MINIMUM DESIGN STANDARDS STRATEGIES FOR SPECIFIC URBAN LOCATIONS WITH REFERENCE TO INDIA

by

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(ABSTRACT)

The purpose of this study was to document seven selected sets of minimum housing design standards in two specific case locations, New Delhi and Madras, in India, and to evaluate criteria used for establishing these standards. A model of selected criteria from the different frameworks was then developed as part of an overall housing strategy.

An integrated concept of housing as an environment, need, process and product was used as the basis of this study which was documented through review of literature and field research in India. The minimum standards were broadly classified as minimum space requirements, recommended building materials and general subdivision requirements. Variations and ranges across the sets of standards were then tabulated to indicate the multiplicity of recommendations, an initial premise of this study.
Implications, based on broad premises, for future strategies in this field were developed. These suggestions were grouped into three clusters, namely, access to shelter by the abjectly poor, access to shelter by the low income groups in general and the restructuring of extant institutional and implementation frameworks.
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CHAPTER 1
INTRODUCTION

Shelter is more than a simple human need. It is also both the cause and the consequence of many aspects of socio-economic change, and represents a vital component of a nation's development strategies. Nowhere is this more true than in the third world nations, where housing and shelter deficits are enormous, and growing rapidly.

According to Fichter, Turner and Grenell (1972),

The important thing about housing is not what it is, but what it does for peoples' lives. What it does has to do with the dwelling's use value, as opposed to its market value. In other words, dweller satisfaction is not necessarily related to the imposition of standards. (p.159)

The nature and extent of governmental regulation of standards are highly controversial issues. One view is that codes are enforced to ensure that owner-builders use expensive, profit-generating construction materials in which prices are controlled by state or private monopolies. A more charitable view is one in which societal concerns for community health and safety are expressed in legal terms.

On one hand, planning instruments and official housing policies usually seek an 'ideal' modernized city form while on the other hand exist the informal shelter arrangements of the urban poor and deprived. The informal sector defines
housing that has been built without approval or authorization from the government. The 'ideal' type of housing is sought to be achieved through building, rebuilding, zoning laws and regulations -- all of which may be seen as facets in the struggle between the government, the private sector and the people to claim urban space and establish alternative spatial orders.

Most developing countries are generally characterized by high levels of population growth (ranging from 1.5 - 8 percent annually) and low per capita incomes (ranging from U.S.$110 - 5000, with most of them below the 2000 dollar level). (World Bank, 1989). Increasing industrialization, coupled with rural stagnation, has created a strong tendency for people to migrate to urban centers for better employment prospects and infrastructure facilities. Developing countries currently have twice the urban population growth rate of developed nations due to natural increases as well as migration, and by the end of the century, the most densely populated cities of the world will be found in the third world. (Renaud, 1981).

Tables from the World Development Report, 1989 indicating urbanization trends and general information from a limited number of countries, including some of the more
developed countries for cross reference have been included in Appendix A.

However, this extremely high rate of urbanization has become a serious concern. While up to 75% of the population in most developing countries live in rural areas, there is increasing focus on urban shelter issues. Indeed, the literature dealing with housing issues in the third world is almost dominated by urban housing.

Developing nations will need to expand the urban housing stock rapidly to maintain even current (often inadequate) standards in their urban areas, where explosive population increases have already caused serious environmental problems. A large percentage of the urban population (often up to 65 percent) live in slums or shanty towns with no electric power, sewage, water or garbage removal facilities (Rodwin and Sanyal, 1987). Rudimentary shelter, in the form of scrap material, squatter settlements, and pavement dwellers characterize the form of these slums.

It is in the definition of these slums, as well as in the context of other illegal settlements like shanty towns or illegally sub-divided land, that the term 'standards' comes into question. As defined by the Department of Economic and Social Affairs, U.N., 1986),
Building standards may be defined as measures of acceptability at a given time and place, and in a given set of cultural, economic and technological conditions. The determination of needs depends both on what is (level) and what should be (standard). (p. 6)

In several developing nations, the role of standards in the process of improving shelter has received attention.

As quoted in Mabogunje (1978),

Environmental problems in developing countries have generally been regarded as the results of poverty or as consequences of the early stages of industrialization....Especially in the urban areas, such negative impacts are manifested in the form of poor housing, the inadequacy of services and the general insanitary and dreary living conditions....The main objective of this report is to prove that a judicious review of the standards and criteria that govern the provision of shelter in developing countries can help bring about rapid, if not dramatic, changes in the present situation. (p.xi)

This view has been reinforced by Dwyer (1975), by Rodwin and Sanyal (1981) and by Spence and Cook (1983) who present the case that standards may actually need to be lower i.e. more realistic and more affordable.

Standards in shelter are set by governments. They typically try to reconcile basic needs, as determined by natural and biological requirements with cultural needs which reflect social values, the level of economic development and technological capacity.

Between the basic and cultural needs, one might identify what might be termed as minimum needs. The locus of this point of minimum needs on the basic - desirable
continuum is determined by the economy, the class structure in society, government housing policy, the capacity of individuals in different strata of society to build, and environmental and resource constraints. In a developing country like India that is also characterized by accentuated class differences, a large group of the population is typically near or below basic needs, and a small minority of about five percent close to or above desirable needs. Between these extremes is the middle class, which might constitute between 20-40 percent of the population. (Mabogunje, 1978).

Need for the Research

Shelter shortage issues increasingly have become focused at most developing nations, India being no exception. In recent years, the Indian government has reported tremendous shortages of adequate housing units to meet current and emerging needs of the population.

Most important of all, continued disregard of self-help housing as a legitimate response to the shelter deficit has increased official estimates of housing shortages. In many third world countries, as in India, self-help or spontaneous shelter in fact comprises a very large percentage of urban housing.
Official government statistics indicate a cumulative construction backlog of nearly 7 million urban houses and about 17 million rural houses. (National Buildings Organization (NBO), 1987). In this case, backlog is defined by the NBO as the number of dwelling units failing to meet the existing required minimum standards. About 75 percent of the population live in rural areas, but the high rate of migration is gradually shifting that balance. Assuming a national average of 5.5 persons per household, the numbers imply that over 100 million rural and 30 million urban people out of a total population of about 760 million are "shelterless" (Buch, 1987).

The estimates of the backlog do not take into account the possibility of upgrading and maintenance of existing stock which are often more effective strategies than building new houses. The estimates are based on certain sociological and cultural assumptions. For example, 'one house to one family', which are not appropriate to the Indian context, where joint or extended families tend to be the rule rather than the exception. The estimates of the deficit disregard shelter built without official approval, or which does not conform to official standards. Hence, even the census data reflects the flaw in the Indian government's housing policy.
The following seven issues have been identified in analyzing this phenomenon. With some variation, these can be extended to other developing countries (Ghosh, 1985).

1. indifference to local experience
2. lack of reference to local resources
3. irrelevance to local culture
4. inappropriateness of technology
5. virtual impossibility of total enforcement of regulations, particularly in the outlying and rural areas
6. strong bias in urban development, with prominence being given only to select cities.
7. prevailing use of imported design parameters, particularly the use of high standards leading to high costs.

For instance, standards based on western experiences (which may be irrelevant or unrealistic in terms of financial or technological capacity) can raise housing costs, making formal housing unaffordable to the majority of urban populations in developing nations. As reported by Abrams (1970),

There has been a tendency in a number of developing countries to copy the complex codes of England, Germany or the United States, as well as their zoning and planning laws, though they are irrelevant, and the means to enforce, construe and adapt them may be completely lacking. (p. 82)
The issue of high standards is closely linked to many other factors. As observed by Martin (1983),

High standards are always popular with politicians, who like to be proud of their achievements, and the higher the standards, the prouder they are. But high standards imply high costs, which will mean the imposition of a heavy burden on the residents in terms of cost recovery, or else to the government through massive subsidies. (p. 58)

High costs to the authorities have restricted their building activity, while the high costs to the residents have hindered cost recovery and thereby reduced the effectiveness of even the more innovative programs like the sites and services schemes in Madras, India (Robben and van Stuijvenberg, 1986).

Several studies have been conducted in India by official and research agencies to look into cost reduction in building through the use of alternative construction and materials use. (Ministry of Works and Housing, 1977 and 1982; National Buildings Organization 1978, 1980 and 1987 are the more prominent ones). However, there exists a large gap between research and implementing agencies in India, with the result that most of this useful research has not been incorporated into the codes or regulations, thus restricting its use. The standards that are being used today are basically modifications of the codes used during the colonial days, and were not conceived for the Indian
context. At this point, it must be mentioned that the adoption of these newer, more appropriate standards has proved to be easier in rural areas, where enforcement of codes is far more difficult than in urban areas (Verma and Trikha, 1977)

Field research in India during the summer of 1989 confirmed that difficulties arise both from the large number of organizations involved in setting standards and implementing them at the national or the local levels and from the use of borrowed, high standards. This problem has also been observed in several developed nations, including the United States (Meeks, 1989).

The objective of this study is to compile data on selected minimum standards in specific urban locations in India, and to attempt a comparative analysis of these standards, noting possible contradictions in the sets of standards. There will also be a review of the criteria that have been used in establishing these standards, leading to the formulation of a new minimum standards strategy based on the results of the study.

Statement of the Problem

In most developing nations, agencies involved with standards are found at all levels of government - municipal,
provincial, regional or state and national (Glasser, 1988). The complexity of the situation is illustrated by the situation in India. At the apex of all planning effort, including the shelter sector, is the Planning Commission, which is responsible for preparing national plans and giving advice to the national government on policies and programs. Major housing programs evolve from this body as part of more comprehensive development programs. Although the Commission is not a standard-setting body, it has often given its opinion and ruled on minimum accommodation and density in housing programs.

Apart from the Planning Commission, other central government agencies involved include the Town and Country Planning Commission (TCP), the Housing and Urban Development Corporation (HUDCO), and research and technical organizations like the National Buildings Organization (NBO), the Central Building Research Institute (CBRI), and the Indian Standards Institution (ISI). At the state level are the State Planning Boards, Housing and Slum Clearance Boards, Public Works and Public Health Engineering Departments and Town Planning Departments. At the local level are the Municipal Corporations, Municipal Councils, City Improvement Trust Boards and Metropolitan Development agencies.
As stated by Mabogunje (1978),

With such a multiplicity of standard-setting agencies and their hierarchial relationships, frequent conflict among standards and agencies is inevitable. Usually, of course, such conflicts are resolved in favour of the agency which has the greater power of sanction. Thus the international financial agencies often override the objections of national agencies and the latter in turn ignore local initiatives. The National Planning Commission of India has frequently imposed new standards on the grounds of costs. (p. 74)

It becomes clear that this multiplicity of agencies creates a picture of confusion and indecision in India, and this scenario may not be very different in other third world countries. It is, therefore, important to consider similarities and differences in the bases and content of the several existing guidelines. This is an important issue, and a starting point in sorting out the prevailing frameworks in the quest to establish a set of minimum design criteria relevant to a particular context.

**Purpose of the Study**

The main purpose of this study was to attempt to clarify the objectives, content and criteria used to choose specific minimum standards that are currently being recommended and used in the case locations in India.

Four aspects need to be recognized in such a task as defined in Mabogunje (1978).
1. The relation between the standards and available scientific knowledge

2. The extent to which the standards take into account local lifestyles and cultural norms

3. Whether the standards actually improve the quality of life for the under-privileged

4. Whether the standards are affordable either to the government or to the user. If the standards are affordable to the government, it should be possible for the public sector to build low income housing units on a par with the demand. If these formal standards were affordable to the user, then they could also afford to buy these units within the legal sector without resorting to building in the informal sector.

   It is very important, therefore, to have clearly identifiable and affordable standards. This is especially significant in the area of low cost or minimum standards. If standards are ambiguous, or if there are simply too many of them, they can hinder the planning and implementation of low cost housing schemes.

   Lack of adequate power, lengthy legal procedures, political interference and corrupt local officials are usually cited as reasons for the ineffectiveness of housing programs. It is seldom appreciated that the unrealistic
bases on which many standards have been set are among the major reasons for their failure. (Mabogunje, 1978). Another important handicap in setting and enforcing standards is the divided responsibilities of the many agencies involved.

There is a need to review what exactly the legally required minimum is in the areas covered by the study. This would aid designers and concerned agencies in the private and public sector to develop projects quickly based on all the guidelines. This will help pool repetitious information from all the major sources, and help arrive at a basic set of criteria in setting standards.

Objectives of the Study

The word 'standards' needs to be clearly defined. As mentioned earlier, there are many types of standards - density, space use, infrastructure, building structure and so on. The focus of this paper will be on the physical design of the dwelling unit. As such, the term 'standards' is used in this study only to denote minimum standards in the design of low cost housing units.

They will generally include the following:

1. minimum lot sizes
2. minimum access street widths
3. minimum setbacks from the plot boundaries
4. minimum floor area of the dwelling unit
5. minimum number of rooms
6. types of rooms that are to be provided
7. minimum dimensions of each room
8. recommended building materials

The two locations of this study, New Delhi and Madras were chosen for the following reasons:
1. New Delhi is the capital of India, and it is one of the few cities in India that was comprehensively planned. As a result, development in Delhi has been regulated more stringently than in other cities in the country. Because it is the capital of the nation, more resources are available in Delhi (Gupta, 1985). Delhi is also the seat of the central government, and many of the research and development organizations mentioned earlier have their headquarters in the capital. Much of their building experimentation has been in and around Delhi. At the same time, the presence of so many national organizations implies the likelihood of a variety of standards being proposed, recommended, and used.
2. Madras, the capital of the southern state of Tamil Nadu, was the fastest growing urban region in the country in the 1970s and 1980s. Because of this the World Bank chose Madras as the pilot location for their sites and services and slum upgrading schemes in that part of the world. These
projects were initiated for the low income groups using minimum standards developed by the Bank. The Madras case allows us to examine the extent to which the Bank, as a foreign agency, has influenced minimum standard setting in Tamil Nadu. We can compare the Bank's recommendations with the minimum standards recommended and used simultaneously by other housing agencies in the state like the Tamil Nadu Housing Board.

The specific dimensions of the study are:
1. To briefly discuss minimum housing policy in India by tracing the development of standards and urban shelter policy from 1947 to 1988, along with the level and extent of public sector involvement in low cost housing in India, as a focus of housing policy to date. This exercise will be useful in analyzing the reasons for the current housing crisis in India.
2. To list and discuss the seven selected sets of standards currently recommended or used at the national or local level in Delhi and Madras. The agencies responsible for formulating, regulating and enforcing these standards will also be identified in this section.
3. To study these standards using a comparative table and to cross study the range of criteria recommended for a given feature, for example, roof materials. It is proposed to
identify three sets of minimum standards. The first would be the minimum value of the standards with numerical values recommended for a particular feature. While this would be logical for reducing costs, it may not be immediately useful in the field, since taking the minimum recommendation means that other and related recommendations may be contravened. The next set would represent the maximum value for standards with numerical values, which would be more practical but less cost effective. The third would be a weighted mean of the standards. For certain features like building materials, it would be the mode, or the most commonly recommended material. The sets would then be comparatively analyzed within and between sets.

4. To develop a framework or unified set of guidelines, as part of a strategy for evolving minimum standards, based on the existing models and components, including the actors, and their interactions. This new framework may, therefore, be more comprehensive and provide a better base for establishing a minimum standards strategy, and for the subsequent development of a set of common recommendations which can be used at the national level. In the process, new components and concepts not being used in the existing guidelines may be incorporated based on the review of material for this study.
Approach to the Study

In developing countries where resources are scarce and their allocation extremely important, policy makers need to focus on basic needs. As defined in Streeter (1981),

Basic needs may be interpreted in terms of minimum specified quantities of food, clothing, shelter, water and sanitation that are necessary to prevent ill health, undernourishment and the like. Basic needs may also be interpreted more subjectively as the satisfaction of consumers' wants as perceived by the consumers themselves, rather than by professionals or by specialists. (p. 25)

This point of view has been reinforced in Stewart (1985). This model includes food, health and education as the three major human needs. Shelter is a relatively minor component of the model.

