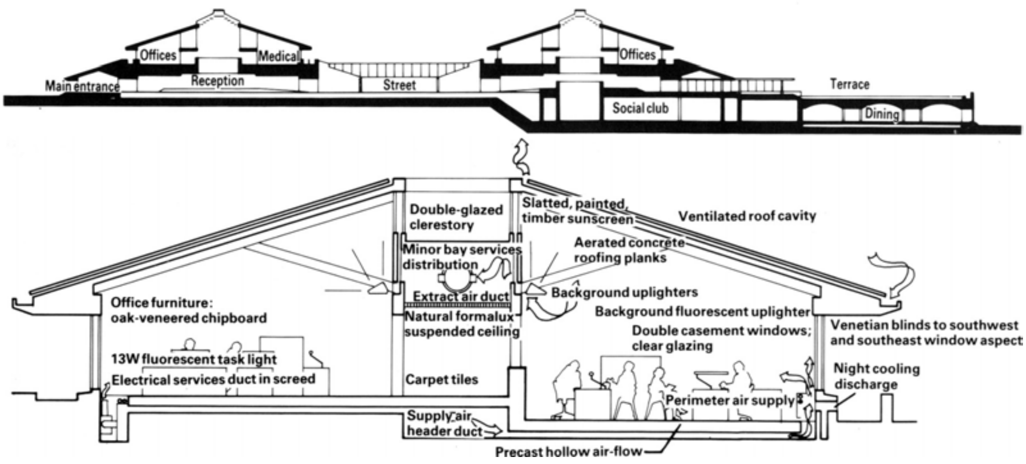
By the 1970s, there were investigations and practices concerning "ecologically safe technology" (Pike 1972, p. 441), carried out by different research groups in schools of architecture. In the United Kingdom, the Technical Research Division of the University of Cambridge, Department of Architecture, for example, instituted a research program attempting to assist architects and planners in technological innovations. The program involved technology-based studies considering ecologically safe solutions in building technology, the cost of product, utilization of labor force and particularly in the field of housing and industrialization of housing.

The utilization of technology for environmental control led to reliance on technology in buildings. Indeed, the idea was connected with seeing the building as a closed box. In that sense, the inner-environment was predominantly artificial, i.e. fully air-conditioned, artificially lit and automatically controlled, and thus the orientation of the building was relatively unimportant. Energy needs were met primarily from generated sources, therefore the building shape was predominantly compact to minimize the interaction between interior and exterior environments. For example, reduction of summer cooling loads, leading to economies in the use of air conditioning, requires the window size to be kept within strict bounds. As a result, the emphasis of plant over building fabric broke down the crucial relationship between environmental control and the form of a building.

Toward the end of the 1970s, alternative solutions to fully conditioned buildings began to be developed: the Central Electricity Generating Board Building at Bristol of ARUP Associates (Hawkes 1996), completed in 1979, was a case in point (Figure E.2). With its connection and mediation with the external environment, it challenged the standardized environment of office design types in the 1970s. This remarkable attempt demonstrated a courageous idea unique for its period that the building should be a complete system in which building envelope and mechanical systems work in harmonious relationship (Figure E.3).

Title of the Project: Central Electricity Generating Board Building
Location: Bristol, United Kingdom
Completed: 1979
Architect: ARUP Associates

Figure E.2 Central Electricity Generating Board Building, Bristol, United Kingdom. **Photography** unnotified.



Central Electricity Generating Board Building

Figure E.3 Schematic sections indicating the location of offices in Central Electricity Generating Board Building, United Kingdom, and the lighting, ventilating and electrical systems in which building envelope and mechanical systems work in harmonious relationship. **Figure** ARUP Associates.

This period were the promotion years in the United Kingdom for the extravagant use of fully mechanized systems.[6] The buildings, especially office

[6] Hawkes (1996) explains the interferences to promote the use of mechanical devices in buildings. He exemplifies that in the 1970s, the Electricity Council in Britain declared principles, namely Integrated Environmental Design (IED), to expand a new approach in environmental design. He questions a hidden agenda behind the environmental virtue of this approach claiming that, “the aim was to obtain a larger share of the office environment market and, perhaps more important, to help spread the demand for electricity more evenly over the year” (Hawkes 1996, p. 20).

buildings, were known more for such concerns as highly insulated, minimally glazed exterior walls, which made possible heating by the permanent use of artificial lighting, the heat generated by people and machines, and mechanical devices for the cooling season. The advantages of the approach were that it provided a fully air-conditioned environment for relatively low capital and running costs. This approach, nevertheless, resulted in high seasonal fluctuations in energy demands, particularly for the peak winter months. By contrast, ARUP Associates redefined the function of the building envelope through using windows to let in natural light and natural ventilation.

E.1.3. Design of Early Passive Buildings

In comparison with the previous first and second modes which led to highly uniform buildings, this design approach was more sensitive to its local environment in that its success depended on the existence and sustainability of connection between building form and building site. Reflecting the economic crisis of the 1970s', the development of passive design was contingent on the cost-effective exploitation of renewable and natural forms of energy for energy demand.

In passive buildings of the period, there was a possibility that the environment could be controlled by either fully manual or a combination of automatic and manual means; energy was from either natural form or back up systems. In spite of the fact that applications were located mostly in the North, the concern for the passive design approach was reasonable for the 'developing' countries in terms of its simply designed components, cheaper ways of energy supply, and easy application and maintenance possibilities.

The Italian architect Sergio Los's building Kindergarten at Crossara, Italy, of 1972 demonstrated the conscious utilization of passive design, in Los's terms "bioclimatic design" (Hawkes 1996, p. 23), constructed on the basis of principles by which the collection of solar energy becomes the source of the building's characteristic section. The whole building has, at the same time, a modernist language with the expressive part, the large conservatory, as the principal element of the building's energy strategy and which is clearly differentiated in form and material from the body of the building (Hagan 2001) (Figure E.4; E.5).

Title of the Project:
Kindergarten
Location: Crossara, Italy
Completed: 1972
Architect: Sergio Los

Figure E.4 Kindergarten in Crossara, Italy. **Photography** Sergio Los.

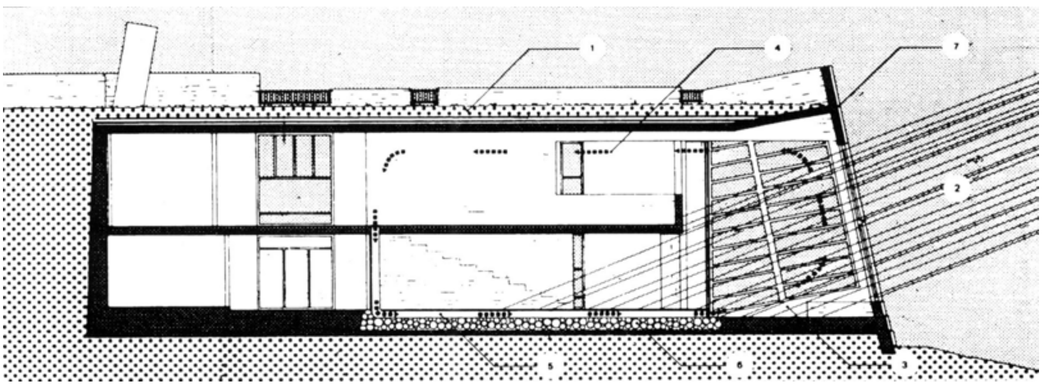
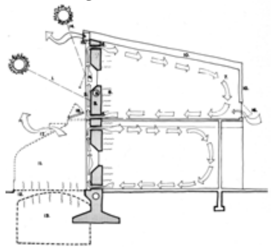


Figure E.5 Characteristic section of Kindergarten, Crossara, Italy, indicating the collection and utilization of solar energy. **Figure** Sergio Los.