However, as suggested by Streeter, a basic needs approach can either embrace components of previous strategies and approaches, or it can become a supplement or complement to the existing strategies by the addition of new elements. It is proposed to use in this study a little of both strategies, but focusing on shelter as an important component of basic needs.

More specifically, this study will be based on the integrated concept of housing as a need, process, service and product, following Oliver (1977). Housing as a need is an input factor, housing as a process includes the
throughputs for the conversion of the inputs to outputs, and housing as a product is an output from the system.

As defined by White (1985), housing is heavily influenced not only by personal factors, but also by external forces. The study of housing views it holistically as a product, environment, service and process for people. As a product, housing provides physical shelter and symbolic meaning for people. Housing units are unique products that combine to create neighborhoods and communities. Policy implementation is perhaps the weakest link in the continuum of planning, developing and implementing. Often in India, and in other developing countries, the product phase is where most problems are seen. (All these processes flow from the basic need of the potential user or resident).

Housing includes small and large-scale settings. Housing services are provided by the people who plan, regulate and implement the product and its use. The housing process or activity involves the individual and collective provision and maintenance of the housing stock by households, and other public and private sector agencies. This is the conceptual framework on which this study will be based. A model which was developed by White and presented at the American Association of Housing Educators Conference in 1985 (Fig.1) has been included.
Figure 1: A conceptual framework for the study of housing adapted from White, 1985.
Limitations of the Study

1. The study takes into account only the major standards recommended and used in the formal sector. It does not take into account the types of standards that may be extant in the informal sector. Such standards would be arbitrary and will vary a great deal even within a settlement since they are decided on by each dwelling's occupant depending on his or her particular needs (Shoup, 1987). These are difficult to assemble and document and due to the nature, level and time frame of this thesis, only the formal sector was considered.

2. Resource constraints limited the study to two major urban centers in India, New Delhi and Madras. While the results are, of course, not necessarily applicable to other urban centers in India, it is possible that identified issues are of concern not only in other metropolitan centers in India, but also in cities in other developing countries.

3. The study focused on standards that have actually been implemented or legislated at least on an experimental level and on those alternative standards which have been recommended by organizations prominent at a local or national level in low cost housing provision.
CHAPTER 2

REVIEW OF LITERATURE

Background of the study

In the 1950s many third world countries identified housing as a problem. Until then, the rich and the middle income groups were supposed to rely on the so-called market forces to provide them with the necessary shelter of the right size and standards, and in the right place. Lower income groups were expected to rely on what was euphemistically called the 'trickling-down process' since public housing and other private markets were either unaffordable, or simply inadequate (Koenigsberger, 1986).

Governments, facing rapidly growing urban areas recognized that rural urban migration could not be stopped by legislation or force. Urban growth and subsequent urban pressure had to be accepted as normal concomitants of economic development.

In recent years, the combination of urban investment together with an increasing surplus labor force in the rural areas have both contributed to further rural-urban migration, and subsequent urban expansion. The phenomenal increase in urban population has not simply been quantitative; there has also been a qualitative
transformation of the cities and their social and spatial structures (Sethuraman, 1985). Shanty, slum or squatter housing is increasing at a far greater rate than any other aspect of physical development and has become the dominant form of most third world urban settlements (Rapoport, 1983).

For instance, in 1977, occupancy rates for housing in Calcutta, India indicated that more than two-thirds of the families lived in one room or less. Approximately 200,000 people lived a part, if not all, their lives on public pavements, and approximately 2 million people (then about 20 percent of the population) lived in one story huts. In Bombay, the corresponding population figures were 60,000 to 250,000 (Payne, 1977).

More recent figures indicate that in 1985, in the Bombay metropolitan area, the annual demand for shelter often outweighed the supply by at least 40,000 units. About 40 percent of the city's population already live in housing officially classified as slums. About 50 percent of all Indian households also have only one room for the whole family, and over 50 percent of all houses in the country have walls constructed out of non-permanent materials like grass, leaves, bamboo and mud (Robben and van Stuijvenberg, 1986).
Keeping these figures in mind, a brief review of urbanization processes and corresponding policy emphasis, particularly in the post-independence era may be useful.

**Urbanization Trends in India**

In the early part of the century, less than 10 percent of the population of India lived in urban areas. From the 1920s to the 1940s, there was rapid urban growth with a continuous natural increase in population (due to improved health services) and increasing industrialization.

The 1940s registered the highest rate of urban growth experienced in any decade this century. During the following decade, there was relatively fast growth of medium-sized towns under public policy encouraging industrialization away from the major urban areas.

From the 1960s to the 1970s, there was more urban-to-urban migration with explosive growth in metropolitan and peripheral areas at the expense of small towns. The next decades into the mid-1980s saw rapid urbanization with the emergence of many new towns. After 1951, large cities were more and more differentiated from small towns, but the gap in the growth rate of large and medium sized towns narrowed. It was also felt that the role of services, transport and
construction facilities were more critical than actual manufacturing in promoting urbanization.

In conclusion, there was a clear difference in spatial expression in the pre and post Independence eras. Colonial urbanization was concentrated in a few big cities in local areas with plantations or docks. The cities of colonial setting were principal ports, like Madras, Calcutta and Bombay, which grew rapidly. The poor tended to be concentrated in the older parts of the city, and usually away from the main city center area, where the British were located.

After Independence, there was a diffusion of urbanization with urban-urban migration becoming prominent. Unlike many other developing countries, Indian urban structure had a multi-metropolitan apex. There are several large cities and towns, and migration is not particularly concentrated in any single one of them. Recent trends have focused on reducing urban pressure by promoting the growth of new and satellite towns, as well as medium sized towns in rural areas (Mehta, 1979)

However, despite the high rate of urban growth, and the ensuing housing problems, the allocation of resources to housing has, in relative terms, not changed very much throughout the thirty five years of planned development.
One is compelled to assess that the case of the Indian slum dweller, whether in urban or in rural areas, has never been given high priority (Robben and van Stuijvenberg, 1986). Table 1 from the Planning Commission of India (1989) indicates that the level of investment has actually dropped during the successive plan periods. It can be seen that the percentage of housing expenditure of the total outlay has been steadily decreasing. While the urban housing outlay has comprised nearly the total housing outlay in almost all the plans, it has been inadequate, as already discussed. It does, however, demonstrate the government's greater concern with urban shelter issues than rural ones. This section of the report relies heavily on Bala (1986).

**Minimum Housing in India**

Minimum housing connotates two basic things in the Indian context. One is the public sector approach to minimum housing, and the other is the private sector or the 'informal' sector approach to minimum housing. While the former is more regulated and aims for higher standards, the latter describes the accommodation of most of those housed in Indian cities.
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<tr>
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<td>2,069</td>
<td>4,672</td>
<td>8,579</td>
<td>6,625</td>
<td>15,779</td>
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<td>expenditure</td>
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<td>Total housing</td>
<td>38.5</td>
<td>90</td>
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<td>% of housing</td>
<td>1.96%</td>
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<td>18</td>
<td>17.6</td>
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<td>81.2</td>
<td>309</td>
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<tr>
<td>Total urban</td>
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<td>80</td>
<td>97.3</td>
<td>69.74</td>
<td>123.2</td>
<td>439</td>
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<td>1.87</td>
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**NOTE:** It can be seen from the above table that the percent of housing expenditure of the total outlay has been steadily decreasing. While the urban housing outlay has comprised nearly the total housing outlay in almost all the plans, it has been inadequate, as already discussed. It does, however, demonstrate the government's greater concern with urban shelter issues than rural ones.
Public housing in India, as in most other countries elsewhere in the third world, failed to solve the housing problem. It is popularly associated with leaking pipes, peeling plaster, and cracking walls, its design leaves much to be desired. Each unit is usually an assemblage of rooms into small units piled one on top of the other to create multiple storied buildings, which are then arranged in rows. This pattern of 'perfect barracks' is what government housing represents -- minimizing short run costs, and nothing else. Above all, the number of units built falls far short of the number of units needed.

Bureaucratic indifference, scant regard for the environment and a lack of understanding (or even deliberate neglect) of the requirements of the residents have contributed to the unpopularity of public housing as a workable shelter solution (Correa, 1981).

In recent years, the governmental approach has shifted towards providing serviced sites which offers the poor a chance to shape their own dwellings within the framework of support facilities for which the government is responsible. These projects are typically designed and implemented on a turnkey basis in the same bureaucratic fashion that characterizes any public works department. Here, again, the groupings of the plots into smaller blocks and the ultimate
shape and size of the dwelling are a result of cost
minimization. While this in itself may not be a bad thing,
users' needs are rarely given adequate importance. As
quoted in Das (1988),

The functionality of the plot for its user, the
community formation and environmental suitability are
of no consequence, being obviously scorned as luxury
preoccupations. (p. 43)

Some development 'experts' and housing economists have
argued that the government should not be in the business of
building houses at all and many of the aid-giving
international agencies support this view.

And yet, there are many people who would prefer built
housing to building housing by themselves. If built housing
allows for the regional and community expressions of the
dwellers and offers a 'place' rather than a 'site', it would
constitute a viable alternative for many people if they can
afford it. Built housing is bound to undergo transformation
and change over time. If this is recognized and
incorporated as an active element of the design, user
initiatives would manifest themselves within an overall
public frame, rather than destroying it.

The physical profile of Indian cities clearly reflects
the distinction between the small firm economy and the large
corporate sector, as both types of economic organizations
produce settlements and housing of vastly different characteristics.

The poor (and not so poor) find their own housing alternatives. The 'small economy' as the dominant and persevering aspect of production in a city is engaged in a symbiotic relationship with large firms and has its own strength that ensures its survival. Small firms using cheap labor thrive on the traditional and informal settlements which are often the abode of those who cannot find housing in the formal market. The poorest live on the pavement. Other poor households enter squatter settlements (Architecture and Design, 1988).

The unauthorized colonies and places offered by illegal land sub-divisions are generated by a new brand of self-appointed or quasi-legal housing developers enjoying the 'unofficial' patronage of officials and politicians. Such a high degree of unofficial commercialization in squatter settlements has been noted in other parts of the world, including in Nairobi, Kenya (Amis, 1984).

The government's attitude is contradictory: it tolerates the traditional and informal sources of labor and materials that are rooted in these settlements, even when wanting to rid cities of such dwellings in order to establish a more 'modern' and 'orderly' housing environment.
At a social level, a particular form of hypocrisy characterizes the attitude of the management and the elite. Many of them interact through 'agents' and are dependent upon the informal sector for many aspects of their life. At the same time through official pronouncements, they abhor the type of settlements or housing environments that are generated by the informal sector, which is paid minimally by them. In fact, they feel that those who do not manage to procure even the least paid jobs have no business to be in the city and therefore must return to the village (Inside and Outside, 1985).

Informal environments are not necessarily haphazard or uncontrolled. Traditional settlements often present a physical fabric truly representative of social, cultural and climatic circumstances. Informal, traditional and other such popular settlement forms have one thing in common: a high degree of dweller participation in their development, and maintenance and above all, a high degree of familiarity of the dwellers with the place (Prakash, 1987).

With so many houses being built in the informal sector, and with the majority of third world urban populations living in the informal sector (Turner, 1986), public housing policy is clearly failing, and faces a grave challenge. Four features that can be influenced to a large extent, and
which can induce changes in the housing situation in a relatively short span of time by public policy have been isolated: (Grimes, 1976)

1. livable space per household
2. land area per household
3. public service levels
4. location of housing

In India, the non-land related cost of a house has two major components -- material (about 73 percent) and labor (about 27 percent) (Gupta, 1985). Materials therefore form the crucial element in cost, and the amount and type of materials, including the construction technology used need to be related to the prescribed space and habitation standards (Rao, 1979). It is therefore imperative that newer, more appropriate standards are urgently evolved in light of India's severe housing crisis.

Housing Situation in Delhi

In Delhi, the problem of slums as perceived in the 1950s, when the housing situation began to grow serious, was not of squatter settlements, but of the dilapidated and congested housing of Old Delhi. These settlements then, and still house, about 25 percent of the city's population (Ministry of Urban Development, 1987). By the 1960s,
squatter settlements grew rapidly, and about 100,000 squatter families were the first to be re-located to the outskirts of New Delhi. By the mid 1970s, another 600,000 had been re-located. In 1979, there were an estimated 20,000 people living on the pavements of New Delhi (Singh and de Souza, 1980). The population of New Delhi has grown from about 700,000 in 1931 to 3.6 million in 1971 to 8.5 million in 1988 (Dey, 1989). A Master Plan for Delhi was approved in 1962 for two decades' of planned growth which allowed for the development of seven Ring Towns around New Delhi. Urban Delhi was intended to be planned for a population of about 4.5 million by 1986, and that was clearly unrealistic (D.D.A., 1986). This was an important weakness of the Master Plan, but one that has been seen in several other situations.

By the early 1980s, only about 42,500 acres of land had been acquired, falling short of the required 70,000 acres, and land development for residential purposes fell short of the target by about 55 percent (Datta and Jha, 1983).

Another serious lapse was the virtual neglect of the old walled city of Old Delhi, a major wholesale and trade center, which has led to further deterioration and decay in that area. However, the most conspicuous failure of plan implementation in the national capital has been the
distorted development. Planned effort seems to have been entirely directed to benefit south Delhi, an affluent locality, leaving the relocated settlement areas across the river Yamuna largely unattended to. It has often been remarked that the movement of the economically weaker section (EWS) across the river was no accident, but designed to form, literally, a physical barrier between the privileged and the not-so-privileged. EWS is a term that is commonly used in India to denote the poorest 40 percent of the population, who come below the high, middle and low income categories, as defined by the National Planning Commission of India in conjunction with other official agencies like the Ministry of Finance.

Despite its failures, the Delhi Development Authority (DDA), the major planning and implementing agency in Delhi established in 1957, has a record of some success. With a requirement of about 80,000 additional dwelling units annually, the formal sector manages to provide about 50,000. Presently, efforts are being made to relocate about 200,000 slum families to better housing.

**Housing Situation in Madras**

The capital of the southern state of Tamil Nadu, Madras has a population of about 5.5 million people, making it the
fourth largest city in the country behind Bombay, Calcutta and Delhi. By the 1960s, it was already the fastest growing city in India, a pace that it still maintains (Nambiari, 1970). The biggest problem in Madras is an excessive degree of overcrowding, with densities of 1500 people per hectare being common in the older parts of the city. An estimated 20,000 people live just on the streets, and more than a million live in unauthorized self-built settlements. Every year, an additional 14,000 households (about 70,000 people) move into slums (Robben and van Stuijvenberg, 1986).

Only 10,000 flats or tenements were constructed by the Tamil Nadu Slum Clearance Board from 1975 to 1987 to rehouse slum dwellers, which is clearly inadequate. In the mid 1970s, the World Bank chose Madras as the pilot project location for its sites and services and slum upgrading schemes. The Madras Urban Development Project I (MUDP I) provided about 12,500 serviced sites and covered an additional 23,000 families in existing settlements as part of the upgrading program. Since then, under MUDP II, till 1981, an additional 24,000 sites were planned under the sites and services schemes and about 50,000 households under the slum upgrading projects. However, many of the projects have failed to live up to their original expectations, with allegations of political interference in the choice of
future residents, poor phasing of implementing services, unrealistic financial loan procedures and lack of reflection of socio-cultural norms in the design of the dwelling units. (Robben and van Stuijvenberg, 1986). The Tamil Nadu World Bank Circle (TNWBC), which plans and implements the World Bank policies has begun cutting back drastically on the options it offered in the sites and services projects, and the growth of these settlements has lapsed into a fairly disorganized and haphazard manner. This move was in part due to the fact that the residents, disgruntled with the services that were or were not being offered, took to sub-leasing their lots and moving back to slums in the inner city areas. For this reason, the slum upgrading projects have been receiving more emphasis lately in Madras.

Approach to Minimum Standards

In most developing nations, standards tend to be highly arbitrary. For instance floor area allocations are often directed towards the equitable distribution of scarce building resources, and are unrelated to what might contribute to adequate or even humane housing. Often extraordinarily small living areas are passed off as habitable through the interpretative skills, buttressed by class biases of building officials.
For example, in India, as in most developing countries, standards are often arbitrary. The space considered adequate for an average Indian family of five members is 13 sq. meters in Bombay and 26 sq. meters in Madras. The question of quality standards also has a direct bearing on unit size. As mentioned earlier, insistence on permanent, formal construction forces low income families to reduce floor area so that they consume less building materials and lay claim to less space (Glasser).

Whatever the minimum, there must be four essential requirements that the standard fulfills. They are:

1. shelter from elements and intruders
2. security from dangers like fire and other causes of building collapse
3. ensuring healthy living conditions through the provision of adequate water, sewage disposal systems and other infrastructural facilities
4. adequate space and privacy

There have been several constraints in developing countries which have hindered the effective implementation of the targeted minimum standards, and these are briefly on the next page.
1. Cultural constraints

Oliver (1977) points out that

There can exist a fundamental difference between the product of the architect as a form and symbol giver, and the symbolic elements that already exist within the traditional shelter of a vernacular society. (p.57)

Existing building traditions, which make far better use of natural resources and embody skills perfected over the generations, are usually overlooked in the formulation of official standards.

2. Economic constraints

These can be at the macro-economic level in terms of a poor cash economy, a lack of capital accumulation, high inflation rates, as well as at the micro-economic level. For instance, housing tends to be usually low on the list of development priorities because economists tend to consider it as a high capital input with a low market value output. There are also financial constraints like the lack of stable financial institutions that can offer credit on reasonable terms. In addition, high un- and under-employment rates compound the problem of ability to pay.

As quoted in Ramachandran (1976)

It is clear that codes for building and infrastructural facilities should be realistic to take account of local resource availability, and should be flexible enough to make allowances for and take advantage of variations in local conditions. (p. 537)
3. Technical constraints

These constraints are primarily related to economic feasibility, and there exists a less-than-adequate emphasis on manageable logistics, cost-effective building construction, replication of building methods, and appropriate technology.

4. Social constraints

Eminent planners like Charles Abrams and John F.C. Turner have long argued that the burgeoning informal sector, which reflects demand associated with population growth and accelerating rural out-migration, should be recognized as a legal response to the overwhelming shelter shortages. As quoted in Fichter, Turner and Grenell (1972),

when dwellers control the major decisions and are free to make their own contribution to the design and construction management of their housing, both the process and the environment produced, stimulate individual and social well-being. (p. 241)

5. Political constraints

High standards tend to be popular with politicians who hope to win support from the masses by promising them publicly provided permanent shelter. Governments may also have reservations about accepting foreign aid. Political partisanship in most third world nations has greatly contributed to the concentration of land, either literally
or figuratively, in a few hands, leading to the further exploitation of an already depressed population.

6. Environmental concerns

Ecological considerations are often overwhelmingly overridden in the face of the desperate need for shelter. Natural disasters, too, take their toll periodically because of lack of preventive measures to mitigate their effects.

7. Aesthetic considerations

In the context of formal sector low cost housing, where the primary concern is affordability, explicit aesthetic considerations are usually neglected. Little consideration is given to the users' aesthetic needs or to their capacity for creating their own individualistic and valid aesthetic aspirations. But informal sector designs are becoming increasingly appreciated reinforcing the notion of considering the users' building capacities.

The standards normally specified in developing countries include:

1. Space standards which specify not only the amount of space to be made available in shelter provision, but also the rights of individuals to that space, and the manner in which it is to be used (e.g. minimum lot sizes, number of persons per room and density).
2. Technological or performance standards which define the quality of environment, particularly in terms of the quality of construction, the type of materials that must be used and the quality of services that can be offered. (e.g. building by-laws, codes of construction and regulations on fire, water and noise).

3. Threshold and range standards which define the lower and upper limits on the size of population, area or distance to be serviced by a particular amenity or community facility. (e.g. standards regarding the per capita supply of water, (Barquin et al., 1986)

The multitude of standards can also be any one of the following:

1. Identifiable, spontaneous, or positive standards which indicate what actually exists and setting out guidelines based on local experiences.

2. Normative standards indicate what the government may actually want to achieve. These are often largely borrowed from alien and more affluent contexts. Most of the standards in India have tended to be of this type.

3. Participatory standards which allow for differential interpretations depending on the circumstance, and based on a mixture of spontaneous and normative
standards. These are more realistic standards that can be put together as a feasible alternative to the status quo.

4. Regulatory standards defining legally required minima, which again, may or may not vary according to different income groups, which is the usual basis for determining differential housing standards. Regulatory standards are lower than normative standards (van der Linden, 1986).

Whether the standards are space-use and density standards or health and sanitation standards or community facilities and service standards, it must be recognized that standards and norms can have a major impact on the national and local economy. Housing is directly related to levels of income, poverty, employment and development, all important indicators of the economy (Gupta, 1985).

The continued insistence by governments on prescribing impossibly high standards is compounded by a recurring neglect of the cost implications. For example, in India, 50 - 60 percent of the land in a development is frequently allocated to streets and open spaces, which drastically reduces land available for housing.

Official planning codes, when viewed in the light of field reality, stand testimony to the non-feasibility of
many of the formally adopted standards today. Lowering standards has always been unpopular with the government. For example, as mentioned in NBO (1978) from the Journal of the Indian Institute of Town Planners (1955),

Standards that have been established now for the minimum requirements for this society, that is regarding the provision of a two-room house for each family, are the barest minimum if normal aspirations of healthy living are to be achieved. These standards cannot and should not be lowered whatever the community, whatever the location, and whatever the economic situation of the country. Deliberate substandard housing will defeat the very purpose of housing as it will lead to the creation of future slums. These basic standards must be adhered to at all costs. (p. 22)

The present standards have not been changed to any great extent over the past few years. This despite the fact that it is becoming clearer day by day that the existing standards have only succeeded in pushing more people to the informal sector, making a mockery of the standards and rendering the government even less effective than before.

Barquin, Brook, Puri and Rybczynski (1986) substantiate this view that

The normally high standards used in most developing nations reflect a view of optimal solutions that is not only culturally inappropriate, but also inadequate. A new set of settlement standards should be evolved which seeks to accommodate, rather than re-organize users' needs and preferences. (p. 57)
There have been several proposals for the development of alternative and more efficient standards. One, as suggested in Koenigsberger (1986), calls for

The devolution of responsibility for initiative, standards and management to the families who build the houses or arrange to have them built; the definitions of the roles of public authorities as support rather than governance or control; and the education and formation of new cadres of officials for this support role. (p. 32)

Other planners have stressed the need to consider both what the users consider appropriate (they could prefer the familiar and supportive features of the traditional environment, or a more modern image, depending on the circumstance), as well as the preferences of the authorities. It is important to achieve a judicious balance of the attributes of the so-called modern image and the older features of the traditional environment (Rapoport, 1983).

Such new strategies are especially important in the realization that standards that are currently being employed and enforced by third world governments, especially in the context of low income housing, do not appear to be helping alleviate the housing crisis, but may actually be contributing to exacerbating the situation.
CHAPTER 3

DESIGN OF THE STUDY

In the process of formulating a different approach to a minimum standards strategy, it may be useful to remember that shelter is essentially a cultural phenomenon and standards for shelter must necessarily relate to people and their culture. Of course, these factors will vary even within one region of a country. However, the criteria used to define standards are universal because the needs and aspirations of people are universal, and so are the forces that influence individual and group thinking (Mabogunje, 1978).

Different living conditions (which refer to social, demographic and economic factors) exist in different parts of the country, and in different parts of the same city, which reflect differences in the responses of the poor. These responses depend on their expectations and views of what kind of housing they want and the degree to which they are organized to improve their living conditions (Gilbert and Gugler, 1981). The range of applicability of a minimum standards strategy, therefore, will relate to how well it takes into consideration universal criteria for decent human
habitation, while allowing for local variations and possible innovations.

Standards, if they are to be effective, must be enforceable to the maximum extent possible, and they must not deter or delay either the public or the private sector from providing shelter based on realistic objectives and goals (Toth, 1984). It is in the formulation of these goals that a standards planning strategy is required for a holistic approach.

This, in essence, is the focal point of this study. It is not that minimum standards do not already exist, or that some attempts have not been made to redirect low cost housing policy objectives in India, especially in areas of finance and land use planning. There has also been some interest displayed, especially by private sector non-profits, in reducing housing costs through the use of more appropriate materials and technology.

However, these efforts have tended to be very broad-based, and rarely focused on specific locations or agencies. There has also been little effort taken to base suggestions on existing frameworks, and most of the work done has been concentrated in rural areas, as has already been discussed earlier in the paper. It is here that this paper will attempt to take a slightly different approach. The
suggested strategy will be based on existing frameworks and guidelines, which may possibly facilitate their adoption into official policy. This concept has been discussed as being appropriate in Streeten's work for meeting basic human needs in developing countries.

As suggested by Gilbert (1986), to the extent that there have been some changes in the attitudes of many third world governments towards "informal" or "irregular" housing, in the past few years, it may be important to consider these implications in devising a new shelter strategy. Because standards are only one issue of an overall shelter policy, an attempt will be made at the conclusion of this study to suggest where and how the proposed minimum standards strategy will fit into a broader housing policy. This aspect is important in the realization that unless the setting of standards is backed by adequate methods of utilization and enforcement, the whole exercise becomes pointless (Shearer, 1984).

This issue is significant especially in the formulation of minimum or basic standards, which have already been defined as being the minimum required for safe and decent living. In India, existing minimum standards are clearly not being applied to the informal housing which shelters the majority of the urban populations, so it is obvious that
they are failing somewhere. One possible reason could be the fact that the National Building Code, the main national guideline, is often by and large enforced de facto at local levels without due consideration for regional variations in traditions, techniques and resources. By focusing on two case locations, one aim of this paper was to narrow the scope of selected national recommendations on minimum shelter standards by analyzing them with reference to a particular context, and by cross-referring them to local minimum standards.

Data Collection

An important part of this study was the field research that was done during a visit to India from May to August 1989. During this visit, all the primary agencies involved with low cost housing, particularly from the public or formal sector in the two case locations were visited and data on minimum recommendations collected. Short visits were also made to Bombay and Calcutta, the other two major urban centers in India, to research material at local libraries and sources. Interviews were conducted with professionals in the private and public sector, and a list of the interviewees has been included in Appendix B.
Information sources

The main sources that were used in the course of this study were publications of the Government of India, and by the Delhi and Madras local governments. The three national sets of minimum recommendations, which were chosen on the basis of most frequent use, will be referred to directly from the following three sources:

1. The National Building Code of India (1983) published by the Ministry of Urban Development, Govt. of India

The first two are primary sources which are used directly as references in the building field. The third has not been published as an independent set of standards, but the report itself, a research type publication, is used as the main source of recommendations.

The standards for the Tamil Nadu Housing Board, Tamil Nadu Slum Clearance Board, Tamil Nadu World Bank Circle and
the Delhi Development Authority are listed as publications of these agencies, and use drawings and specifications that they have issued. All these agencies have based their recommendations to some extent on the precedent set by the National Building Code, but have used several elements of other frameworks, many of them foreign, to formulate their minimum standards. These frameworks will be discussed in greater detail later in this paper.

The secondary sources used for this study were publications discussing government policy and efforts in the field of minimum housing in India. These were either articles from magazines and books from the private sector, or they were from official publications. The latter were collected, along with other government publications, during the summer field research, and they include some of the following:


These are examples of state or local government publications which discuss work that has been done in the two case locations specifically, and they also indicate possible future directions in the provision of minimum housing in these areas.

Other examples of publications that were collected during the summer include:


The publications listed above are examples of official documents discussing either extant or proposed policies regarding the provision of minimum cost housing. A perusal of these will be useful in determining where official research and innovations are heading currently, and this may prove useful in the formulation of new strategies.

Detailed lists of sources are given in the references section at the end of this document. This section also
includes general references to third world urban housing contexts, in the manner of a general literature review.

**Approach to Implementing Objectives**

As has already been stated, this study had four main objectives. The first objective, namely, of tracing the development of housing policy in India after 1947 was attempted by reviewing relevant material. Much of this section is a descriptive analysis of government intervention in the area of low cost housing over the seven five-year plan periods to date. Publications from the National Planning Commission of India, including "The Indian Planning Experience -- A Statistical Profile" (1989), as well as other official publications like the "Draft Status Reports on Housing and Construction Technologies" (1976 and 1986), which basically describe government attitudes towards shelter in the last forty one years of planned development were used as references for this section. The government publications were supplemented with articles and readings from the private sector, which may take a less biased view of public sector involvement in the field of minimum housing.

This descriptive section provides the base for the next objective, which is an analysis of the seven major sets of
minimum standards that are currently being recommended and used in Delhi and Madras, the two case study locations. Several sets of recommendations are used in these two metropolitan areas, but an effort was made to restrict and focus the scope of this study on the minimum recommendations of the largest housing agencies in these two urban centers. In this section, seven sets of standards are discussed in detail. They include the following:

**National standards**

1. National Building Code
2. Indian Standards Institute standards
3. National Buildings Organization standards

**Local standards specific to case locations**

4. Tamil Nadu Housing Board recommendations
5. Tamil Nadu Slum Clearance Board recommendations
6. Tamil Nadu World Bank Circle minimum standards
7. Delhi Development Authority minimum standards

The objective of this exercise was to do a cross comparative analysis of the seven sets of minimum standards to reveal variations and differences among them. A table or matrix form was developed as part of this study. Basically three groups have been established. The first relates to minimum space standards for the different living areas of a low cost dwelling; the second relates to recommended
building materials and techniques; and the third includes general recommendations, including minimum setbacks, lot sizes, density and so on. The matrix was developed to indicate the minimum, maximum, mean and modal values for each feature as applicable, and a comparative discussion follows the tabulation process. This section fulfills the third objective.

Finally, the models or criteria that have been used to establish the existing minimum standards are discussed in detail as part of achieving the fourth objective. The stated objectives and criteria of each are identified. A new minimum standards framework is then suggested based on the analysis of the existing frameworks. New components are introduced into this system based on the material reviewed. The input, throughput and output factors are assimilated from each framework, and then are pooled together to form the new framework, indicating the different processes involved in the formulation of minimum standards.

The comparative study of the minimum recommendations and the proposed framework, along with a discussion of possible implications for future policy directions forms the bulk of the minimum standards strategy that is the main focus of this study. It is hoped that the model and the analysis of the minimum standards will be a practical tool
that can find application in the New Delhi and Madras metropolitan areas, besides being one starting point for further research and development of a more appropriate framework for one basic set of realistic guidelines.
CHAPTER 4
REVIEW OF MINIMUM STANDARDS

A Brief Review of Urban Settlements Policy in India (1947-1987)

The process of the evolution and major transitions in human settlements policy, programs and action in India can be broken down into four fairly well defined phases spanning the forty years 1947 - 1987, based on the review of relevant materials. The identification of these four phases is supported in Bala (1986), Development Alternatives (1988) and Mohan (1977).

Phase I: Assessment and institution building (1947-1960)

This period was essentially characterized by the provision of an adequate infrastructural base for economic development. The investment in the social development sector, including housing was comparatively lower. The outlay on housing was about 1.9 percent of the total budget, and the major expenditure was in the area of urban housing and urban development. A number of subsidized, loan and rental housing schemes were launched to provide housing for the lower, middle income and other special groups. The total number of houses constructed in this period by Housing
Boards and other formal agencies was less than 0.16 million (Development Alternatives, 1988).

Land was recognized as a key issue in urban development. The primary concern in the area of technology, building materials and design was the cost of construction and scarcity of "modern" building materials. This phase saw an immense investment in modernization and the foundation was laid with increased production capacity for the entry of cement and steel into the housing arena in the 1970s.

The strategies adopted during this period were linked to governmental interventions in the area of legislation, the initiation of subsidized programs and the formation of specialized institutions like Housing Boards and Development Authorities to take up housing and land development programs. A strong focus on the need for physical planning emerged at the end of this period.