The Solar House in New Jersey, USA, exploits a later innovation in passive solar energy technology in design, that is, the Trombe Wall (Figure E.6). This was one of the experimental houses constructed by the architect Doug Kelbaugh (1976) using a Trombe-type solar heated and cooled technology in the mid-1970s. Kelbaugh compares the advantages and disadvantages of this new system. The easy understandability of the Trombe system was demonstrated as one of the advantages, because simplicity was an important aspect of public acceptance of this system and all the other solar heating systems. In terms of the economic factor, the Trombe system was found to be an inexpensive system; the free energy from the sun proliferated the plus points of the passive design approach. Yet Kelbaugh (1976, p. 656) pointed out that the system had "less architectural flexibility" than the mechanized systems because of the prerequisites for building orientation and the limited views to the south.

Title of the Project:
Solar House
Location:
New Jersey, USA
Completed: Mid-1970s
Client: Doug Kelbaugh
Architect: Doug Kelbaugh



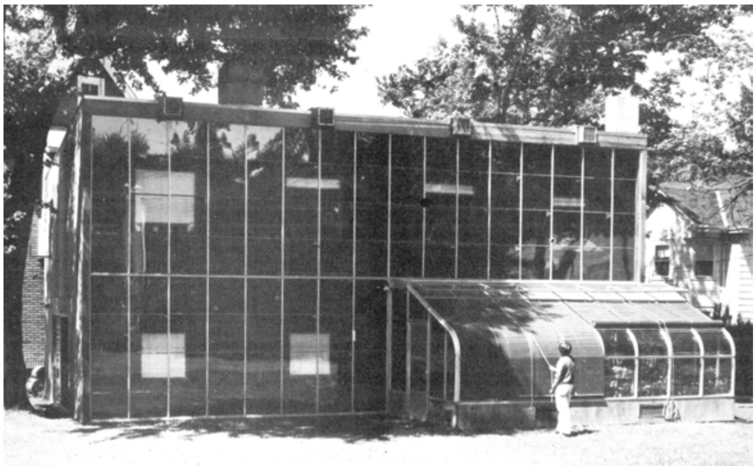


Figure E.6 Trombe-type solar heated and cooled house in New Jersey, USA. **Photography** unnotified. **Figure** Doug Kelbaugh.

The passive design approach of the 1970s indicated the possibility of allowing any shape with no need for any stereotype. The success of buildings highlighted the scientific experiments through passive building technology and materials and unsurprisingly through a new solar architecture. Conversely, as a result of inadequate interest and the shortcomings of existing technology and materials, passive design solutions could not compete with the trend toward highly mechanized environmental buildings, and thus the applications stayed on an experimental level.

On the basis of these three modes of environmental design approach, it may be concluded that there was a mechanical, systematic theoretical approach leading sustainable architectural practices until the 1980s, which understood the concept of locality as merely changing topographic and climatic conditions. This approach was assembled around a techno-centric epistemology.

E.2. Green Design: The 1980s

The changing course of the design field of the 1980s must be viewed within the framework of the broader development of ‘green’ thought. One initial feature is a change in terminology. The original term ‘environmental design’ was used rarely. Instead, ‘green’ became the most widely accepted term.

After the pluralism of the 1970s, in the 1980s, the term ‘green’ became widespread in the years when the liberal economy improved gradually within the context of global encouragement of the consumer society and the consumption of common global resources. The concept of recycling gained popularity with the rise in green consumerism; at the same time, ozone-friendly, biodegradable, recyclable or compostable products and materials brought environmental considerations into stores.[7]

The incremental progress in green consumerism was a hopeful sign for those years. Consumer pressure toward green consumerism was a potent new tactic for environmental advocates, who sent messages directly to governmental boards and private sector agents. Some major corporations such as McDonald's and Procter & Gamble, for example, decreased the use of packaging in their products in consideration of consumer demand. However, as claimed by Durning (1992), ecological concerns were taken more seriously in the marketing sector than in manufacturing. Again according to Durning, green consumerism was "a palliative for the conscience of the consumer class, allowing us to continue business as usual while feeling like we are doing our part" (1992, p. 125).

It is now nearly two decades since the first trend of green design emerged as a significant new factor in product design and architecture. The wave arose from the spreading awareness of environmental problems, the reputation of green political parties in Europe, most notably the Green Party in Germany, and the interest in media and advertising. The term even became a symbol as Madge (1997, p. 45) explains that, "because green encapsulated green politics, current environmental concerns, and identified them with a specific color […], green design arrived with a ready-made symbolism: green products, green packaging," green materials and even green food. There were even green labeling programs aiming to steer consumers to environmentally preferable products.

Green architecture, thus, borrowed ideas from ecology and the environmentalist ideas of the period. It reconsidered energy use in buildings, including concepts of durability and recyclability. This approach reflected the predominant form of green design which represented a light green, technocentric, or shallow ecological approach.

By the late 1980s, there had arisen the use of the prefix 'eco' with 'architecture'. The term *ecotecture* (Button 1988) was also common in reference

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[7] Alan Durning (1992, p. 124) explains the exertion of product companies on the greening process in the following terms: "in the United States, one fourth of all household products introduced in 1990 advertised themselves as ozone-friendly, biodegradable, recyclable or compostable."

to ecological architecture. The reason for the change in terminology was the emphasis on the ecological crisis. Especially after the declaration of the Brundtland Report in 1987, ecological ideas had become commonplace as a matter of urgent necessity, that is to say, survival. There was also a crucial perception in the architectural milieu; Charter (1993, p. 9) underlined the urgency, and attracted attention to the role of architecture in elucidating that, “something had gone wrong with the way in which mankind viewed and was exploiting nature and that unless something was done, a fearful price would have to be paid.”

Moreover, green designers began increasingly to refer to their work as ‘ecological architecture’ by the end of the 1980s. The use of the term ‘ecological’ increased from the time when the environmental movement intensified in the late 1960s and 1970s. Architects and critics chose the term ‘ecological’ rather than ‘green’, because the latter had become outdated (Madge 1997).[8]

The 1980s’ architectural practices in reference to sustainability range from organic design approaches utilizing nature as the source of inspiration for regionalist solutions emphasizing a particular place. When the postmodern in architecture came to the fore, green architecture confronted many issues concerning the deficiencies of abstract modernist space and the homogeneity of the International Style; one reaction was toward the creation of green or alternative lifestyles and, inevitably, ecological spaces (Vale and Vale 1996).

E.2.1. Healthy, Biological, and Organic Buildings

The debates over green consumerism turned their attention to identification of darker green or deeper ecological design approaches. The German *Baubiologie* (building biology) movement (Pearson 1989; Edwards 1999), for instance, bore affinities with deep ecology because of its basic concern for health and ecosystem.[9] The *Baubiologie* idea highlighted a new concern for human health and the effect of toxins inside buildings, and struggled, as it still does, against the common belief that modern buildings are healthier. Many

[8] The concept of ‘ecodesign’ came into prominence through the Ecological Design Association (EDA) first formed in 1989 (Madge 1997). The institution also preferred to use the prefix *eco*, since the *green* would be an outdated term.

[9] The German *Baubiologie* movement awakened with the birth of new disciplines in the alternative health movement, environmental medicine and clinical ecology in which people from industrialized countries turned to new self-care health methods and because of awareness of use of chemical materials in building as the source of disease and allergy.

problems are actually caused by the high technology that was designed to improve our lives. One essential problem is the ‘Sick Building Syndrome’ (Edwards 1999; Schmitz-Günther 1998; Pearson 1989) caused by the qualities of built environment such as polluted air and drinking water, chemical vapors, synthetic building materials and electromagnetic fields.[10]

The concept of *Baubiologie*, therefore, utilized again a scientific approach but without unadulterated admiration for technology. It advocated the idea that, “living with less is better than saving energy” (Madge 1997, p. 46) and proposed the building as our third skin, while our actual skin is the first, and our clothes the second (Edwards 1999). Pearson (1995, p. 26) put forth the idea that a building should satisfy the essential living utilities such as “protecting, insulating, breathing, absorbing, evaporating, regulating and communicating.” Thus a critical approach to current science and technology has lead to designing buildings that meet the physical and spiritual needs of their residents (Edwards 1999).

The resulting buildings, or “biological houses,” as they were called by the *Baubiologie* movement, and other toxin-free housing made use once again of natural materials and traditional building methods. The very idea was the reinterpretation of vernacular architecture, therefore the use of earth, brick and timber with grass roofs, and passive heating and ventilation systems were promoted, while color and light—its admission, exclusion and transmission through filters and blinds—were utilized for human health. Additionally, all paints, treatments and finishes had to be organic.

In spite of its limited acceptance within the geographical boundaries of Germany, the *Baubiologie* movement spread across the United States and the United Kingdom from the Institute for Building Biology and Ecology, first established in 1976 in West Germany. Peter Schmid, Floyd Stein, the Gaia group in Norway, Francis Séguinel and Horst Schmitges (Pearson 1989) started to build and spread the word about the biological houses in the 1980s (Figure E.7; E.8). Their legible architectural representation appeared in the minimalist design approaches, posing the pure expression of the essence of materials such as

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[10] The ‘sick building syndrome’ is the general name of a group of health problems. Symptoms can be headaches, fatigue, sleepiness, irritation to eyes and nose, dry throat, general loss of concentration and nausea. Here the illness is related to not only the viruses and bacteria but also the chemical substances, e.g. organic and inorganic, the biological entities, e.g. bacteria, moulds, dust, pollen, and physical factors, e.g. electromagnetic fields, light, temperature, humidity, noise (Edwards 1999).

concrete, glass, wood, and steel. Their ideas advanced environmental awareness and the idea that living with less is a higher way of life (Pearson 1989).

Title of the Project:
Dome à Barreau
Location: Agen, France
Architects: Francis Séguinel

Figure E.7 Dome à Barreau in Agen, France, by Francis Séguinel. **Photography** Francis Séguinel.

Title of the Project:
Private House
Location: Linzenbach, Germany
Architects: Horst Schmitges

Figure E.8 Private House in Linzenbach, Germany, by Horst Schmitges. **Photography** Camera Press.

The other shade of green ideas in the practices of the 1980s were the innovative, organic creatures, metaphors of birds or animals, to generate the extraordinary forms of building. These examples, such as Imre Makovecz's buildings (Cook 1993; Cousins 1992; Farmer 1997; MacInnes 1995; Pisani 1999) in Hungary, did not simply imitate or directly quote as in the postmodernist, clichéd respect for nature, because there was a concern with local craftsmanship, materials, tectonic and tactile characteristics (Figure E.9). His design was "able to

Title of the Project:
Siófok Lutheran Church
Location: Siófok, Hungary
Completed: 1990
Architect: Imre Makovecz

Figure E.9 Siófok Lutheran Church in Siófok, Hungary, by Imre Makovecz. **Photography** unnotified.

maintain the true organic craft traditions lost to western Europe with industrialization" (Farmer 1996, p. 183).

There were also opposing views in architecture that wished to apprehend and handle nature in a formalist, utilitarian, pragmatic, consumerist way. Buchanan (1989) asserts that there was a general desire for a new culture organized by arbitrary artifice, which would be at the same time both healthy and artificial. Indeed, his underlying vision appealed to the critics of organic architecture as an unselfconscious and anti-formalist architecture reacting to nineteenth-century industrial development and opposed to orthogonal forms. Yet, in the 1980s with the rise of green architecture, his assertion came to incorporate the desire to be green in architecture with simple abstractions of ships or geological formations, or by easily conjoining a form with the flowing landscape. His wish was to clarify the problem between current culture and its understanding of nature by defining "culturally adequate architecture." Buchanan (1989, p. 80) asserted that any architecture that was culturally adequate must deal with three quite different uses of the word 'nature'. Besides the meaning of 'biosphere', there should be the notion of the 'nature' of things, i.e. the nature of the chair or a city, and there was also 'human nature'.

E.2.2. Passive Energy Systems in Public Buildings

At the other side of the green consumerist spectrum, there was an interest in the utilization of passive systems which followed from the energy crisis of the

1970s. The possibility of reducing energy costs by the switch from artificial to natural received the attention of many researchers and designers. Investigations by mechanical engineers into the predictability and controllability of natural ventilation also developed rapidly. Since the early 1980s, passive approaches to meeting the heating, cooling, lighting and ventilation loads of a building have finally been broadened from domestic-scale applications to include public buildings.

In Gateway Two at Basingstoke, United Kingdom, of 1983 (Hawkes 1996; Jones 1998), Arup Associates made an important contribution to the evolution of the passive way of design in large scale office buildings (Figure E.10). The firm explored the environmental potential of a glazed courtyard, i.e. an atrium, around which the building was organized. The Arup building benefits from the technical performance of atria without disregarding the inevitable problems caused by acoustics and summer temperatures.[11] In spite of the fact that it has no artificial air-conditioning system, the building achieves year-round comfort by means of natural ventilation in which the stack effect of warm air, rising up to the atrium, is

Title of the Project:
Gateway Two Building
Location: Basingstoke, United Kingdom
Completed: 1983
Architects: Arup Associates

Figure E.10 Gateway Two for the Wiggins Teape Building in Basingstoke, United Kingdom. **Photography** unnotified .

[11] Hawkes (1996) signifies that many strategies about the concept of passive design tend to be formed and framed by comprehensive research and subsequent applications in those years. For example, same as today, “architects set out to avoid the need for summer cooling by careful design of external façades, incorporating fixed sunshades and by providing thermal mass in the exposed concrete of the office ceilings” (Hawkes 1996, p. 155).

exploited to draw fresh air from the surrounding offices.[12] In summary, Arup Associates produced a typical example for the effective design of an atrium. As a central feature of a building, the atrium will later become one of the most treated themes in the sustainable office building design of the 1990s within the divergent solutions proper to different climatic conditions.

E.2.3. Mediation of Green Ideas Through Regionalism

Apart form the adoption of green consumerist ideas, the 1980s were the years of the revitalization of the regionalist attitude. The focus on regionalism in the early 1980s brought forth local values in design in opposition to the strong impact of the International Style. The remembrance of locality in the postmodernist age of the 1980s evolved not only out of the criticism and reinterpretation of modernity, but also from the conception of the vernacular building harmonizing with nature. Therefore, the design approaches adjusted modernism to their own climate, geography and culture as an unconscious attempt toward the idea of sustainable development.