The growing housing gap and the difficulty of finding funds to close it were recognized. Some housing infrastructure, institutions and program execution experience were built up during this period. Still, the seeds of a number of attitudes and values towards shelter which would have a definite impact were sown in the field of policy making, including no strong attempts to include the community in the planning process.
The production of modern building materials like cement and steel was initiated, even as doubts were being expressed by a few that this might later create problems for people aspiring to materials and buildings beyond their means and local resource base. Type design construction (the use of a few typical designs regardless of the local context) was also taken up, a move which would come to be evaluated in later years. The overall impact of these interventions continued to be negligible as the shelter situation continued to deteriorate with increasing population growth, decreasing additions to new housing stock and little emphasis on upgrading (Bala, 1986).

Urban management became a new issue. The limited implementation of the plans prepared for urban areas and the almost total failure of land control measures to curb the growth of urban land prices became increasingly evident.

**Phase III. Management and shelter programs (1970-1979).**

The early part of this period was dominated by an energy crisis which had a direct impact on development plans and resource conservation. The focus of national development shifted to poverty alleviation, of which shelter was a subsidiary concern. The planned outlays for housing increased marginally to 1.25 percent and for urban
development, more substantially from 0.21 to 0.75 percent. However, the outlays for slum development, physical planning and research all dropped (Planning Commission of India).

Policy makers rather suddenly began to appreciate the need for new strategies to make shelter available to the poor on a mass scale. First, there was a major policy shift from slum relocation to upgrading, and the acceptance of the fact that slums would continue to exist. Second, the lack of appropriate technology and standards and the opportunity offered by adequate design and information dissemination were recognized for the first time. Third, some policy makers began to realize that the failure and rejection of some housing programs was due in large measure to inadequate opportunities of public participation.

The need for a national financing structure led to the formation of the Housing and Urban Development Corporation (HUDCO), which is now the primary financing agency. Official agencies were also established for environment, energy and pollution control. Several non-government initiatives were launched during this period. International agencies like the World Bank promoted the setting up of large metropolitan development programs, including several innovative approaches like the sites and services schemes in Madras.
The primary beneficiaries of the formal sector schemes were employees of the formal sector. The Urban Land Ceiling Act of 1974 (from the Compendium of the Urban Land Ceiling and Regulation Act, Ministry of Works and Housing, 1977) had little impact on land values, which continued to rise. Increasing commercialization of traditional building resources and growing scarcity of many of these led to a general lowering of the quality of materials used for construction among the poor.


This period has been marked by relatively rapid economic growth, some mobility and increased benefits to those employed in the formal sector. In the area of shelter, the seventh current five year plan envisages a dramatic turn-around in policy, seeing the government's role change to one of "facilitation", from that of "implementation". The government also increasingly expects to mobilize private savings for investment in the shelter sector, and seeks to direct most formal sector efforts towards the development of land and infrastructure. The national draft housing policy (from National Housing Policy, Ministry of Urban Development, 1988) was released in May
1988, but this proved to be a disappointment in that it repeated many of the same platitudes as before.

The sixth plan saw some increase in formal house building activity, leading to the construction of 0.36 million houses, one-third of the total number built during the thirty-five years of planned development. The seventh plan has allocated a further increase, with urban development now receiving 1.2 percent of the outlay compared to the previous figure of 0.78 percent (Development Alternatives, 1988). Formal sector interventions have begun to allow for some community and local participation, and recognize, in varying degrees the capacities, variations and potential for innovation and self-reliance among the people who make up the mass of the nation's shelterless.

The definition of the shelter problem is beginning to take on some socio-economic dimensions and also to being perceived as a generator of employment. Environmental and resource management considerations are surfacing as major settlement issues. Integrated strategies to link shelter activity with other development programs is being sought.

HUDCO programs and financing procedures were redefined in their scale and scope, especially in the areas of subsidies, loan recovery, and cross subsidization. Small and medium town development programs were launched, as were
the basic services programs in cities. Environmental improvement and community development programs also gained momentum. Also, innovations were seen in the granting of tenure rights and construction assistance to slum dwellers in addition to providing some urban poor with serviced sites. Although progress has been made in the attitudes of the government towards low income housing, several more barriers have to be broken to achieve stated objectives.

Minimum Standards in the Case Locations

As part of the preceding discussion on policy emphasis, the establishing of particular guidelines along with the development of related agencies to control and monitor formal sector involvement in housing was mentioned. This section will deal with the different sets of minimum standards that are being recommended in the two case study locations. There are seven sets of recommendations that are most widely used. Three of these are used on a national basis, and they have been discussed first. The major housing agencies in New Delhi and Madras use one or more of these seven sets of minimum standards.
1. The National Building Code of India (NBC)

This code is the major national guideline which is followed more often than any other code. The first version, titled as given above, was published in 1970, and the latest version, in 1983. Specialist panels, under the aegis of the Planning Commission of India, comprising architects, town planners, materials experts and structural, construction, electrical, illumination, acoustic and public health engineers, worked to develop this code.

The expert panels were set up in the first place because it was felt that:

"...methods of construction were outmoded, designs were overburdened with safety factors and building byelaws and regulations were outdated and did not cater to the use of new building materials and construction technology...they also lacked uniformity, and were more specification, rather than performance oriented." (p. v)

The NBC was to unify building regulations throughout the country, but as the introduction to the code itself acknowledges,

"As late as 1983, in spite of the best efforts by all concerned to implement the code, the revised byelaws have not been adopted by the concerned agencies due to procedural bottlenecks." (p. vi)

The code basically covers aspects of structural sufficiency, fire hazards, health aspects of buildings,
development control rules and regulations for water supply, drainage, ventilation and electrical installations. While it is stated that the choice of materials and methods of design and construction was left open to encourage latitude, the structural specifications are so rigid that use of newer, alternative materials, as proposed even by federal agencies like the National Buildings Organization, is inhibited.

The introduction to the code also states that "revision and changes according to changing needs are important aspects of the code" (p.ii). This is interesting in light of the fact that despite the voluminous research that has been done in recent years, only one revised edition was published in thirteen years, and since 1983, no modifications have been made.

The NBC is a document of a little over 900 pages, of which nearly half deals with complex tests for the structural safety of cement and steel building components. With so much emphasis being given to these materials, there is, therefore, an inherent bias in the code.

Exactly three pages deal with low cost housing, and that too, as an appendix to the introductory chapter. This possibly is representative of the government's "commitment" to resolve the housing crisis in India and to alleviate the
shelter poverty among the poor masses, particularly in urban areas. The salient points as relevant to this study, have been listed in tables at the end of this section, as well as for the other six sets of minimum recommendations.

2. The Indian Standards Institute (ISI) guide

The ISI was to be the agency which would initiate a vigorous implementation drive to propagate the contents and use of the NBC code when it was first published in 1970. Subsequently in 1978, the ISI published a guide for requirements in low income housing, where the categories of features were identical to those in the NBC. The point of issuing a separate set of guidelines eight years later with very few variations from the original suggestions seems indistinct. Moreover, the second version of the NBC (the source used in this study) continues with the same categories, with no additions and only a few minor variations in the numerical values.

The booklet, titled "Indian Standard Guide for Requirements of Low Income Housing -- (IS 8888:1978)", is small and about ten pages long. Broad suggestions here include:

1. increased densities with clusters of about 400 dwellings
2. relaxing standards without compromising any of the original objectives

3. mass housing and incremental housing schemes

4. deal only with permanent structures in all cases

5. use any specification for materials and methods, but only from the NBC

6. requirements should be laid out for easy design processes for public as well as private sector agencies. (ISI, 1978)

These suggestions came about in the form of the ISI guide as a direct result of a Housing Ministers Conference held in 1975. Political overtones, therefore, could not be avoided, and the insistence on permanent structures to win popular support was one such example. It was also very clearly outlined that all these "relaxations were only very temporary in nature and soon the economic conditions would greatly improve so that all Indian families would have regular housing" (ISI, 1978, p. 4).

Nothing can demonstrate the blinders-on approach of federal housing policy better. If the ISI, as one of the major standard-setting agencies in the country treats lowered standards as a temporary concession, but not as an acceptable solution, new approaches will never really be initiated. This is particularly significant in that most
new paradigms for third world urban housing problems have the concept of reduced standards worked somewhere into their frameworks. The IS:8888-1978 is yet another one of those innumerable redundant statements that the government issues periodically, and not surprisingly, it is treated as such. To even obtain a copy for this study, the author had to approach five different agencies and ministries before successfully getting a copy of the standards guide. Still, one important issue that the ISI has been the first to raise has been the distinction between "low cost" and "low income" housing. The guide correctly points out that "low cost" housing can still be unaffordable to the really low income groups, and may not signify an adequate solution for poorer income groups.

3. The National Buildings Organization (NBO) recommendations

The NBO comes under the aegis of the Ministry of Urban Development. It is primarily a research agency which has been publishing substantial material on the state of housing and building in India. Work has also been done on several aspects of alternative materials and construction technology, which would reduce costs to some extent.

A development group, comprising several eminent architects and planners, was initially formed in 1977 to
look into minimum economic specifications. They released a document titled "Report of the Development Group on Low Cost Housing including Minimum Economic Specifications", stating general recommendations on minimum cost housing based on issues of current demand and supply relationships, the existing type of structures, the capacity to pay and the resources available. These recommendations in the NBO document were more comprehensive than their predecessors.

The main objective was "to ensure adequate and decent accommodation and a suitable living environment" (NBO, 1978, p.124). The target was to wipe out the housing shortage by 2001, and "all temporary structures would have to be totally replaced by permanent structures with the construction of additional housing for all increases in population" (p.26). Temporary structures here have been defined as all structures not made of brick or cement for walling, and concrete or metal sheets for roofing (NBO 1978,1984).

It was not until 1984 that the group reconvened and listed specific minimum standards, which have also been tabulated here. The minimum standards for a basic home, as quoted in the Journal of the Institute of Town Planners in 1955 is a two room house, with an additional bath, water closet space and a separate kitchen. These were taken to be the norm here, even 29 years later.
In the area of alternative materials, techniques that were new at that time have been listed as possible choices, but with the caveat expressed that as these had not been codified (and most still have not been), it would be difficult to use them in the field. Much of this work has been used mostly in the experimental projects that the NBO periodically participates in, mostly in and around Delhi. By all accounts, these have been successful.

But even after 15 years, most of the NBO's work has yet to be incorporated into the codes. The government's lack of encouragement to one of its own agencies exemplifies the gap between research and implementing agencies, an issue acknowledged by officials themselves. In fact, it was indicated that the NBO will probably be phased out in the next plan period, laying to waste all the years of effort that have been put into research in low income housing by the NBO.

4. Minimum standards of the Delhi Development Authority (DDA)

The DDA was established in 1954, but really started its housing activities only in 1967. Up to 1984, they were constructing housing units, usually averaging about 4000-6000 units per year, which was hardly adequate. Since 1984,
following the World Bank experience in Madras, some sites and services schemes have been launched.

Interestingly, the DDA doesn't use slum upgrading schemes because a main priority of the local government has been to move all the Low Income Groups (LIG) and EWS squatters out of the planned city of New Delhi. The DDA was an active participant in this "resettlement" process. Between 1960 and 1973, 58,000 families were relocated, and from 1973-1979, 140,000 units in the main city were demolished leaving 700,000 evicted squatters with nowhere to go (van der Linden, 1986). Some were moved to the resettlement colonies, which were hurriedly erected shantytowns across the river.

Migrant squatters were described to be "like plague or some other rare kind of fever, which would cripple and kill the city" by the then mayor of Delhi (van der Linden, 1986, p. 91). In that context, the DDA claimed to have achieved four main objectives by demolishing the slums:

1. provide "regular and decent housing" for those living on unauthorized land in sub-human conditions
2. to reclaim land earmarked for other uses
3. to clear slums from congested areas and provide accommodation for people living in "suffocation and congestion" and last, but not the least important,
4. to provide a "facelift" for Delhi, especially with the 1982 Asian Games drawing near.

This elitist approach totally disregards the fact that even today, roads are non-existent in these colonies, and the "decent accommodation" is basically a morass of dilapidated structures on mud paths inches deep in trash and sewage. With about one water standpost for about 50-75 families on the average, it is of no great surprise that annual outbreaks of diseases manage to wipe out about 20-30 percent of the children in these areas.

This naturally leads one to wonder about the minimum standards that the DDA attempts to enforce. It was indicated, in several conversations with officials in this agency, including the Director of the City Planning Wing, Mr. R.G. Gupta, that the DDA uses its own guidelines which vary depending on the economic and social circumstances. Highly arbitrary standards are used, with little reference to the more prevalent guidelines that have already been discussed.

The DDA mostly confines itself to building housing for the lower middle income groups. Standards normally range from non-existent (where the agency restricts itself to the provision of a plot, usually to the EWS groups, and then turns a blind eye to the construction procedures) to some
semblance of building and construction guidelines in the higher income housing. The standards have been relatively unchanged for the past decade or so, and this is interesting, especially since so much of the building research in the country originates out of Delhi, and the DDA would have first access to it.

5. Minimum recommendations of the Tamil Nadu World Bank Circle (TNWBC)

The TNWBC is the extension of the Madras Urban development Projects I and II (MUDP I from 1977-1980 and MUDP II from 1981-1987) initiated by the World Bank in Madras (Structure Plan for the Madras Metropolitan Area, 1980). It is now supposed to be in the process of being extended statewide.

During the summer visit to India, however, there were several indications from officials that the programs were being cut back, and fewer options were being offered. Currently, the TNWBC's activities in the sites and services schemes appear restricted merely to allotting the individual plots of land. The subdivision, supervision and enforcement of regulations lie with the Madras Metropolitan Development Agency (MMDA). A check with the MMDA revealed that beyond prescribing densities, access road specifications and layout
approaches, the construction of the housing was left mostly to the imagination and convenience of the residents.

While this may not be a bad thing, the issue of minimum standards for adequate health and safety comes to mind here. The residents build mostly on their own, with less than adequate technical assistance on site, which was a key component of the original program (Robben and van Stuijvenberg, 1986). The only on-plot regulation that is enforced is the provision of a 1.0m by 1.2m sanitary core, which the TNWBC builds before handing the lot over to the resident.

Rough access roads are also laid out and streetlighting and water connection pipes are also provided. While the TNWBC is good about the provision of infrastructure, poor implementation phasing usually results in the delayed connection of these services. Initially several minimum guidelines were laid out, based on World Bank experiences in other parts of the world, including specifications on the structure types for the different options. While many of these are now infrequently used in the Madras schemes, they have been included in the tables.

The slum upgrading schemes are implemented by the Tamil Nadu Slum Clearance Board (TNSCB) and minimum specifications
for those are prescribed by that agency, whose recommendations are also included in the Tables 1-3.

6. Minimum specifications of the Tamil Nadu Housing Board (TNHB)

This is the main housing agency in the state and it was established in 1976. Initially the housing board was responsible for the construction of built units for the higher, middle and lower income groups. However, when it became increasingly clear that the public sector was having trouble providing enough units on par with the demand, particularly for the lower income groups, the major responsibilities for that sector were shifted to the TNSCB, created in 1974, which in turn, shifted some of its responsibilities to the TNNBC (Tamil Nadu Slum Clearance Board: Performance and Prospects, Government of Tamil Nadu, 1989).

However, the TNHB and the TNSCB both still build completed houses, ostensibly for the low income sector. The TNHB technically builds for the LIG, while the TNSCB builds tenements to house the poorest sections of the population, the EWS. The minimum specifications for the LIG housing from the TNHB and for the tenements from the TNSCB are both included in the Tables 1-3.
The presence of three major agencies in one metropolitan area, all involved in the planning and design of low cost housing, and each following its own guidelines, naturally creates confusion about what the requirements are. This excludes the Madras Metropolitan Development Agency (MMDA), which is the main implementing agency in the city, and which is responsible for enforcement and regulation of all codes and regulations in the metropolitan area. More importantly, is very difficult to determine what each agency's responsibilities are, and where the sphere of influence of each ends, which is clearly a problem of policy implementation.