In the 1980s, several buildings were created which respond intelligently to a particular climate, place, memory and landscape, without ignoring continual social and technological change. Some of these emerged from the dramatic contrast between urban and rural worlds in the South where the matters of cultural identity are reasonably a conscious part of the intention. Others emerged in remote corners of the 'developed' world where native, traditional architecture was still visible, even if native cultures had been seriously undermined. The best of these buildings seem able to draw upon indigenous wisdom, but without simply imitating vernacular forms. They penetrate beyond the obvious features of regional style to some deeper mythical structures rooted in the past adjustments to landscape and climate. This critical regionalist attitude, identified later on by Frampton (1983; 1992), can be evaluated as an unconscious attempt toward the idea of sustainable development. Here, 'culture' and 'place' were the key concepts; the related features of those buildings in common with the green design approach can be itemized as follows: they provide emotional power of place,

[12] In the British climate, the elegant central atrium of the Gateway Two Building provided great economy of energy use in terms of the minimization of heating, cooling, lighting and ventilation loads. Moreover, the building served the possibility for occupants to be able to control the artificial lighting and natural ventilation while, at the same time, providing a lively semi-public space in the highly formal body.

capture the spirit of place, interpret natural conditions through the inheritance of myth, engage with the very idea of architectural origins, re-examine local traditions, and respect regional innuendoes.

At the same time, entities such as the Aga Khan Awards for Architecture ("The Aga Khan Award" 2003) of the Aga Khan Trust extended the central focus on regional architecture to the sphere of Islam. Since 1978, the awards have indicated a strong concern for contextual architecture, and have presented a wide range but less known accumulation of practices to the architectural intelligentsia. Indeed, this attempt in the 1980s may be evaluated as an undefined effort that evoked new expressions and new contexts for the comprehension of the sustainable architecture of the 1990s (Özkan 1995).

In brief, the two different attitudes of the 1980s, i.e. green consumerism and regionalism, and many shades between, determined the green architectural discourse of those years. Although there was a noticeable intensification of overall ecological problems, environmentalist viewpoints and debates, the green concerns were not converted to a transboundary policy applied in a regional or global scale, contrary to the 1990s, by the concept of sustainable development. Hence, the practices called green or ecological in the 1980s were independent, singular and experimental solutions far from any global interest. Yet, the projects and critical ideas mentioned here still take place on the cutting edge of contemporary debate on sustainable architecture.

APPENDIX F

SHEET OF SITE INVESTIGATION

1. Analysis in Macro Scale

1.1. Physical Structure

Topography

Geological Input: Soil structure, seismic structure, earthquake zones

Hydrology: Underwater and surface water

Macro and microclimate of site: Wind directions and loads, precipitation, temperature, number of sunny days, relative humidity

Flora and Fauna: Determination of species in endangered or in going to extinction

Ecological cycle: Determination of ecosystems closer to the settlement in macro scale

1.2 Infrastructure

Transportation: Transportation axes, types, capacity and development plans for near future

Sewer system: Sewage networks, purification centers

Waste storage and elimination system

Potable / Irrigation water system

Data transfer

Electrical energy transfer lines

1.3 Land Use and Evolution of Planning Process

1.4 Pollution

Types of pollution

Polluters

2. Analysis in Micro scale

2.1. Settlement in General

Physical Character

Land use

Legislative aspects: Local building regulations

Infrastructure: Sewer system, waste storage and elimination system, potable / irrigation water system, transportation

Socio-economic Character

Demographic form

Number of person per unit and population density

Distribution of income, sources of income

Migration (inner / outer)

Neighborhood relations

Inhabitants' point of view for environmental problems

Consumption habits

Livelihood habits

2.2. Building Features

Settlement Form

Definition of settlement pattern

Definition of street pattern

Districts & Building density

Organization on Site

The general layout of dwellings in neighborhood scale

House clusters

Dwelling – Building plot relations: Organization of building in the plot

Dwelling as boundary to street

Dwelling off street

Degrees of publicness

Circulation realms

Entrance to one's domain

Sun - wind directions and orientation of building

Building Layout: Space Needs

Types of buildings

Archetypal units

Layout of buildings according to functions

Size

Number of storey

Façade arrangements

Roof

Lateral and vertical connection of the building

Transitions, stairs

Architectural elements of building

Doors, windows, chimneys

Building Materials and Construction Technology

3. Peculiarities of the Case Area in Viewpoint of Sustainable Development

3.1 Energy

Energy Consumption in Buildings: Current and Potential Possibilities for the Use of Alternative Energy Sources

Types of ambient energy sources

Extant heating and cooling systems

Conservation and Minimization of Natural Sources

Use of Passive Design Principles: Energy Efficiency

Characteristics of building envelope

Building form

Thermal mass effect

Climate-based Design

Orientation of façades

Natural ventilation

Sun control elements

Building Material and Energy

3.2 Water

Search for Cycle: Circulation of Water

Use of local water resources

Conservation and Minimization of Water

3.3 Waste

Search for Cycle: Utilization of Waste Material

Recycling system of disposable material in building or building lot without transferring directly to sewer system

Nutrition cycle

Conservation and Minimization of Waste

3.4 Healthy Building Features

Lighting

Humidity

Ventilation

Building Material

3.5. Local Architectural Characters: Tectonic and Tactile Language of Built Environment

Cultural Requirements

APPENDIX G
MEASUREMENT OF HEAT LOSS AND GAIN

The following introduces the values of heat loss and heat gain specific to the sample dwelling (D_1') which is a load bearing dwelling made of load bearing brick, gas concrete, and rammed earth, and has a cavity wall (Yavuz and Durmuş Arsan 2003a; 2003 b; 2003c; 2003d). The measurements were conducted with the assistance of Mechanical Engineer Nevzat Yavuz of Ceren Engineering and Consultation, Inc. A private computer program in Turkish—*Klima Programı (Isı Kayıp ve Kazanç Hesapları Programı)*—designed by Mr Yavuz and in popular use in Izmir, was utilized in analyzing each space and component. In the initial part of the study, the following coefficients of thermal conductivity of each building component, including inner and outer walls, Trombe Wall, sunspace, floor, and ceiling, were measured as the basis for analysis.

In the following pages, the detailed compilation of measurements for the sample dwelling (D_1') made of load bearing brick is presented in original print-outs from the software. It is composed of two parts namely the heat loses and gains. The measurements for the dwelling with cavity wall, and made of gas concrete and earth are not included into this part, yet the related results were declared in Chapter 8.