7. Tamil Nadu Slum Clearance Board (TNSCB) recommendations

Despite all the clamor about "innovative schemes" and adopting more innovative and appropriate methods, the TNSCB has continued to demolish slums and squatter settlements, often failing to relocate the dwellers soon or adequately enough. From 1974-1984, the TNSCB constructed about 42,000 tenements while displacing more than twice that number of families (Government of Tamil Nadu, 1989). Despite the fact that 65 percent of the units have subsequently been sublet to higher income groups (a fact acknowledged by officials in the agency), and the poorest of the poor are back in slums
or on the streets, the agency is going right ahead with their schemes, though they are not obviously reaching their target population. Granted that they are adding to the stock, the fact still remains that the filtering-down process is not reaching the EWS, who are the most urgently in need of assistance.

As an example of the multiplicity of responsibilities, the TNSCB simultaneously supervises the slum upgrading schemes of the TNWBC. This is an extreme example of one agency pursuing two polar courses of action. While some of these efforts, like those of the World Bank, have to be lauded for their intent, what usually happens is that the slum dweller is caught between several agencies and their independent cycles, and doesn't reap adequate benefits. On the other hand, unscrupulous dealers, often with political connections, take advantage of the loopholes and gaps, and use it to maximize their profits.

In summary, it can be seen that most of the minimum guidelines just discussed evolved in the 1970s - a decade of some political change in India. As in many other third world countries, it appears that the formulation of none of these guidelines was entirely devoid of some sort of political considerations. Several guidelines were established with little relevance to each other, although
the stated objectives were nearly similar for all of them. Differences are seen to exist even in guidelines recommended for the same location, and these variations have been expressed in terms of measures of central tendency like the mean, median and modal values for each feature. The following tables are divided into three sections - Minimum Space Requirements, Recommended Building Materials and General Recommendations. Maximum, minimum, mean, median and modal values are given as relevant for the seven sets of recommendations. A brief discussion of the contents of the tables follows.

The sources for the data in all three tables are given below:

4. DDA -- *Housing for the Poorer Section of Society in Delhi*, City Planning Wing, Delhi Development Authority (1985).
5. TNWBC -- Specifications from drawings for the Design of Core Units in the Sites and Services Schemes, 1988.
6. THHB -- Specifications from the Type Design for the Economically Weaker Section and Low Income Group Houses drawings (1987).

Discussion of Tables

Table I includes the minimum space requirements as reported by the seven agencies. The features have been divided on the basis of what kind of space the recommendations are for, and include habitable or living rooms, bathrooms, kitchens, circulation and storage spaces, which are the most common areas in most formal sector minimum housing.

A quick review of the section on the measures of central tendency reveals that some features show widely ranging recommendations. One, for instance is the minimum floor area recommendation, which varies from a minimum of 13.5 sq.m to a maximum of 45 sq.m, which is more than three times the minimum recommendation, and surprisingly, the recommendations are both from the D.D.A, which can create some problems for designers in New Delhi.
<table>
<thead>
<tr>
<th>TABLE 7: MINIMUM SPACE REQUIREMENTS</th>
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<tr>
<td>FEATURES</td>
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<td>--------------------------------------</td>
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<tr>
<td><strong>Habitable/Living Spaces</strong></td>
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<td>Area (sq.m)</td>
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<td>Length (m)</td>
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<td>Height (m)</td>
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<td><strong>Bathroom/W.C.</strong></td>
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<td>Area (sq.m)</td>
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<td>Height (m)</td>
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<td><strong>Kitchen</strong></td>
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<td>Area (sq.m)</td>
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<td>Width (m)</td>
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<td>Height (m)</td>
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<td><strong>Circulation spaces</strong></td>
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<td>Area (sq.m)</td>
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<td>Length (m)</td>
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<tr>
<td>Height (m)</td>
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<tr>
<td><strong>Storage spaces (sq.m)</strong></td>
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<td>Area (sq.m)</td>
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<tr>
<td><strong>Minimum floor area (sq.m)</strong></td>
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<td>Area (sq.m)</td>
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*Where ranges of recommendations are seen to exist, the lower value was taken into consideration for the calculation of the minimum, mode, mean, median and modal values of the data of this paper was on minimum standards or the lowest recommended value.*
The recommendations for bathroom and kitchen areas tend to be nearly similar, but those for the living areas tend to be widely disparate, the range being from 23.05 to 7.5 sq.m. One possible explanation for this could be that the service zones in a house tend to have more rigidly defined norms for space than living areas, which can be designed with more latitude. Several uni- and bi-modal ranges are also observed, and these are evenly distributed through the range of features included in this section.

It is also interesting to note the similarities and differences between the different sets of standards. The NBC and the ISI recommendations tend to be nearly similar, while the TNSCB probably has the most restrictive recommendations on the whole. The TNHB and the TNWBC recommendations appear also to have related values for different features, which facilitates the work of designers in that particular area.

Table II. indicates the most commonly recommended building materials for the most important structural components of a dwelling unit. These have been simplified from their original architectural terminology for the benefit of the lay reader. An overwhelming predominance of recommendations involving brick and cement and R.C.C. (reinforced cement concrete which means the combined use of
<table>
<thead>
<tr>
<th>FEATURES</th>
<th>WBC</th>
<th>ISB</th>
<th>DDB</th>
<th>TMD</th>
<th>TMC</th>
<th>TMB</th>
<th>MGM</th>
<th>Total recommendation</th>
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<td><strong>ROOF</strong></td>
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<tr>
<td>Cement, or brick tiles, or prefab.</td>
<td>Flat roof on flat roof sloping</td>
<td>Precast R.C.C. slab on precast</td>
<td>R.C.C. slab laid on concrete</td>
<td>Vinyl sheeting R.C.C. slab laid on concrete</td>
<td>R.C. cement slab/tiles laid on precast</td>
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<tr>
<td>conc. beams, or</td>
<td>conc. tiles</td>
<td>or brick tiles on top, 3-inches-or</td>
<td>beans on</td>
<td>beams. Situated</td>
<td>on concrete</td>
<td></td>
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<tr>
<td>precast concrete</td>
<td>beams. Situated</td>
<td>1/16-inches</td>
<td>R.C.C.</td>
<td>on top.</td>
<td>precast</td>
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<td>on top.</td>
<td>underslab.</td>
<td>beams, or wood</td>
<td>on conc.</td>
<td>beams. Situated</td>
<td>beams, or wood</td>
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<td><strong>WALL</strong></td>
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<td>4&quot; brick with 6&quot;x4&quot; brick wall</td>
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<td>6&quot;x4&quot; brick wall</td>
<td>6&quot;x4&quot; brick wall</td>
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<td>6&quot;x4&quot; brick wall</td>
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<tr>
<td>Mortar. Lining</td>
<td>with mortar</td>
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recommendations involving brick and cement and R.C.C. (reinforced cement concrete which means the combined use of cement and steel) can be observed. This despite the fact that it has been indicated repeatedly that these materials increase the cost of construction tremendously. Another instance is the almost universal recommendation for cement plaster, which costs about ten times more than lime plaster, which is nearly as effective, and is more readily available.

Even the NBO, which is the primary research agency in the country, refuses to innovate (translated to taking risks), and remains entrenched in the traditional dogma. If this agency does not look beyond the narrow confines that exist today, it would be too much to expect any other agency to innovate.

The recommendations for certain features like brick walls are nearly the same in all the cases. The most expensive component of a building in India is the roof, and almost all the recommendations call for the use of R.C.C, which is perhaps the most expensive building material in the market today. It is also disheartening to note that the TNHB persists in recommending the use of asbestos sheets not only for roofing but also for door panels despite world-wide concern over the health effects of this material.
The widest range of recommendations is seen for the door and window openings, where some use of more innovative materials is seen. For instance, the use of honeycomb brickwork is a feature that has been encouraged by several research agencies since timber is by and large difficult to obtain and is expensive in most parts of the country. Ironically, most of the publications of the NBO exhort the use of features like honeycomb blocks, but in their own specific recommendations, they fail to represent this. Possibly, the widest range of recommendations is seen in the last section on openings because this is comparatively less important, and involves fewer possibilities of structural failure.

One can only conclude that the fear of structural failure looms over the heads of officials who hardly want to risk their necks or their jobs to save the exchequer some money to be used in other critical areas. In fact, this attitude was explicitly stated to the author during the course of several interviews in the summer. It was hoped at the beginning of this study, after reviewing several research reports, that at least some agencies like the NBO and the DDA (because of proximity to research agencies in the capital) would have included some of the newer materials like stabilized soil, country brick for walls, lime concrete
and lime plaster and brick tile roofing, restricting the use of cement and steel products in their recommendations. However, the table indicates that such innovations are yet to manifest themselves, and the most likely reason for that is that unless the NBC takes the initiative to codify these, none of the smaller or state agencies will be willing to take the risk.

Table III lists some general recommendations including the minimum lot sizes, the density, setbacks and access roads. As with the minimum floor area in the first table, the minimum lot size recommendations also vary a great deal, with the maximum value of 55 sq.m being about three times as high as the minimum recommended value of 17.5 sq.m. Interestingly, the maximum recommendation comes from the NBO, the main research agency. Road width recommendations do not appear to be significantly different from each other, but for path widths, the variation is from two to six meters.

Other general recommendations have been included at the end of this table to indicate the kinds of structures that each agency favors. As can be seen, these vary from basic core housing to built clusters of dwelling units. Some recommendations call for multi-storyed development up to a height of four floors, which has been determined as the
maximum height for walk-up units. The DDA and the TNHB, on the other hand, restrict the height of their buildings to one or two stories at the most, which is a commendable break from the tradition of providing tenement-like public housing. The provision of sanitary facilities also varies a great deal, with some agencies calling for communal bathing facilities, but nearly all agree that individual toilets to each unit is an important and necessary feature because this has serious health implications.

In summary, living and social areas had a wider range of recommendations than did the work and service areas in the house which are the kitchen and bath areas. Perhaps this may be explained by the fact that these zones have fairly commonly recommended anthropometric requirements for the use of standard appliances and fixtures. When the requirements for living spaces varied widely, they often came from the same agency, usually the DDA.

The two national sets of standards, the NBC and the ISI, were nearly similar, as also the two local sets of standards in Madras from the the TNHB and the TNWBC. Despite substantive research in building materials and techniques, there were continued recommendations for the more capital intensive and expensive materials like cement and steel.
In conclusion, it can only be stated that the agencies do not appear to suggest significantly different values for certain features like building materials. But in the area of minimum space requirements, certain spaces which have less rigidly defined norms of anthropometric dimensions are seen to have varying recommended values. In all, significant reduction to present costs does not appear to be possible using the recommendations that have been listed in the tables. Clearly, the volumes of research that are being conducted has to be incorporated in the code for major changes to be observed.
CHAPTER 5

GENERAL CRITERIA USED FOR ESTABLISHING MINIMUM STANDARDS

If it is to be argued at all that the extant minimum standards being used in the case locations are not fulfilling their original objectives, as may be apparent from the growing housing crisis, a review of the criteria that were used to establish these standards seems necessary. Field research in the summer established that with the exception of the TNWBC, none of the agencies followed any one particular framework completely. They have, however, based much of their work on one or the other general framework. The following section of the paper discusses the main criteria drawn from these frameworks.

Visual representations of these criteria as sketches have been developed by the author, when these have not been immediately available in that form. This was done as a part of the process of evolving a cumulative model at the end of this section, which includes both a list of significant criteria selected from all the seven frameworks, as well as a graphical representation of these criteria.
1. The NBC and ISI

The National Building Code of India and the ISI recommendations both rely on a similar planning process for the formulation of parameters on their requirements for low income housing. These have been represented graphically on the following page (Fig.2). The components for this figure were derived from recommendations in the National Building Code (1983) and the Indian Standard Guide, ISI (1978) for selecting criteria for minimum standards. These have been briefly listed below:

1. Overall development plan - Housing component of the regional/urban development plan
2. Land - Issues of acquisition, development, and most important of all, the availability and the accessibility of land
3. Infrastructure - Both the types, as well as the level of services required
4. Resources - Fiscal, physical, labor and community resources available for construction of low cost shelter.
5. Building Materials and Building Construction - Supply criteria, including the production, management and distribution of these materials. Research and development of alternative materials and techniques
Figure 2: Graphical representation of criteria used by the NBC and the ISI (NBC, 1983 and ISI, 1978).
6. Institutional - Structuring of the policy, finance, implementation, regulation and administration agencies. Details and extent of private sector involvement in this sector

Figure 2, derived by the author, is based on the criteria listed above. All these factors are believed to impact on the formulation of minimum standards. Both the design and the list above clearly exclude any mention of social, cultural and traditional norms and user preferences. All choices rest with the government. During several interviews conducted in the summer, this attitude manifested itself.

The prevailing attitude is that determining user preferences or trade-offs would take up unnecessary time and resources. In any case, the numbers involved were too overwhelming to successfully complete such an attempt. And the target population had better be happy that the government was doing anything at all to help them. This patronizing attitude has only served to alienate the target population from the official sector. Clearly, a greater level of community participation with increased emphasis on user preferences would be required steps to building a more successful housing program in the country.
2. *The NBO*

The NBO claims to have based much of its recent work on the *Guidelines for Human Settlements Standards*, published by the Danish Building Research Institute for the United Nations Economic and Social Commission for Asia and Pacific. The latest edition of this manual was published in 1983. This work was initially drafted in 1979 by an expert group meeting on standards in Bangkok, Thailand.

This document suggests only recommendations, not actual standards themselves. The group anticipated that this basis would be a solid foundation for professionals in their respective countries from which to devise standards. They advocated the following as requisites for setting standards:

1. conscientious documentation of existing conditions
2. perusal of existing policy guidelines
3. listing of feasible or relevant options
4. importance of specific project conditions (Danish Building Research Institute, 1983).

Such a beginning seems logical for setting standards. As for standards themselves, the guidelines lapse into platitudes — standards should be flexible, enforceable, attainable by the community, appropriate to local technology and so on, without any clear directions on how to achieve these. Despite their objectives of "optimizing resource
utilization, social justice, provide healthy living for all
and narrowing the gap between the rich and the poor", 
(Danish Building Research Institute, 1983, p.2), the group
fails to look beyond the usual paraphrases.

There is an interesting checklist of possible options, 
including one for building technologies, with an associated
one for conditions for the choice of technologies. This is
prescribed as an example of "lists of options as tools for
informed choices", which is an important objective of the
document. It is an interesting concept, and one that could
work well in the evolution of a framework for establishing
minimum standards, considering all possible options as input
factors into the research process.

If developed in a graphic form, the criteria may be
represented as indicated on the following page. It can be
seen that equal emphasis is laid on the development of
standards and appropriate technology choices, and the
determinants of these two have been listed as influencing
factors. Figure 3, developed by the author, was based on
the criteria listed in the Guidelines for Human Settlement
Standards (Danish Building Research Institute, 1983).
Figure 3: Visual representation of the NBO criteria (adapted from the Danish Building Research Institute, 1983).
The inclusion of the "quality of life" feature seems significant, if not obvious. That is clearly the foundation on which any standard-setting strategy must be based, but it is often overlooked as an integral part of the process. Also the impact of federal policy through land use practices has been indicated as a visible component of the model: another feature which is often assumed, but not implicitly or explicitly expressed.

3. The TNHB

The TNHB claims to use aspects of the United States Agency for International Development (USAID) model. A simple version of this model is seen in Figure 4. The USAID model states that the setting of realistic standards needs to be based on the concept of affordability in combination with the commitment of responsible officials in the country involved (Gray and Richardson, 1985).

The assessment of national housing needs involves:

1. the projected need for housing and
2. the level of investment required.

The methodology breaks down into factors:

3. supply - cost of alternative housing solutions, condition of the existing housing stock and the
Figure 4: The USAID model of housing needs
(Gray and Richardson, 1985)
potential impact of the increased demand on these costs, and

4. demand - population growth, household formation, household income and its distribution.

This is a computer based model which is easy to use, but the accuracy of the assessment is directly proportional to the accuracy of the data inputted. There are also some built-in assumptions -- that total housing needs projected for each five year time frame will be fully met within minimum standards, and that no sub-standard housing will be built during the life of the model.

In the study by Gray and Richardson, this model was contrasted with another model developed in 1983 by Stephen Merrett, whose approach is shown in Figure 5. This model is based on housing consumption requirements, which Merrett tries to differentiate from housing needs. Future consumption requirements will be determined by the existing housing poverty (defined as the shortfall in actual standards of housing consumed in comparison with defined norms i.e. targeted minimum standards). In the article, it is stated that Merrett suggests that such minimum standards be developed in liaison with the user based on four factors - physical character, control, and environmental and relative locus.
Figure 5: Merrett's model of housing needs. (Gray and Richardson, 1985).
While this model is superior to the USAID model in that it considers users' perspectives, it also calls for a great deal of social research, which is difficult in many developing countries. Merrett does warn that the higher the standards, the greater the number of households suffering from household poverty. The re-iterative approach suggested by Merrett for evaluation and feedback is a good one, as are the issues of flexibility and considering effective demand i.e. what people are willing to pay for their shelter.

The USAID model views the problem as technical, and the main concern is to contain the financial costs. The term 'user' only means the model or the manual user. Merrett's approach is more theoretical and less precise on the issue of obtaining data, but it considers the ultimate beneficiary to a greater extent, which is desirable.

4. The DDA

The Methods of Developing Standards and Targets for Housing and Related Facilities, as developed by the Department of Economic and Social Affairs, U.N. (1986) and earlier versions of the same manuscript have essentially been the base on which many of the DDA's strategies (except for the resettlement process) on minimum cost housing were
founded on (Housing for the Poorer Sections of Society in Delhi, DDA, 1985).

The general principle is that minimum standards should represent a clear improvement over the present state of living. This seems logical and more interestingly, the model also suggests that maximum standards also be set so that scarce resources do not benefit only a favored few. Initially, public subsidiaries are also suggested for the poorest section.

The basic criteria for developing standards are graphically represented in Figure 6. The more unique aspects of the criteria listed by the Department of Economic and Social Affairs are the suggestions that:

1. some dwellings be built at higher than minimum standards to act as incentives, but that this proportion be very carefully monitored
2. if resources are inadequate, then the options could be:
a) to lower the minimum standards
b) to maintain the standards, but to build at a lower rate
c) to emphasize self-aided housing to increase the ratio of minimum standards dwellings per population
Figure 6: DDA criteria adapted from the Department of Economic and Social Affairs, U.N. (1986).
d) to design dwellings according to a higher-than-minimum standard suitable for future conditions and equip the dwellings for temporary occupancy by two or more families

e) to concentrate only on core and shell housing and build many of them to meet minimum standards for more dwellings

f) to maintain basic standards only for certain special programs, and lower the standards on all other types of construction activity.

Other suggestions include the following:

3. temporarily acceptable standards for the improvement of existing permanent dwellings not able to meet the desired standard, which could permit significant improvement in a relatively large number of units for 10-20 years until the economy can develop to a point where the rate of construction will be high enough to replace them

4. emergency standards for the improvement of existing temporary dwellings to a minimum level of livability for 5-10 years, or for temporary new dwellings to be built with minimum facilities on vacant land for new migrants
This process suggests arriving at housing requirements after determining tentative minimum standards. This is a different approach than usual, when standards are determined by the resources needed to meet the current and future housing requirements. Here, the elements needed to determine housing requirements are listed as follows:

1. existing deficit in housing meeting the standard
2. replacement of obsolescent dwellings
3. population growth and household size

There is little emphasis on income here, or of changes in income levels which could be influential in determining housing requirements, and subsequently, on establishing minimum standards.

5. The TNSCB

The U.N. World model, linking housing requirements and national resources, is an economics-based model developed by Wassily Leontif. It is useful for the estimation of the scale of housing investment required and available till the end of this century. The TNSCB officials indicate that they have attempted to use parts of this model at a local scale, especially those sections relating the concept of urbanization to determine the level of investment required.
The review of the model for this thesis was mostly drawn from a study (Lakshmanan, Chatterjee and Roy, 1979) that matched the level of housing investment that can be sustained by the growth of developing economies against the scale of housing needs generated to identify the kinds of housing that will be affordable. Figure 7 below has been developed by the researcher to indicate the main component of the housing needs factor as expressed in Lakshmanan et al (1978).

![Housing needs components diagram](image)

**Figure 7:** Housing needs components (adapted from Lakshmanan, Chatterjee and Roy, 1979).

Briefly, the article has revealed that the production, consumption, natural resource use, pollution abatement and
urbanization are integral parts of world economic
development, and will affect adequate provision of housing
for all. International comparisons have also suggested that
housing does benefit from increases in income over time, but
in proportion to other goods and services at the highest
income levels.

According to this article, the distribution of income
among urban households also determines the number of
families with different levels of income and ability to pay
for housing. If neither a region's population nor its real
income increased, then it can be assumed that no housing
investment would take place apart from the needs of
replacement capital.

The article concluded that research had indicated that a
significant portion of urban households could not afford the
cheapest low cost housing currently being produced. Even
the newer approaches of using minimum shelter as by the
World Bank may still leave the lowest 25 percent unserved,
since the low incomes of the countries make any substantial
subsidies to the urban poor difficult. Also, current
figures indicate that the increasing average cost of housing
does not match rates of increases in real incomes.

According to this model, an effective and affordable
standard should include consideration of the following:
1. indigenous materials
2. modest space standards
3. lower service levels with shared kitchens and bathroom facilities
4. formal recognition of lower standards
5. health considerations of lower standards.

This strategy is useful in broadly charting out the future investment strategies, and also to determine the rate at which proposed standards can be assimilated into policy.

6. The TNWBC

The Progressive Development model, developed by the World Bank in 1972, has been the basis of the minimum shelter approach that has been executed in several parts of the world. The main focus of this model is the provision of secure tenure and a range of basic services to encourage low income families to improve their housing through self-financing and construction. Improvements in housing conditions are expected to lead to growth in productivity and incomes over time (Keare and Jimenez, 1983). A graphical representation of this model has been indicated in Fig. 8.
Figure 8: Graphical representation of the TNWEC criteria. (adapted from the Progressive Development model, Keare and Jimenez, 1983).
The key concepts of this model are:

1. impacts on the housing stock to reduce overall deficit
2. affordability of projects to the urban poor
3. accessibility of projects to the urban poor
4. impact on socio-economic conditions of the participants
5. efficiency of the shelter programs in terms of self-help program success
6. anticipated problems in implementation
7. potential project impact on urban housing policies
8. observations of the reactions of the target population

In theory, this model seems to be holistic in nature. However, recent evidence has indicated several problems, especially in the implementation phases. Keare and Jimenez (1983) indicate that perhaps too many components are incorporated. The authors suggest more careful analysis to make informed choices depending on the circumstance. They also suggest that current standards be revised to lower levels to decrease unit costs and to increase opportunities for rental arrangements in the schemes.

These issues seem to have become apparent to officials in the TNWBC, where the project options have been reduced.
The previous practices of providing a room or two, or basic structural skeletons appears to be steadily decreasing. All lots are now provided only with the standard sanitary core and basic service connections like water, sewage, streetlighting, electric power and access roads. Technical assistance to families on the site has been dropped also, as already mentioned.

Poor implementation phasing (like inadequate transport links to the urban centers) has raised questions about the success of several sites and services schemes, which have largely been based on the progressive development model. On the other hand, the slum upgrading projects have been successful, leading to increased resource allocation to that sector in Tamil Nadu. This may be a valuable point in determining future shelter approaches.
Selected Criteria for Minimum Standards in Housing

Based on the review of the various frameworks that are being used in the two case study locations, the next objective of this study was to develop a comprehensive set of criteria which could be used in the formulation of minimum standards.

As defined in Streeten (1981), basing a new strategy on extant processes is one way of working, and it is as acceptable as formulating entirely new concepts. Perhaps in a social science such as housing, where there is much room for interpretation unlike in a pure science, the former approach has more merit. It considers previous work and literature, and only suggests modifications by incorporating new or clarified concepts to the existing model. With that approach, it is possible to begin identifying certain broad-based categories of criteria. These have been listed below.

1. Quality of life desired

It is, first of all, very important to determine the particular value or significance attached to housing or shelter in the society. Different cultures view shelter differently in their priorities, and this is often reflected in the official attitudes and policies. Social and cultural
traditions, as well as the organization of the community all play an important role in determining lifestyles.

Will the housing unit allow for economic activity? Is the society organized on communal activity where the community spaces become more important than the individual zones? These are the kinds of questions that must be answered, but whatever the issue may be, it is clear that there is a certain minimum quality of life that is desirable. That is the focus of this paper, and this point has been reiterated several times. What needs to be clarified is that even the minimum level can vary across different societies, even within the same country.

2. Quality of housing desired

Once the quality of life has been determined, the next factor is the quality of housing desired. The permanence of the structure, the size, design and type of housing are all variable factors. And these factors must be clearly outlined in the preliminary stages of the planning process. Poorly defined objectives have often been a prime cause of policy implementation failure in developing nations. And objectives cannot be clarified till the purpose of the project is defined.
The determination of the desired quality for housing is based generally on the same factors as those for the desired quality of life, like social, cultural and traditional norms and values. There are also a few other factors more specific to building activities. These include a review of existing building systems and possible alternatives to these. Physical criteria like the nature of land use, topography/geography, climate and building materials availability in the area also impact on the choice of building systems, and therefore, on the quality of housing.

It is also to be remembered that the quality of housing relates not only to the physical quality of the dwelling unit, but also to the satisfaction it affords to the user. The determination of dwelling space needs also deals with the need for emotional and social spaces. To quote Turner (1972) again, the important thing about housing is not what is, but what it does for people.

3. Observations of existing housing

Any attempt to arrive at estimates of shelter poverty should begin with a thorough inventory of existing housing. Several third world countries lack an adequate base for a detailed housing census, but it is a very important part of determining housing consumption requirements. Any
predictive statement on shelter deficits will also have to involve an analysis of current housing operations.

Since most governments have yet to arrive at a consensus as to what denotes adequate housing, a census need not be judgmental. A descriptive survey of what exists can help arrive at more realistic estimates of what the users consider adequate, and thereby, what the shelter shortages really are.

Requirements for low cost housing must include not only surveys of existing housing, but also projections for additional demand and for replacement needs, depending on the state of dilapidation or obsolescence. Projections for the future should consider issues related to economic, fiscal, social and resource planning.

A key component of determining housing requirements is demographic projections. Most developing nations are generally overpopulated and urban areas in particular face severe pressure. Predicting realistic trends using social research techniques can greatly help determine not only current needs, but also what these needs are likely to be in the future.
4. Formal and informal housing

As part of the preceding discussion, it is also important to delineate what constitutes formal, or in other words, acceptable housing. As mentioned earlier in this paper, informal housing constitutes the bulk of urban housing not only in New Delhi and Madras, but the world over.

To the extent that the attitudes of several governments are changing somewhat in that they are beginning to accept informal housing as a shelter option, it is important to set clear boundaries as to which types of informal housing can be classified as acceptable. Parameters to determine these boundaries need not only include the physical state of the house, but also the investment of the family in the dwelling - emotional, economic, social and fiscal -- as well as the long-term priorities of the users.

The estimates of shelter deficits can vary greatly depending on the government's attitude towards the informal sector housing. The process of determining which of the extant informal sector would be officially acceptable may also help indicate user preferences and building choices that can be used for outlining minimum standards based on existing housing operations.
5. National/Local goals and objectives

In order for any program or policy to be even partially successfully implemented, it is important to have clearly stated goals and objectives. This is very true of the shelter sector as well. The government has to be clear not only about what it wants to do in the shelter sector, but also about what it is realistically capable of doing. Out of these two streams, a single, focused set of goals must emerge.

Of course the goals may be implemented using different strategies based on local circumstances, and this flexibility is a feature that needs to be incorporated into any planning model. But there also needs to be care taken that national and local objectives do not conflict with one another, as is often the case.

Shelter policy also needs to be integrated with finance, land-use, urban development and overall economic and social development strategies. There is also the issue of the resources available to the government, both natural as well as man-made, and the priorities for their use. The availability of land, building materials, and most important of all, fiscal resources are issues that need to be thought out carefully in the preliminary stages of the planning process. Many projects in India, and not only in the
shelter sector, are often abandoned midway because the funds are expended.

Perhaps no component is as critical in helping the poorest section of the population as the level of investment, and more importantly, the level of subsidy, that the government is willing to commit to the low income shelter sector. Traditionally, in India, national as well as local governments, have treated shelter as a low priority sector. While the level of investment has been low, prior to the minimum shelter approach of the World Bank introduced in the early 1970s, the level of subsidy has been extremely high.

Public housing, or entire built units, were seen to be the ideal solutions. This meant that the government was reaching only a fragment of the needy population, and was not spreading out the available resources evenly. With the advent of the World Bank into the shelter scene in India, cost recovery was emphasized. Now HUDCO, the main financing agency for low cost housing schemes in the country has also adopted a cost recovery/repayment plan in most of its schemes.

Some problems have been discovered in the cost recovery programs at the sites and services schemes in Madras. It would appear that the process of collecting the monthly
payments may have to be further refined, as also the
determination of the proportion of the income that can be
expected to be paid towards housing expenditure. In any
case, it is clear that the government will hardly be able to
completely subsidize everyone in the country who requires
housing aid, so cost recovery is obviously an essential
component of any minimum shelter program.

In summary, national and local objectives are
indications of the level of commitment from the government.
Strong political commitment from the government in Sri Lanka
has helped make their Million Houses Program a successful
model which several countries are attempting to modify to
suit their own contexts. Of course, the possibility also
exists that several platitudes may be stated, with little
real commitment behind them. It may, therefore, be hard to
accept all of the government's objectives at face value.
However, clearly defined goals, and a careful review of
their implicit or explicit objectives is essential in the
formulation of a minimum shelter approach.

6. Definition of housing needs

Housing needs can be defined in a multitude of ways -
what the consumer demands, what the consumer can afford,
what the government believes the consumer needs and so on.
Whatever the definition adopted, it is important that it include a comprehensive view of the consumer, the government and any other intermediate actors in the process. Housing needs have traditionally been associated by economists with housing demand, until the realization grew that demand was impacted by other factors such as income constraints, while housing needs translate to a more humanistic or personal level.

Any assumption of need would be incomplete without input from the consumer. While such a process may be tortuous and require more effort and resources, it is essential in that the definition of housing needs has a crucial impact on the formulation of minimum standards. The needs of the user will have to be balanced with the needs of the government, the private sector, and other agencies that may be involved.

There is also the issue of different types of needs like physical needs, spatial needs, emotional needs and most important of all in the case of minimum standards, health and sanitation needs. The needs of the individual or family also have to be balanced with community needs - the issue of externalities becomes all the more important in the context of low income, high-density settlements. Housing needs have to be clarified before initiating the design
process, otherwise the planner runs the risk of establishing design criteria that do not serve the target population.

7. Affordable costs

The cost of the housing project i.e. standard design costs have to be balanced with affordable costs. Affordable costs include a) what the government can afford to invest and subsidize. This will in turn be affected by the resources available and the priorities and goals of the government, and b) what the household can afford, which is often not given as much importance as the first. The household's expenditure on housing is directly impacted on by several factors, which will be discussed in the next section.

Affordable costs also relate to issues like cost recovery. They reflect the government's pricing policy on building materials, land and any other resource connected to housing. The projects will need to be designed to ensure that the beneficiaries are neither prevented from spending what they want and are able to afford on housing, nor induced to spend beyond their capacity and willingness.