1. Outer Wall: Load Bearing Brick

Type of material	Thickness (cm)	Thermal Conductivity (I) (kcal/mh°C)
Outer plaster	3	1,2
Load bearing brick	19	0,5
Inner plaster	2	0,75

$$K: \frac{1}{\frac{1}{7} + \frac{1}{20} + \frac{0,02}{0,75} + \frac{0,19}{0,5} + \frac{0,03}{1,2}} = 1,60$$

Thermal conductivity coefficient of outer wall with load bearing brick (K): 1,60 kcal/mh°C

2. Outer Wall: Cavity Wall

Type of material	Thickness (cm)	Thermal Conductivity (I) (kcal/mh°C)
Outer plaster	3	1,2
Brick (HPL)*	19	0,4
Brick (solid)	8,5	0,43
Inner plaster	2	0,75

* HPL: Horizontally perforated lightweight brick

$$K: \frac{1}{\frac{1}{7} + \frac{1}{20} + \frac{0,02}{0,75} + \frac{0,085}{0,43} + 0,2 + \frac{0,19}{0,4} + \frac{0,03}{1,2}} = 0,90$$

Thermal conductivity coefficient of cavity wall (K): 0,9 kcal/mh°C

3. Outer Wall: Gas Concrete

Type of material	Thickness (cm)	Thermal Conductivity (I) (kcal/mh°C)
Outer plaster	3	1,2
Gas concrete	25	0,19
Inner plaster	2	0,75

$$K: \frac{1}{\frac{1}{7} + \frac{1}{20} + \frac{0,02}{0,75} + \frac{0,25}{0,19} + \frac{0,03}{1,2}} = 0,64$$

Thermal conductivity coefficient of outer wall with gas concrete (K): 0,64 kcal/mh°C

4. Outer Wall: Rammed Earth

Type of material	Thickness (cm)	Thermal Conductivity (I) (kcal/mh°C)
Rammed earth	30	0,33

$$K: \frac{1}{\frac{1}{7} + \frac{1}{20} + \frac{0,3}{0,33}} = 0,907$$

Thermal conductivity coefficient of outer wall with rammed earth (K): 0,907 kcal/mh°C

5. Inner Wall: Load Bearing Brick

Type of material	Thickness (cm)	Thermal Conductivity (I) (kcal/mh°C)
Inner plaster	2	0,75
Load bearing brick	19	0,5
Inner plaster	2	0,75

$$K: \frac{1}{\frac{2}{7} + \frac{0,04}{0,75} + \frac{0,19}{0,5}} = 1,4$$

Thermal conductivity coefficient of inner wall with load bearing brick (K): 1,4 kcal/mh°C

6. Inner Wall: Horizontally Perforated Lightweight (HPL) Brick (non load bearing)

Type of material	Thickness (cm)	Thermal Conductivity (I) (kcal/mh°C)
Inner plaster	2	0,75
Brick (HPL)	8,5	0,4
Inner plaster	2	0,75

$$K: \frac{1}{\frac{2}{7} + \frac{0,04}{0,75} + \frac{0,085}{0,4}} = 1,8$$

Thermal conductivity coefficient of inner wall with HPL (K): 1,8 kcal/mh°C

7. Inner Wall: Gas Concrete

Type of material	Thickness (cm)	Thermal Conductivity (I) (kcal/mh°C)
Inner plaster	2	0,75
Gas concrete	25	0,19
Inner plaster	2	0,75

$$K: \frac{1}{\frac{2}{7} + \frac{0,04}{0,75} + \frac{0,25}{0,19}} = 0,6$$

Thermal conductivity coefficient of inner wall with gas concrete (K): 0,6 kcal/mh°C

8. Inner Wall: Rammed Earth

Type of material	Thickness (cm)	Thermal Conductivity (I) (kcal/mh°C)
Rammed earth	30	0,33

$$K: \frac{1}{\frac{2}{7} + \frac{0,3}{0,33} + \frac{0,25}{0,19}} = 0,84$$

Thermal conductivity coefficient of inner wall with rammed earth (K): 0,84 kcal/mh°C

6. Ceiling:

Type of material	Thickness (cm)	Thermal Conductivity (I) (kcal/mh°C)
Glass wool	5	0,034
Reinforced concrete slab	10	1,8
Inner plaster	2	0,75

$$K: \frac{1}{\frac{1}{7} + \frac{1}{20} + \frac{0,02}{0,75} + \frac{0,1}{1,8} + \frac{0,05}{0,034}} = 0,56$$

Thermal conductivity coefficient of ceiling (K): 0,56 kcal/mh°C

7. Solid Ground Floor:

Type of material	Thickness (cm)	Thermal Conductivity (I) (kcal/mh°C)
Terracotta tile	2,5	0,4
Mortar	3	1,2
Water insulation	0,4	0,17
Concrete bed	10	1,2
Ash blinding	5	1,8
Hardcore	15	1,2

$$K: \frac{1}{\frac{1}{5} + \frac{0,025}{0,4} + \frac{0,03}{1,2} + \frac{0,1}{1,2} + \frac{0,004}{0,17} + \frac{0,05}{1,8} + \frac{0,15}{1,2}} = 1,8$$

Thermal conductivity coefficient of solid ground floor (K): 1,8 kcal/mh°C

8. Suspended Ground Floor

Type of material	Thickness (cm)	Thermal Conductivity (I) (kcal/mh°C)
Timber plank	2	0,17
Concrete bed	10	1,2
Ash blinding	8	1,8
Hardcore	15	1,2

$$K: \frac{1}{\frac{1}{5} + \frac{0{,}02}{0{,}17} + 0{,}2 + \frac{0{,}1}{1{,}2} + \frac{0{,}08}{1{,}8} + \frac{0{,}15}{1{,}2}} = 1{,}29$$

Thermal conductivity coefficient of suspended ground floor (K): 1,29 kcal/mh°C

9. Trombe Wall: Brick (solid)

Type of material	Thickness (cm)	Thermal Conductivity (I) (kcal/mh°C)
Glass	0,4	0,7
Brick (solid)	19	0,43

$$K: \frac{1}{\frac{1}{7} + \frac{1}{20} + \frac{0{,}004}{0{,}7} + 0{,}2 + \frac{0{,}19}{0{,}43}} = 1{,}19$$

Thermal conductivity coefficient of this type of Trombe Wall (K): 1,19 kcal/mh°C

9. Trombe Wall: Rammed Earth

Type of material	Thickness (cm)	Thermal Conductivity (I) (kcal/mh°C)
Glass	0,4	0,7
Rammed earth	30	0,33

$$K: \frac{1}{\frac{1}{7} + \frac{1}{20} + \frac{0{,}3}{0{,}33} + 0{,}2 + \frac{0{,}004}{0{,}7}} = 0{,}77$$

Thermal conductivity coefficient of Trombe Wall with rammed earth (K): 0,77 kcal/mh°C

10. Sunspace:

Type of material	Thickness (cm)	Thermal Conductivity (I) (kcal/mh°C)
Glass	0,4	0,7

$$K: \frac{1}{\frac{1}{7} + \frac{1}{20} + \frac{0{,}008}{0{,}7} + 0{,}2} = 2{,}5$$

Thermal conductivity coefficient of sunspace (K): 2,5 kcal/mh°C

C E R E N
MUHENDiSLiK MUSAViRLiK TiC.LTD.STi

PROJE GENEL VERI TABLOSU

SURDURULEBILIR KONUT PROJESI, SEYREK

BINANIN YERI ....:	SEYREK/IZMIR
BINANIN KULLANIM AMACI ....:	KONUT
BINANIN ENLEMI ....:	38
BINANIN BOYLAMI ....:	27
BINA DURUMU ....:	RUZ.BOL./SERBEST/AYRIK NiZAM
ISLETME DURUMU ....:	II
IKLIM BOLGESI ....:	1
SECILEN SARTLANDIRMA SISTEMI ....:	
DIS KURU TERMOMETRE SICAKLIGI [YAZ] :	37
DIS KURU TERMOMETRE SICAKLIGI [KIS] :	0
DIS YAS TERMOMETRE SICAKLIGI [YAZ] :	24
DIS YAS TERMOMETRE SICAKLIGI [KIS] :	0
GUNDUZ-GECE SICAKLIK FARKI ....:	13
DIS DUVAR RENGI ....:	ACIK
EMNIYET FAKTORU ....:	1.1
ASIRI SOGUTMA FAKTORU ....:	1
ISIK KULLANMA FAKTORU ....:	1.2
MAKINA KULLANMA FAKTORU ....:	1
GOLGELEME FAKTORU ....:	

ISI KAYIP HESAPLARI

CEREN Muhendislik Musavirlik TIC.LTD.STI.	ISI KAYIP FOYU		SAYFA 1

YON	TIP	TOPLAM ALAN	ISI TRANS. KATSAYISI	SICAKLIK FARKI	ZAMSIZ ISI KAYBI	ISLT. ZAMMI	YON ZAMMI	KAT ZAMMI	TOP. ZAM	ISI IHTIYACI
KAT NO:[Z]		MAHAL NO:[1]		BANYO		DIZAYN SICAKLIGI: 26				
K	DD	5.72	1.60	25.00	237.74					
K	DP	0.36	4.50	26.00	42.12					
D	DD	6.48	1.60	26.00	269.57					
2	ID	3.21	1.40	8.00	35.95					
2	IK	1.78	3.50	8.00	49.98					
7	ID	5.67	1.40	11.00	87.32					
	DOS	4.40	1.80	17.00	134.64					
	TAV	4.40	0.56	20.00	49.28					
					906.60	15%	5%	0%	20%	1087.92

INFILTRASYON ISI KAYIP HESABI:

TOPLAM SIZINTI MIKTARI(Σa*l) : 3.89 m3/h
ODA DURUMU KATSAYISI (R) : 0.90
BINA DURUMU KATSAYISI (H) : 0.64
(Ze) : 1.00

INFILTRASYON ISI KAYBI : [Σa*l*R*H*Ze*(Tm-Td)] 76.42
TOPLAM ISI KAYBI : 1164.34

YON	TIP	TOPLAM ALAN	ISI TRANS. KATSAYISI	SICAKLIK FARKI	ZAMSIZ ISI KAYBI	ISLT. ZAMMI	YON ZAMMI	KAT ZAMMI	TOP. ZAM	ISI IHTIYACI
KAT NO:[Z]		MAHAL NO:[2]		MUTFAK		DIZAYN SICAKLIGI: 18				
D	DD	10.40	1.60	18.00	299.38					
G	DD	9.18	2.50	18.00	413.10					
	DOS	9.30	1.80	9.00	150.66					
	TAV	9.30	0.56	12.00	62.50					
					925.63	15%	0%	0%	15%	1064.48

TOPLAM ISI KAYBI : 1064.48

CEREN Muhendislik Musavirlik TIC.LTD.STI.	ISI KAYIP FOYU		SAYFA 2

YON	TIP	TOPLAM ALAN	ISI TRANS. KATSAYISI	SICAKLIK FARKI	ZAMSIZ ISI KAYBI	ISLT. ZAMMI	YON ZAMMI	KAT ZAMMI	TOP. ZAM	ISI IHTIYACI
KAT NO:[Z]		MAHAL NO:[3]		SALON		DIZAYN SICAKLIGI: 22				
7	ID	0.65	1.40	7.00	6.32					
7	IK	1.78	3.50	7.00	43.73					
2	ID	12.96	1.40	4.00	72.58					
G	DD	3.24	1.60	22.00	114.05					
G	DP	7.83	3.20	22.00	551.23					
K	DD	6.45	1.60	22.00	227.04					
K	DP	5.16	2.50	22.00	283.80					
	DOS	22.60	1.30	13.00	381.94					
	TAV	22.60	0.55	16.00	202.50					
					1883.19	15%	5%	0%	20%	2259.82

INFILTRASYON ISI KAYIP HESABI:

TOPLAM SIZINTI MIKTARI(Σa*l) : 115.32 m3/h
ODA DURUMU KATSAYISI (R) : 0.90
BINA DURUMU KATSAYISI (H) : 0.94
(Ze) : 1.20

INFILTRASYON ISI KAYBI : [Σa*l*R*H*Ze*(Tm-Td)] 2321.57
TOPLAM ISI KAYBI : 4581.39

YON	TIP	TOPLAM ALAN	ISI TRANS. KATSAYISI	SICAKLIK FARKI	ZAMSIZ ISI KAYBI	ISLT. ZAMMI	YON ZAMMI	KAT ZAMMI	TOP. ZAM	ISI IHTIYACI
KAT NO:[Z]		MAHAL NO:[4]		YATAK ODASI I		DIZAYN SICAKLIGI: 22				
G	DD	4.59	1.60	22.00	161.57					
G	DP	4.86	3.20	22.00	342.14					
B	DD	8.78	1.60	22.00	308.88					
B	DP	1.08	3.20	22.00	76.03					
	DOS	10.40	1.30	13.00	175.76					
	TAV	10.40	0.56	16.00	93.18					
					1157.57	15%	0%	0%	15%	1331.20

INFILTRASYON ISI KAYIP HESABI:

TOPLAM SIZINTI MIKTARI(Σa*l) : 40.10 m3/h
ODA DURUMU KATSAYISI (R) : 0.90
BINA DURUMU KATSAYISI (H) : 0.94
(Ze) : 1.20

INFILTRASYON ISI KAYBI : [Σa*l*R*H*Ze*(Tm-Td)] 800.23
TOPLAM ISI KAYBI : 2131.44

CEREN Muhendislik Musavirlik TiC.LTD.STi.	ISI KAYIP FOYU		SAYFA 3

YON	TIP	TOPLAM ALAN	ISI TRANS. KATSAYISI	SICAKLIK FARKI	ZAMSIZ ISI KAYBI	ISLT. ZAMMI	YON ZAMMI	KAT ZAMMI	TOP. ZAM	ISI IHTIYACI
KAT NO:[Z]		MAHAL NO:[5]			YATAK ODASI II		DIZAYN SICAKLIGI: 22			
B	DD	9.72	1.60	22.00	342.14					
B	DP	1.08	3.20	22.00	76.03					
K	DD	9.45	1.60	22.00	332.64					
	DOS	11.30	1.30	13.00	190.97					
	TAV	11.30	0.56	16.00	101.25					
					1043.03	15%	5%	0%	20%	1251.64

INFILTRASYON ISI KAYIP HESABI:

TOPLAM SIZINTI MIKTARI(Σa*l) : 7.29 m3/h
ODA DURUMU KATSAYISI (R) : 0.90
BINA DURUMU KATSAYISI (H) : 0.84
(Ze) : 1.00

INFILTRASYON ISI KAYBI : [Σa*l*R*H*Ze*(Tm-Td)] 121.25
TOPLAM ISI KAYBI : 1372.89

C E R E N
MUHENDiSLiK MUSAViRLiK TiC.LTD.STi

MAHALLER ISI KAYIP LiSTESi

KAT No	MAHAL No	MAHAL iSMi	ZAMSIZ ISI KAYBI	TOPLAM ZAM	ZAMLI ISI KAYBI	INFILTRASYON ISI KAYBI	TOPLAM ISI KAYBI
Z	1	BANYO	906.60	20.00	1087.92	76.42	1164.34
Z	2	MUTFAK	925.63	15.00	1064.48	0.00	1064.48
Z	3	SALON	1883.19	20.00	2259.82	2321.57	4581.39
Z	4	YATAK ODASI I	1157.57	15.00	1331.20	800.23	2131.44
Z	5	YATAK ODASI II	1043.03	20.00	1251.64	121.25	1372.89
Z	6	GIRIS					ISITILMIYOR
Z	7	WC					ISITILMIYOR
Z	8	SERA					ISITILMIYOR
Z	9						ISITILMIYOR
			5916.02		6995.07	3319.47	10314.54