These considerations define the concern for affordable costs, which is closely related to the issues of accessibility and replicability. Accessibility is achieved
when families within the specified range of income either qualify or gain entrance to the project. Replicability refers to the goal of having project costs mostly paid by the beneficiaries, which is necessary for increasing the scale of the project without causing unsustainable burdens on local or national budgets (Keare and Jimenez, 1985).

8. Expenditure on housing

Affordable costs must be related to what households can pay for their housing, and more importantly, what they are willing to pay for their housing. This factor also impacts on the levels of subsidy that the government may decide to provide. Households' expenditures on housing can depend on a great many more factors, but a few of the significant ones have been listed below:

a) Household income - This is obviously the most important criterion that will determine what a household can or is investing in shelter. Incomes can include total income of all household members or only the income of the primary wage earner or only incomes connected in some way with the formal sector (which ensures their relative stability). Whatever measure is made to establish household income, it must be clearly fixed in order to arrive at affordable costs.
b) Occupation status - This is particularly important for the primary wage earner in that it will directly impact on the household's income. Most low income urban families in the third world are marginal workers in the informal sector. But this cannot be discounted or overlooked in any way, since there are all levels of employment stability and actual earnings even within the informal sector. It is useful to determine the stability, duration and permanence of the household's various occupations as a measure of their income that can be spent on housing.

c) Household size and composition - This will impact both on the amount of money from their income that the household will spend on housing, as well as to the type of housing that they will want to consume. Demographic data is therefore of importance.

d) Availability of capital/credit - Besides income, the savings of the family is another major financial concern. Even low income, low interest loans require some kind of a downpayment. Housing is a bulk investment of sorts, although admittedly, the scale of investment varies widely. The availability of ready credit is also of concern. This may be public or private sector credit, but to build a housing scheme requires some money upfront.
e) Cost of other goods - Households will consume housing depending on the cost of other essential commodities like food and clothing. While it is true that investment in housing may not vary as much as for other goods, say clothing or food, it is to be acknowledged that given certain other factors like tenure security, households will tend to channel funds saved from other consumer expenditures into housing. Thus shelter is perhaps any household's most durable, as well as the heaviest, investment.

f) Tenure security - This has been established through several studies to be a crucial component of a household's investment or expenditure on their housing. World Bank studies have indicated that in their slum upgrading projects, once the residents were granted de jure tenure, the level of personal investment to upgrade their properties went up considerably. In that light, the tenure status of the household becomes significant.

g) Household priorities - In several societies, as already mentioned, shelter comes fairly low on the list of priorities. Certain families may also be in a transient stage of their lives, for example. Household priorities will need to be established in order to determine the type and quality of housing to be built.
h) Housing quality - This factor is really influenced by all the other factors just discussed. But it is an essential issue to consider since the costs of a housing scheme are directly related to the quantity, and more importantly, the quality of the housing. It almost seems redundant to mention this, but including this feature in the framework will serve as a valuable reminder of the priorities that need to be established in planning low income housing.

9. Choices/ Flexibility of options

Popular aspirations are very important in formulating minimum standards. User preferences have only recently begun to be included in frameworks for designing minimum criteria for housing. Till then, the choices of the beneficiaries were thought to be relatively unimportant. Only when the beneficiaries began rejecting the government schemes did the officials realize the importance of considering what people wanted as opposed to what the government thought they wanted or what the government thought was best for them.

These choices may be explicit or implicit. More than interviewing people, or asking them what they want (which, of course, is important) it is useful to observe their current building activities in the informal sector. The
tradeoffs that people have chosen to make is manifested in the housing that they live in. The amenities that households perceive to be most useful to them are essential in determining the types and level of housing services that can be offered.

An important part of the issue of user preferences and choices is the flexibility of the program. Alternative proposals are important to cater to the variety of households that are being served, and lists of options is becoming a significant part of planning strategy. Choices can be offered in all aspects of the scheme - the financing programs, the tenure choices and the design prototypes, for example.

10. Institutional frameworks

Any program or policy as stated by a government, national or local, must inherently consider the institutional structure present in that context. For instance, grassroots development programs would be hard to implement effectively without strong local or community organizations. Administrative, financing, implementation, planning and regulatory agencies all play significant roles in the successful translation of a policy to a program or project.
It is important to outline not only how each agency functions and what each institution's responsibilities are, but also how they interact with each other. This point can be underscored by the fact that in each of the two case locations, there are at least three sets of minimum standards being recommended by three different agencies, all of whose responsibilities overlap. The institutional structure is important during all phases of the policy-planning, developing and implementing.

11. Public and private sectors

In most third world countries, the private or the corporate sector has restricted its involvement in housing to some measure of employer-assisted housing. Even this has usually been restricted to the middle or upper middle income employees. To encourage greater private sector involvement, particularly in the low income sector could mean the availability of a greater pool of resources. However, due to a lack of initiative, most of the formal sector private companies hesitate to enter a field which shows little real potential for immediate returns.

It therefore becomes important to create situations and opportunities for the private sector to become involved in formal sector low income housing. At this point, it becomes
essential to distinguish between the formal and informal sectors because most of the informal sector is currently built with direct or indirect aid from the small scale private sector.

Tax breaks or laws which compel private developers to invest some of their land or resources in the development of low income housing is one possible strategy. However, caution must be exercised to carefully structure the entry of the private sector into the low cost housing field so that problems that have cropped up in other contexts are not repeated. Considering the capital constraints of most third world countries, the private sector can be a very valuable, if not necessary, source of resources to approach the shelter problem.

12. Need for research

Continuing research and development (R&D) work is crucial in every field, shelter being no exception. Perhaps it is even more important in that housing encompasses such a broad range of fields. There is however little use if the research done is not at least experimented with in practical use, if not completely translated to policy, and thereafter to built projects.
The case of the NBO in India is a standing example. The agency has been turning out volumes of work, particularly on indigenous materials and appropriate technology, both considered standard criteria for lowering design standards and costs. The agency even attempts to disseminate the information through several publications—all of which have been virtually overlooked by the implementing and the regulating agencies.

The main purpose of research is to improve the real state of the world in some way, but if it is suppressed, or worse, simply overlooked, then its very purpose comes to question. There is, however, no doubt that research is critical in the field of low cost housing because shelter deficits are only increasing in developing nations. New materials and more cost effective techniques are desperately needed to offset the current high costs which restrict the scale and the replicability of the projects. It is even more important to ensure that the research done be used. Changes in legislation or in the institutional frameworks to that effect would be a necessary and preliminary step.

The inter-relationships of these 12 main features is illustrated in Figure 9. The chart depicts a linear progression of where the different features would fit into the planning process.
Figure 9: Model developed of selected criteria for establishing minimum guidelines.
A bigger model relating minimum standards to the whole process of planning an overall housing strategy has been shown in Fig. 10. This has been based on a model developed by the Ministry of Overseas Development, United Kingdom (1977).

In conclusion, these criteria that have been listed as being important in setting minimum standards are only broad categories. They have been drawn from existing frameworks, and certain points that have been suggested have been borrowed from the review of literature for this study. Frameworks or criteria were first identified, and then agencies were matched to the framework that they had based most of their recommendations on. Finally, the significant criteria were identified, and represented graphically. While still a beginning, the identification of these concepts is a step towards detailing factors that are important in evolving minimum standards.
Figure 10: Components of an overall housing strategy
Institutions and Implementation

When policies or programs fail, the problems may lie in faulty conceptualization or lack of an adequate planning base. Wherever the problems may lie, it is in the implementation phase that they manifest themselves. With that view, it may be stated that implementation procedures and institutions may need to be reviewed first before reworking planning strategies. This concept has been examined already in the context of the multiplicity of agencies involved in the minimum standards strategies in the case locations, and will be further explored in the last chapter. Using the impetus provided by the draft national housing policy issued in 1988, decision makers may show a renewed interest in looking at innovative approaches, and contributing factors which include:

1. Program implementing agencies now have to cope with a wider range of issues and cannot define their role as narrowly as before.

2. The focus of government policy has slowly started to shift from built housing to initiating land and infrastructure development programs by providing basic services, house sites and so on.

3. Some agencies are beginning to look beyond the historically set targets and use a more pragmatic approach
regarding the informal sector, quality of the environment, access to employment, basic services and land.

4. The present patterns of urban development are not sustainable because of the virtual collapse of urban services and the plummeting quality of life in cities.

5. The major shelter-directed interventions have to match up to the aspirations of the people and demands of the local economy and environment.

6. Increasing activity by voluntary agencies and other groups working with the people are often reflecting the real world state of shelter more objectively than official statistics.

While considering new paradigms in shelter approaches, especially in the context of reworking institutional frameworks, a brief review of the agencies involved in urban minimum shelter in the two case study locations would prove useful. These organizations can be broadly classified into seven clusters.

1. International agencies

These agencies kept a relatively low profile till the early 1970s, and even after that, international agencies have rarely been in a position to dramatically influence public policy or execute large shelter programs in India.
This is partly because international funding of projects is restricted and closely monitored by the Government of India. The main agencies include the World Bank, the United Nations Center for Human Settlements (UNCHS), the British Overseas Development Administration and the USAID.

2. Central government agencies

The overall responsibility for shelter in India lies with the Ministry of Urban Development. Perspective planning for each five year plan period is conducted by specialists within the Planning Commission, and yearly plans are put together in consultation with the States, the Department of Economic Affairs of the Ministry of Finance and the Ministry of Industry. Agencies like the NBO and the Town and Country Planning Organization (TCPO) are other important central government agencies.

3. State government agencies

The state housing ministries have overlapping functions with the public works departments, the local administrations and the water supply, power and sewage boards. State housing boards are semi-autonomous agencies which execute social housing programs, and projects are usually executed through private contractors. Metropolitan development
authorities are specially constituted bodies to oversee metropolitan management, program implementation and planning, land acquisition and development.

4. Financial institutions

The Life Insurance Corporation (LIC) and the General Insurance Corporation (GIC) are the two primary sources of housing funds for the housing sector. HUDCO was established by the central government to finance and undertake housing, urban development, set up satellite towns and support the building industry. Its finance is intended only to serve specific income groups, especially the poor, and there are also limitations to the floor area and the overall cost of the housing unit to which it can provide support. Commercial banks, especially the Reserve Bank of India (RBI) provide up to 5 percent of the total advances in this sector. The Housing Development Finance Corporation Ltd. (HDFC) is a joint sector company which specializes in financing members of cooperative societies and companies for the purchase or construction of houses. Its funding comes from LIC, GIC, commercial banks and public deposits. Most states have also established apex cooperative housing finance societies which is funded by members of primary
cooperatives, and for whom they primarily provide the bulk of the finance.

5. Research institutions

These include the Central Building Research Institute (CBRI), the Structural Engineering Research Center (SERC), the Forest Research Institute (PRI), the National Institute of Urban Affairs (NIUA), the Human Settlements Management Institute (HSMI), and the National Council for Cement and Building Materials (NCBM) which are all public sector agencies.

6. Private organizations

Academic institutions, professionals, consultants and non-profit organizations are all ready to play a role in the development of a strategy for adequate shelter for all. However, due to the current mode of operations, their participation is not actively encouraged. In the recent past, there has been increasing awareness of their contribution to this sector, and several of these agencies are now beginning to work in a consulting capacity to the government.
7. Private corporate sector

The cooperative and private sectors can both be highly important participants in the housing sector, but their involvement, too, is not facilitated by the government. The potential benefits to be derived from the inclusion of the private sector in the housing sector have been discussed earlier in the paper.

The public sector institutional infrastructure displays certain limitations which include the following: (Development Alternatives, 1988).

a) mismatch of interests, for e.g. the central government formulating policies which the state governments find difficult to implement
b) lack of intersectoral linkages
c) lack of interagency linkages, leading to overall inefficiency
d) increasing polarization of resources, leading to institutions with either too much or too little manpower, financial and information-handling resources
e) little institutional capacity to innovate
f) little or no feedback or evaluation.

These limitations are particularly significant in the realization that despite the multitude of agencies involved in minimum shelter in New Delhi and Madras, as well as in
the rest of the country, the urban shelter situation only grows more critical. While changes need to be made to policy directions, they will be useless until the institutional structuring is altered to provide a much more specific and uncluttered approach to low income housing. Some of these proposed changes have been outlined in the concluding chapter.
CHAPTER 6
SUMMARY AND POLICY IMPLICATIONS

The main objective of this study has been to demonstrate the range of standards that are being recommended and used in specific urban locations in India and the variations within them. The numerous criteria that have been used in their formulation have also been discussed, and a cumulative approach was suggested to simplify the process. There are several problems with the planning and implementing of minimum standards in third world countries, but it was the focus of this paper to indicate the multiplicity which exists in India, as well as in other third world contexts. Despite the plethora of institutions, the urban shelter situation appears to be progressively deteriorating.

As this study has indicated, there is more than one housing agency involved in minimum housing in the two case locations. Recommendations for minimum living requirements as well as subdivision regulations vary significantly with the agencies, and it has been noted that sometimes, the same agency recommends both the lowest and highest figure for a particular feature.
While the NBC and the ISI had very similar recommendations for most features, it is difficult to view this entirely as a positive development since it is more than possible one of the two agencies restricted themselves to borrowing the other's recommendations. Innovations were also seen to remain at a small scale, mostly in the areas of building heights, and door and window materials; not in the area of building materials for floors, roofs and walls, which are the more expensive building components.

A review of the frameworks or the criteria that were used to arrive at the minimum recommendations revealed that there was little emphasis on community participation and self-help housing techniques. There was still a tendency to represent the government as the "provider" of housing, with little importance being attached to users' needs. It was also not often made clear how the concept of affordability was worked into the model. The distinction between what the target population would spend, and what they could afford to spend, as well as what the government thought they should be spending was left unclear.

Not only is a minimum standards strategy important as an entity, it is perhaps even more important to integrate this aspect into an overall housing program. Some details
of this have been covered as a model in the previous chapter.

This section will cover brief points with regard to establishing a new minimum shelter approach in urban areas. India is a poor country with few resources. In that context, assuming a reasonable ballpark estimate of the cost of constructing one core housing unit of existing minimum standards for a household of five members as $1,000 in U.S. currency, then the cost of constructing seven million dwelling units (the official estimate of urban housing shortfall) will be seven billion U.S. dollars, or Indian Rs. 140,000 million.

The outlay for the seventh plan period (1985-1990) was Rs. 180,000 million (Planning Commission of India, 1989), and so the average annual outlay can be assumed to be Rs. 36,000 million. The required investment for urban housing is therefore nearly four times the total annual outlay -- clearly a difficult figure to achieve.

To that extent, certain broad premises can be organized with regard to minimum standards strategies, and they are as follows:

1. "Realistic" standards need to be related to "affordable" standards
2. Solutions must be affordable not only to the government, but more importantly to the beneficiaries.
3. Approaches must be self-financing to be viable. Most developing nations are cash poor, and massive subsidies are unrealistic.
4. Equitable development is certainly important, but it is even more important that it is also sustainable.
5. Strategies need to be based on survey and analysis techniques. It is becoming clear that the population is choosing to ignore the prescriptions of the authorities and building as they choose to. To that extent, observations of their choices is a logical start in attempting to formulate effective housing strategies.
6. Access to information and education is as important, if not more so, as material goods or cash aid.
7. Promotion of self-reliance and community participation takes on an added dimension in light of the severity of the housing crisis in India.
8. The income generation and economic aspects of shelter activity can be used in an overall development strategy.
9. The existing multiplicity of agencies contributes to the problem. The roles and importance of the different agencies must first be clarified before new strategies are attempted.
10. Finally, more effective ways of translating the volumes of research to codes needs to be done.

**Future Action and Research Priorities**

An important objective of this study was to indicate directions of future research priorities. In the absence of a national policy on human settlements or even any broad consensus among the major agencies involved in this area, it becomes difficult to project the future course of shelter in India. In any case, any projection of this nature would be better if based on extant building operations with scope for monitoring and evaluation, and allowing for future changes.

Based on work done by the author with a non-profit group Development Alternatives in New Delhi, lists have been developed of the suggested priorities in the area of shelter, as part of a broader development strategy. They are classified into three major clusters covering gaps in knowledge on resources, technologies and institutions. Broadly, the clusters are as follows: (Development Alternatives, 1988).