ISI KAZANC HESAPLARI

CEREN Muhendislik Musavirlik TiC.LTD.STi.	ISI KAZANC FOYU		SAYFA S 1

ISI KAZANCI YAPILAN YER KAT:Z No: 1 BANYO

iC KURU SUHUNET: 26.00°C iC YAS SUHUNET: 18.90°C BAGIL NEM : 50%	NEM MiKTARI: 0.0104 gr./Kg. kuru hava OZGUL HACiM: 0.8601 m3 /Kg. nemli hava ENTALPi : 12.572 Kcal/Kg. kuru hava	MAX. KAZANC HAZiRAN 6:00 V(m3/h) = 99.69	DUYULUR ISI ORANI 82.81% CCN : ---- °C

ISI KAZANC FAKTORU	YON	TOPLAM ALAN m2	ISI TR. KATSAYISI Kcal/m2°C	SUHUNET FARKI IC/DIS °C	ESDEGER °C	RADYASYON DEGERI Kcal/hm2	FAKTOR * RAD ISI KAZANCI Kcal/h	KONVEKSIYON ISI KAZANCI Kcal/h	TOPLAM ISI KAZANCI Kcal/h
DIS PENCERE	K	0.36	3.20	11		87	0.70 * 31.32	12.67	34.60
DIS DUVAR	K	5.72	1.60		2.00		18.29		18.29
DIS DUVAR	D	6.48	1.60		4.20		43.55		43.55
IC DUVAR	7	8.88	1.40	3				37.30	37.30
IC KAPI	7	1.78	3.50	3				18.74	18.74
TAVAN		4.40	0.56	8				19.71	19.71
ELEKTRiK Kcal/h		ISIK GUCU	ISIK K. F.	TOPLAM Q-DUYULUR Kcal/h			83.76	88.42	172.18
		60	1.20	61.92					61.92
MOTOR Kcal/h		MOTOR GUCU	MOTOR K. F.	TOPLAM Q-DUYULUR Kcal/h					
		0	1.00	0.00					0.00
iNSAN Kcal/h		iNSAN ADEDi	Q-DUYULUR Kcal/h/kisi	Q-GiZLi Kcal/h/kisi		TOPLAM Q-DUYULUR Kcal/h	TOPLAM Q-GiZLi Kcal/h		
		1	55.00	60.00		55.00	60.00		115.00
TOPLAM KAZANC		BORU VE KANALLARDA ISINMA FAKTORU	1.10	ASIRI SOGUTMA FAKTORU	1.00		TOPLAM KAZANC ZAMLI TOPLAM KAZANC		349.10 384.01

CEREN Muhendislik Musavirlik TiC.LTD.STi.	ISI KAZANC FOYU		SAYFA S 2

ISI KAZANCI YAPILAN YER KAT:Z No: 2 MUTFAK

iC KURU SUHUNET: 26.00°C	NEM MiKTARI: 0.0104 gr./Kg. kuru hava	MAX. KAZANC EYLUL 12:00	DUYULUR ISI
iC YAS SUHUNET: 18.80°C	OZGUL HACiM: 0.8601 m3 /Kg. nemli hava		ORANI 95.11%
BAGIL NEM : 50%	ENTALPi : 12.572 Kcal/Kg. kuru hava	V(m3/h) = 805.07	CCN : ---- °C

ISI KAZANC FAKTORU	YON	TOPLAM ALAN m2	ISI TR. KATSAYISI Kcal/m2°C	SUHUNET FARKI iC/DIS °C	ESDEGER °C	RADYASYON DEGERi Kcal/hm2	FAKTOR * RAD ISI KAZANCI Kcal/h	KONVEKSIYON ISI KAZANCI Kcal/h	TOPLAM ISI KAZANCI Kcal/h
DIS PENCERE	G	6.24	2.50	11		380	0.70 * 2371.20	171.60	1831.44
DIS DUVAR	D	10.40	1.60		15.30		254.47		254.47
DIS DUVAR	G	2.94	1.60		3.10		14.58		14.58
TAVAN		9.30	0.56	8				41.66	41.66

ELEKTRiK Kcal/h	ISIK GUCU	ISIK K. F.	TOPLAM Q-DUYULUR Kcal/h	1928.89	213.26	2142.16
	80	1.20	82.56			82.56
MOTOR Kcal/h	MOTOR GUCU	MOTOR K. F.	TOPLAM Q-DUYULUR Kcal/h			
	0	1.00	0.00			0.00

iNSAN Kcal/h	iNSAN ADEDi	Q-DUYULUR Kcal/h/kisi	Q-GiZLi Kcal/h/kisi	TOPLAM Q-DUYULUR Kcal/h	TOPLAM Q-GiZLi Kcal/h	
	2	55.00	60.00	110.00	120.00	230.00

TOPLAM KAZANC	BORU VE KANALLARDA ISINMA FAKTORU	1.10	ASIRI SOGUTMA FAKTORU	1.00	TOPLAM KAZANC	2454.72
					ZAMLI TOPLAM KAZANC	2700.19

CEREN Muhendislik Musavirlik TiC.LTD.STi.	ISI KAZANC FOYU		SAYFA S 3

ISI KAZANCI YAPILAN YER KAT:Z No: 3 SALON

iC KURU SUHUNET: 26.00°C iC YAS SUHUNET: 18.80°C BAGIL NEM : 50%	NEM MiKTARI: 0.0104 gr./Kg. kuru hava OZGUL HACiM: 0.8601 m3 /Kg. nemli hava ENTALPi : 12.572 Kcal/Kg. kuru hava	MAX. KAZANC EYLUL 12:00 V(m3/h) = 972.54	DUYULUR ISI ORANI 92.16% CCN : ---- °C

ISI KAZANC FAKTORU	YON	TOPLAM ALAN m2	ISI TR. KATSAYISI Kcal/m2°C	SUHUNET FARKI iC/DIS °C	SUHUNET FARKI ESDEGER °C	RADYASYON DEGERi Kcal/hm2	FAKTOR * RAD ISI KAZANCI Kcal/h	KONVEKSIYON ISI KAZANCI Kcal/h	TOPLAM ISI KAZANCI Kcal/h
DIS PENCERE	G	7.83	3.20	11		380	0.70 * 2975.40	275.62	2358.40
DIS DUVAR	G	3.24	1.60		3.10		16.07		16.07
IC DUVAR	7	0.65	1.40	3				2.71	2.71
IC KAPI	7	1.78	3.50	3				18.74	18.74
TAVAN		22.60	0.56	8				101.25	101.25

ELEKTRiK Kcal/h	ISIK GUCU	ISIK K. F.	TOPLAM Q-DUYULUR Kcal/h	2098.85	398.32	2497.17
	100	1.20	103.20			103.20
MOTOR Kcal/h	MOTOR GUCU	MOTOR K. F.	TOPLAM Q-DUYULUR Kcal/h			
	0	1.00	0.00			0.00

iNSAN Kcal/h	iNSAN ADEDi	Q-DUYULUR Kcal/h/kisi	Q-GiZLi Kcal/h/kisi	TOPLAM Q-DUYULUR Kcal/h	TOPLAM Q-GiZLi Kcal/h	
	4	55.00	60.00	220.00	240.00	460.00

TOPLAM KAZANC	BORU VE KANALLARDA ISINMA FAKTORU	1.10	ASIRI SOGUTMA FAKTORU	1.00	TOPLAM KAZANC ZAMLI TOPLAM KAZANC	3060.37 3366.40

CEREN Muhendislik Musavirlik TiC.LTD.STi.	ISI KAZANC FOYU		SAYFA S 4

ISI KAZANCI YAPILAN YER KAT:Z No: 4 YATAK ODASI I			
iC KURU SUHUNET: 26.00°C iC YAS SUHUNET: 18.80°C BAGIL NEM : 50%	NEM MiKTARI: 0.0104 gr./Kg. kuru hava OZGUL HACiM: 0.8601 m3 /Kg. nemli hava ENTALPi : 12.572 Kcal/Kg. kuru hava	MAX. KAZANC EYLUL 12:00 V(m3/h) = 721.18	DUYULUR ISI ORANI 94.57% CCN : ---- °C

ISI KAZANC FAKTORU	YON	TOPLAM ALAN m2	ISI TR. KATSAYISI Kcal/m2°C	SUHUNET FARKI iC/DIS °C	SUHUNET FARKI ESDEGER °C	RADYASYON DEGERi Kcal/hm2	FAKTOR * RAD ISI KAZANCI Kcal/h	KONVEKSIYON ISI KAZANCI Kcal/h	TOPLAM ISI KAZANCI Kcal/h
DIS PENCERE	G	5.67	3.20	11		380	0.70 * 2154.60	199.58	1707.80
DIS PENCERE	B	1.08	3.20	11		38	0.70 * 41.04	38.02	66.74
DIS DUVAR	G	3.78	1.60		3.10		18.75		18.75
DIS DUVAR	B	8.78	1.60		4.20		58.97		58.97
TAVAN		10.40	0.56	8				46.59	46.59

ELEKTRiK Kcal/h	ISIK GUCU	ISIK K. F.	TOPLAM Q-DUYULUR Kcal/h			
				1614.66	284.19	1898.86
	80	1.20	82.56			82.56

MOTOR Kcal/h	MOTOR GUCU	MOTOR K. F.	TOPLAM Q-DUYULUR Kcal/h	
	0	1.00	0.00	0.00

iNSAN Kcal/h	iNSAN ADEDi	Q-DUYULUR Kcal/h/kisi	Q-GiZLi Kcal/h/kisi	TOPLAM Q-DUYULUR Kcal/h	TOPLAM Q-GiZLi Kcal/h	
	2	55.00	60.00	110.00	120.00	230.00

TOPLAM KAZANC	BORU VE KANALLARDA ISINMA FAKTORU	1.10	ASIRI SOGUTMA FAKTORU	1.00	TOPLAM KAZANC ZAMLI TOPLAM KAZANC	2211.42 2432.56

CEREN Muhendislik Musavirlik TiC.LTD.STi.	ISI KAZANC FOYU		SAYFA S 5

ISI KAZANCI YAPILAN YER KAT:Z No: 5 YATAK ODASI II			
iC KURU SUHUNET: 26.00°C iC YAS SUHUNET: 18.80°C BAGIL NEM : 50%	NEM MiKTARI: 0.0104 gr./Kg. kuru hava OZGUL HACiM: 0.8601 m3 /Kg. nemli hava ENTALPi : 12.572 Kcal/Kg. kuru hava	MAX. KAZANC TEMMUZ 16:00 V(m3/h) = 281.36	DUYULUR ISI ORANI 87.18% CCN : ---- °C

ISI KAZANC FAKTORU	YON	TOPLAM ALAN m2	ISI TR. KATSAYISI Kcal/m2°C	SUHUNET FARKI iC/DIS °C	ESDEGER °C	RADYASYON DEGERi Kcal/hm2	FAKTOR * RAD ISI KAZANCI Kcal/h	KONVEKSIYON ISI KAZANCI Kcal/h	TOPLAM ISI KAZANCI Kcal/h
DIS PENCERE	B	1.08	3.20	11		445	0.70 * 480.50	38.02	374.44
DIS DUVAR	K	9.45	1.60		5.30		80.14		80.14
DIS DUVAR	B	9.72	1.60		7.60		118.20		118.20
TAVAN		11.30	0.56	8				50.62	50.62

ELEKTRiK Kcal/h	ISIK GUCU	ISIK K. F.	TOPLAM Q-DUYULUR Kcal/h	534.75	88.64	623.39
	80	1.20	82.56			82.56
MOTOR Kcal/h	MOTOR GUCU	MOTOR K. F.	TOPLAM Q-DUYULUR Kcal/h			
	0	1.00	0.00			0.00

iNSAN Kcal/h	iNSAN ADEDi	Q-DUYULUR Kcal/h/kisi	Q-GiZLi Kcal/h/kisi	TOPLAM Q-DUYULUR Kcal/h	TOPLAM Q-GiZLi Kcal/h	
	2	55.00	60.00	110.00	120.00	230.00

TOPLAM KAZANC	BORU VE KANALLARDA ISINMA FAKTORU	1.10	ASIRI SOGUTMA FAKTORU	1.00	TOPLAM KAZANC ZAMLI TOPLAM KAZANC	935.95 1029.55

CEREN Muhendislik Musavirlik TiC.LTD.STi.

MAHALLER ISI KAZANC LiSTESi

KAT No	MAHAL No	MAHAL iSMi	MAX. DUYULUR ISI KAZANCI	MAX. GiZLi ISI KAZANCI	MAX. TOPLAM ISI KAZANCI	DUYULUR ISI ORANI
Z	1	BANYO	318.01	66.00	384.01	82.81
Z	2	MUTFAK	2568.19	132.00	2700.19	95.11
Z	3	SALON	3102.40	264.00	3366.40	92.16
Z	4	YATAK ODASI I	2300.56	132.00	2432.56	94.57
Z	5	YATAK ODASI II	897.55	132.00	1029.55	87.18
Z	6	GIRIS			SOGUTULMUYOR	
Z	7	WC			SOGUTULMUYOR	
Z	8				SOGUTULMUYOR	
			9186.71	726.00	9912.71	

CEREN Muhendislik Musavirlik Tic.LTD.STI.

TUM BINA ISI KAZANC ANALIZI

TUM BINA MAX. KAZANCIN MEYDANA GELDIGI AY VE SAAT : EYLUL 12 :00

TUM BINA RADYASYON ISI KAZANCI :

YON	TOPLAM CAM ALANI	TOPLAM DUVAR ALANI	TOPLAM CATI ALANI	RADYASYON DEGERI	ESDEGER SIC. FARKI	CAM RADYASYON ISI KAZANCI	DUVAR RADYASYON ISI KAZANCI	CATI RADYASYON ISI KAZANCI
K	0.36	15.17		38	2.00	9.5	48.5	
D	0.00	15.82		38	15.30	0.0	413.1	
G	19.74	9.96		390	3.10	5250.8	49.4	
B	2.15	18.50		38	4.20	57.5	124.3	
			0.00		32.00			0.0
						5317.9	635.3	0.0
								5953.2

TUM BINA SABIT ISI KAZANCLARI :

RADYASYON ISI KAZANC TOPLAMI	:	5953.2
KONVEKSIYON ISI KAZANC TOPLAMI	:	1072.8
ISIK ISI KAZANC TOPLAMI	:	412.8
MAKINE ISI KAZANC TOPLAMI	:	0.0
INSANLAR ISI KAZANC TOPLAMI	:	1265.0
	+	
ISI KAZANC TOPLAMI	:	8703.8
EMNIYET FAKTORU : 1.10		
ASIRI SOGUTMA FAKTORU : 1.00		
	+	
TUM BINA ISI KAZANC TOPLAMI	:	9574.2