* **Cluster 1** - Facilitating access to shelter resources by the poorest section of the population.
* Cluster 2 - The promotion of local enterprise and participation in the area of shelter for the next poorer section of the population.

* Cluster 3 - Restructuring human settlements institutions for shelter, particularly in the area of minimum standards. (This has been discussed to some extent earlier).

Cluster 1:

One of the neglected areas of action and research in the field of human settlements is shelter for the large numbers of the abjectly poor and oppressed. The situation of these people is becoming increasingly difficult because of rising costs, increasing demand and competition and dwindling access to traditional and necessary shelter resources.

Most of these people have little or no contact with either the market economy or the governmental mechanisms which are designed more for control and administration than for information. Almost by definition, external cash incomes are minimal. Political awareness, too, has remained mostly at low levels.

Within this context, the reasons why the field of shelter has not been seen by the public sector as an
attractive area for action research are evident. One reason is that most of the important, high-impact interventions are limited to fields with potentially more tangible returns. Also, changes in areas like land ownership and equitable access to resources involve much larger economic and structural issues. Thirdly, any action and research program would have to be consistent and long-term in scope, and so requires considerable on-going investment with a relatively low probability of short-term returns.

Indicative areas of action and research are listed below. These will, of course, need to be fine-tuned to match the specific needs of each region (Development Alternatives, 1988).

Land:
* access by the poor to land for shelter and settlements is important, particularly in the realization that studies by Turner (1972), and Abrams (1970), as examples, have shown that the granting of secure tenure is often a great incentive for urban squatters to begin self-improvement of their shelter.
* subdivision regulations like density and minimum lot sizes need to be worked out keeping issues like externalities in mind. Not only are the recommendations
significant at the individual dwelling unit level, but also at the community level where the standard of one house affects the safety and health of the housing around it. * land ceiling acts also need to be enforced to ensure that the negative effects of the existing concentration of land in the hands of a wealthy few is mitigated.

Water:
* management, use and maintenance of existing supplies is a critical component of resource management.
* Water supply standards is also important in the new minimum housing policies of several international and national agencies where the provision of adequate infrastructure is the key aspect of the programs
* differential access to, and the politics of drinking water supply, which includes the extent of government subsidy and water pricing, is an area that has been receiving attention in recent years. The amount it costs to both the government and the beneficiaries directly impacts on the corresponding amount that can be spent on housing.
Building Materials:
* re-examination of the commercial utilization of natural products, especially the negative impacts on the poor which includes the private sector monopolies that exist in the production and distribution of building materials, restricting their access by the urban poor
* more effective and alternative technologies for natural products use in building, including construction with soil and other indigenous methods of construction. But this also calls for the imposition of newer standards which allow for the use of more appropriate materials

Tools, Design and Information:
* access to basic tools for construction for increased community participation calls for the recommendation of standards which allow for self-help housing
* access to and modification of efficient building systems to meet local needs and education at the grass roots level so that people understand the significance of standards and the need for basic minimum standards
* continuous monitoring and evaluation techniques will help ensure that the standards currently recommended are effective in that both the government and the beneficiaries
both choose to build voluntarily using the recommended standards

Cluster 2:

The second group of action and research areas addresses a different group of people from those covered in the first cluster. This is a segment of the urban poor who are in some measure of contact with the formal market, both the commercial and the administrative. Nevertheless, they have rarely been in a position to draw on these mechanisms mainly because of low incomes and savings, complexity of bureaucratic controls and a lack of adequate production and distribution systems.

There is potential for catalyzing higher levels of activity among this segment of people. A program of promoting enterprises to meet local needs through decentralization should be pursued. The crux of the activities in the second cluster would be the development, production and dissemination of technologies and building systems appropriate to local conditions. This would not only reduce costs of construction and promote the generation of local income, but also help conserve scarce building resources through more efficient building design.
The issues of land, water and building materials as have been discussed for the first cluster are equally significant for this cluster as well, and there are a few other factors which also need to be considered.

Decentralized production systems:
* the economies of small scale production and marketing units should be explored to facilitate employment opportunities for low income groups. This will be possible only if the standards allow for the production of indigenous materials at the local level.
* decentralized production systems also reduce the burden from the government sponsored production agencies, while easing monopolies in this sector, including in distribution and marketing which can be an indirect benefit.

Design and Construction:
* understanding and documenting traditional or existing systems is a beginning to the formulation of lower and more appropriate standards
* the point listed above is related to the design of compatible design elements and systems which are low-cost, incremental and promote self-help building. Recommendations
for living space requirements and building materials use need to incorporate these aspects

Financing local house building activity:
* financing through local building materials production and construction activity especially through small enterprises includes innovative credit mechanisms like cooperative or community societies. This is especially important in home loan finance for upgrading, maintenance, additions and house construction by individuals and cooperatives is an important aspect of upgrading, a key component of new urban shelter approaches. Several third world governments have finally begun to realize the significance of using lower standards in this context.

Information and Dissemination:
* disseminating information and feedback on innovative technologies is important particularly in the area of minimum standards which are more appropriate than extant recommendations
* decision support systems for local administration should include public participation
* identifying opportunities for the export of local skills and techniques to similar contexts, increasing at the same
time, both employment prospects as well as the knowledge base
* training of people in new techniques and incorporating local modifications in intermediate building systems and technology

Other institutional support:
* monitoring and evaluating the impact of formal sector programs on the urban poor, particularly their reactions to the standards and codes which are enforced
* land and resource legislation and implementation of programs to upgrade and add to existing stock
* coordination of inter-sectoral settlement activity

**Cluster 3:**

The previous two clusters will require considerable support from formal sector institutions. In the first cluster, support in the area of inter-sectoral, legislation and coordination programs is vital. In the second cluster, support in the area of innovation, financing, licensing and distribution is essential for any local level networks to build up self reliance and any measure of reliance. In the area of design, training and information systems the only
current resources are confined to existing formal institutions. These will have to be redirected towards the majority living in the informal sector. The concept of reorganizing the existing institutional framework has been expressed previously in this paper, and it is the focus of the third cluster. The main components of this segment should include:

* detailed state of shelter reports at various levels and social, economic and resource information systems for policy makers, particularly with regard to the formulation of minimum housing strategies based on existing housing systems
* administrative information systems for managers of settlements to evaluate the effectiveness of the implementation of minimum standards strategies
* scientific and technological information systems for researchers to reduce building costs and increase levels of affordability
* monitoring and evaluation systems for feedback and constant updating of current policies and programs
* analysis of conflict areas between the formal and informal sectors
Conclusion

The suggestions that have been listed above are indications of possible future research in the field of minimum urban housing. This sector will be receiving even more attention in the future. Minimum standards themselves are important, but they are the end-products of a whole process.

The criteria used to arrive at these minimum standards are even more important since they are the actual determinants of the minimum standards. These criteria must be selected with great care and should be based on surveys of existing conditions, as well as predictions and projections for future needs, while learning from past experiences.

Selecting minimum criteria is only the first step. Translating them to a uniform code is the next process, which, too, requires some effort. But as evidenced earlier in this study, the most difficulty has been encountered in the policy implementation process. This is the weakest link in the standards strategies currently being employed in India as well in other developing nations. The reasons for implementation failure can be varied - poorly defined objectives, lack of adequate political/institutional support (or even too much political pressure), a poor administrative
base, varied interests, time and resource constraints and so on.

It is very important to pinpoint the exact nature of the procedural bottlenecks, and attempt to rectify them before proceeding on to any new planning strategy. When it is obvious that loopholes or impediments exist in the current strategy, it would seem worthwhile, even logical, to solve these before attempting to create new processes, which of course will have their own inherent problems.

In fact, the author believes that there is justification in stating that any attempt to set new shelter strategies in the third world should begin with a review of implementation, rather than the planning or design, processes. It may seem like a reversed approach, but past attempts have proved without a doubt that even the most well-thought-out plans came to nought without adequate implementation frameworks.

While this study has been restricted to two urban centers in India, reviews of a similar nature would be useful in almost any third world context. There is no question that each nation has its own intricacies and characteristics. But with shelter becoming a grave concern in almost all developing nations, particularly in urban areas, it is obvious that present processes are failing.
It can be assumed that perhaps plans have not been adequately developed, or that the government bears little commitment to the shelter sector. But in most third world countries, explicit objectives have been stated by the authorities, and a definite housing policy has been observed to exist in several nations. The problems, therefore, probably lie in the translation of these policies to actual programs and projects. Whether this problem is due to faulty conceptualization or poor administrative strategies, or for any other reason, it is essentially a problem of implementation.

In conclusion, the inherent need of all human beings for adequate housing is synonymous with living. That fact is recognized, and even respected. But the equally inherent right of all human beings to decent shelter is something that is conveniently ignored when necessary. To solve any problem, it is important to get to the roots of the issue. And so with minimum cost housing in developing countries, it is important to start with the basic criteria used in the formulation of minimum standards, which are in turn used to determine both the quantity as well as the quality of housing. From there, a bottom-up approach can be used to arrive at a viable housing strategy. If such an approach can help even a small percentage of the shelter poor achieve
affordable housing of a quality that they have prescribed for themselves, then the effort of formulating and implementing this strategy would be worthwhile.
BIBLIOGRAPHY


APPENDIX A
Table 5: BASIC INDICATORS OF DEVELOPMENT  

<table>
<thead>
<tr>
<th>Population (millions)</th>
<th>GNP per capita</th>
<th>Average annual rate of inflation</th>
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<tr>
<td><em>LOW INCOME ECONOMIES</em></td>
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<tr>
<td>Tanzania</td>
<td>23.9</td>
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<td>China</td>
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<td>Indonesia</td>
<td>171.4</td>
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<tr>
<td>India</td>
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<td>300</td>
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<td><em>MIDDLE AND LOWER INCOME ECONOMIES</em></td>
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<td>Philippines</td>
<td>58.4</td>
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<td>Mexico</td>
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Table 6: URBANIZATION TRENDS
(adapted from the World Development Report, 1989, World Bank publication)

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<td>As % of total pop</td>
<td>Average annual growth</td>
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APPENDIX B
Summer field research interviews

1. Professor S.D. Raj -- Director of the School of Architecture and Planning, Madras, India, and former president of the All India Association of Town Planners (AIATP)

2. Mr Kannan -- Assistant Executive Engineer, TNHB

3. Mr. Thiruvengadam -- Chief Revenue Officer, TNHB

4. Mr. Palani -- Chief Engineer, TNSCB

5. Mr. Benjamin Gorgonza -- Assistant Planner, TNSCB

6. Ms. Vimala Narasimhan -- Assistant Planner, MMDA

7. Mr. S. Natarajan -- Architect, Venkat and Associates, Madras

8. Mr. V. Balaji -- Architect, Bharat and Associates, Madras


10. Mr. Ashok Khosla -- President, Development Alternatives, New Delhi

11. Ms. Snehlata -- Shelter Group, Development Alternatives, New Delhi

12. Mr. K.C.Sivaramakrishnan -- Secretary to the Government of India, Ministry of Urban Development

13. Mr. P.B. Krishnaswamy -- Secretary to the Government of India, Planning Commission

14. Mr. R.G. Gupta -- Director, City Planning Wing, DDA

15. Mr. Samant Ray -- Deputy Secretary, Ministry of Urban Development

16. Mr. Mistry -- Chief Architect, NBO

17. Mr. K.S. Srinivasan -- Acting Director, NBO

18. Students and faculty at the schools of architecture and planning at Madras and New Delhi
GLOSSARY OF TERMS

ALTERNATIVE MATERIALS AND TECHNIQUES: This refers to the use of building materials other than cement, steel and factory-made bricks which have been prescribed by the government for the past few decades. The production and use of these materials are capital intensive, and require expensive tools and technologies. In recent years, concerned planners have been calling for the use of more indigenous or 'appropriate' materials like country brick and stabilized soil which are cheaper to produce and use.

CORE OR INCREMENTAL HOUSING: Instead of providing entire built units, several government agencies have now begun to build only the skeleton of the house with the basic sanitary core. This approach has been used by the World Bank to reduce costs. The beneficiary adds and builds on as his requirements and income/resources change.

CROSS SUBSIDIES: Cross subsidizing is another concept borrowed from the World Bank where the housing schemes have lower and middle income units, as well as space for commercial ventures. Differential rates of interest are charged, so that the income derived from the sale of the commercial plots and from the higher payments of the middle income groups is used to subsidize the lower income groups. This reduces the burden on the government.

ECONOMICALLY WEAKER SECTION (EWS): This section denotes the poorest 40 percent of the Indian population who are below the poverty line, and who subsist through marginal or menial labor.

HIGHER INCOME GROUPS (HIG): This is the upper 10 percent of the population who lead relatively affluent lives. The formal sector housing market mostly caters to their needs.

MIDDLE INCOME GROUPS (MIG): This constitutes the population between the 40-80th deciles. This is the fastest growing segment of the Indian population.

LOWER INCOME GROUPS (LIG): This section lies between the 30-50th deciles and includes the upper spectrum of the EWS group, and the lower spectrum of the MIG group. Unlike the former, some of this population may hold jobs in the formal sector, and have relatively more stable incomes.
INFRASTRUCTURAL SERVICES: These services include all other services related to housing other than the actual dwelling unit. Commonly, water supply, roads, garbage collection and disposal, sewage disposal facilities, electricity supply and community services like playgrounds, community hall and so on are included in this category.

MULTIPURPOSE ROOM: Most lower income dwellings have one large room used for living, social and sleeping activities. In the minimum cost approach used in India, initially one multipurpose room is planned for, with the option of adding on a separate sleeping area to the unit when the beneficiary's resources allow him to do so. The concept of a multipurpose room is a traditional one, and is often seen in rural areas as well.

PIRATE URBANIZATION: Pirate urbanization is a phenomenon that occurs at the urban periphery where large tracts of agricultural land that have not been designated for urbanization are illegally subdivided into small plots and sold.

SQUATTER SETTLEMENTS: In contrast to pirate urbanization, squatter settlements denote illegal occupation of land owned by someone else. These tend to occur more to the center of the urban area, and are much more high-density than pirate urbanized areas.

SLUMS: Slums denote all housing that does not conform to the recommended building standards in that area. Almost all squatter settlements are categorized as slums, but slums can also include legal housing that has fallen into disrepair.

SATellite TOWNS: Satellite towns are new planned communities around the main metropolitan area designed to ease the congestion in the city. These towns are to have all the major amenities of the main city, albeit on a smaller scale.

SITES AND SERVICES: This is a shelter approach that has been popularized by the World Bank. Plots of land at the urban periphery are developed by the government, and infrastructural services are provided. The land is then subdivided and allotted. Each plot usually has a basic sanitary core, and sometimes, a structural skeleton of the house is also provided. Self-help construction is encouraged with loans and technical assistance being given on site. The schemes are supposed to be entirely self-financing.
SLUM UPGRAILING: Unlike the sites and services schemes, here the residents of a slum are not moved out. They are allowed to stay on in their homes, but additional services are provided to the slum dwellers, and their homes are upgraded to meet certain minimum criteria for health and safety considerations. The residents are also granted tenure if they have squatted illegally on that land. This has proved to be more popular than the sites and services approach.
VITA

Vidya Krishnaswamy

A native of Madras, India, Vidya Krishnaswamy, daughter of P.B. Krishnaswamy and Vimala Krishnaswamy, was born on August 16, 1965. She had opportunities to live and study in India, Australia and Thailand during her schooling years. She received a bachelor's degree in Architecture from the School of Architecture and Planning, Madras, and completed the requirements for a Master of Science degree in Housing at Virginia Tech in May, 1990.

She interned at architectural design firms during the course of her undergraduate education, and was a graduate teaching assistant for the two years of graduate study at Virginia Tech. She is a member of the National Association of Students of Architecture of India, the Virginia Tech International Club and was elected to Phi Kappa Phi. Future professional interests include teaching, writing and practicing as a residential designer in India.

Vidya Krishnaswamy

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