

"A STUDY OF HOUSING NEEDS ASSESSMENT :
A CASE STUDY OF MALINDI TOWN"

by

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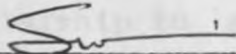
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DECLARATION

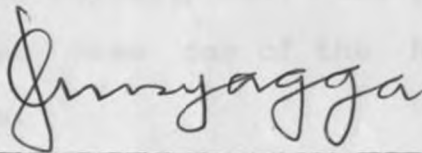
I, MUHAMMAD ABDALLAH SWAZURI hereby declare that this thesis is my original work and has not been presented for a degree in any other University.



SIGNED

DECLARATION BY THE SUPERVISOR

This thesis has been submitted for examination with my approval as University Supervisor.



DR. P.M. SYAGGA

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ABSTRACT

The gap between what amount of housing is available and the desired housing level represents housing need. Investigations have shown that this need is growing over time, with little in the form of more housing being provided. In order to gauge by how far this need is being satisfied, it is necessary to undertake some study of housing needs in an area.

This project work comprises a study of methods for estimating overall housing needs. Prevailing theories of housing need have concentrated very much on the physical housing product itself as a representation of what and how much housing is required. Some of these theories and their practical applications in estimating housing needs are investigated. The results of most of these methods point out that the housing problem in many developing countries is one of unmanageable proportions, and that the needs have in many cases been measured unconvincingly. These methods have been applied to the study area of Malindi Town in the Coast Province of Kenya. The results of the study reveal the deficiencies in the current assessment methods.

Any proper method for estimating housing needs should consider important elements like the environmental quality of the houses and their surrounding neighbourhoods. It should also consider

the level of housing services and peoples' cultures that are necessary for the decent living of the occupants, whether these occupants can or cannot afford these essentials. The proposed model in this study incorporates a methodology for assessing housing needs in the light of the above prerequisites, which have often been neglected in the current housing need estimates.

Though without fault, the method at least tries to reduce some of the defects inherent in the prevailing methods for estimating housing needs.

There are three main parts to the study. First, housing needs are discussed in relation to current theories and methods of measuring them. Models are given and analysed against the magnitude of the housing problem as portrayed by other analysts.

The second part is about the study area, Malindi Town in Coast Province, in which the various methods have been applied in order to test the hypothesis and carry out aims of the study. Data on population trends, household sizes, income structures, building materials, housing information and construction activities are presented and analysed to provide a basis for the estimations.

The third section links parts one and two in actual housing needs estimation using data obtained from a field survey. This section winds up with summary and recommendations obtained from the results of the estimations. Housing needs should not be assessed literally for, they involve more than what meets the eye and more often they should be measured in recognition of the society's housing norms and allied attitudes..

SWAZURI, M.A.

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CHAPTER 1

INTRODUCTION AND PROBLEM STATEMENT

Introduction

The problem of housing shortage in Kenya and many developing countries is now a living phenomena. Studies in the problems of urbanization and the subsequent housing shortage are now well known to us. Like employment shortages, housing has significant economic, social and political implications. The highly visible implications of inadequate housing are quite apparent, and these are clearly manifested in two ways:-

- a) the fewer dwelling units than the number of households, and
- b) the present dwellings themselves being overcrowded.

In many third world countries this housing shortage is increasing and yet insufficient resources are allocated to satisfying the housing need. One reason for this is that housing has held a low priority than other sectors of the economy because the returns from housing take a long time to be tangible. Students, agencies and consumers of housing in developing countries conclude that there exists a housing deficit of astonishing proportions, in most cases underestimated, and progressively growing larger.

This growth of the housing problem is a result of the increased in-migration of population and the

overuse of the housing supply, which in turn accelerates its deterioration and removal from use. There is chronic overcrowding which has taken place in urban areas for long periods, and a frequently low-level of repair and maintenance of much urban housing. The problem is further expanded by the destruction of some housing incidental to redevelopment and the building of modern central business districts and government projects, especially in the populous urban areas.

On the other side is the extremely low capacity of the economy to supply equivalent public housing, either because of inability of central and local governments to supply funds for this purpose; or because of low incomes amongst prospective households, or due to the obstacles to residential development created by the rigid official housing and building standards. The rate of growth of the housing problem is thus so great that it seems inconceivable that any of the countries can hope to catch up with the demand. The United Nations once summed up the situation as follows:

In many countries the provision of completed housing units to all households in need of housing is simply beyond the national resources. The critical point has been reached since most developing countries cannot solve their housing problems without distorting the main development objectives (Dept. of Economic Affairs, 1977 p.4).

Cuban President, Fidel Castro, while analysing housing conditions in developing countries remarked

that the housing deficit in an underdeveloped country, (like Kenya for instance) "is so large that if the country were to dedicate itself to dwelling construction it could not develop; and if it dedicates itself to development it cannot build dwellings" (UN Dept. of Economic Affairs, 1977 p.7). Rather, the problem of housing is as challenging to most countries as the problem of overall development.

Castro's statement implies that there will be a continuing condition of urban growth in developing countries such that the fastest growing segment of the urban population will be composed of migrants who will not have the resources to supply themselves with standard dwellings. The basic fact seems to be that with some few exceptions it is not possible to build a permanent standard housing unit for individual or family occupation at a cost that, when turned into an economic rent, can be met out of the incomes and taste patterns of the lower segments of the urban labour force and peripheral population. Michael Safier (1970, p.35) therefore cautioned that "if standards of living are to rise in a country, the denser concentration of urban population over the coming decades will require that far greater attention be given to the provision of housing and other urban services". Short of this means that the gap between housing need and supply will continue to widen in

even larger magnitudes.

The Problem

The importance of housing stands in contrast to current housing conditions in Kenyan urban areas, and other developing countries. In the majority of these places the housing conditions are much worse than they need be. Even more are the quantifications of the deficits that exist between the required quantities and qualities and those that are provided. The reasons for this situation are many; however, at the risk of oversimplification, they may stem from a lack of understanding of the root causes of housing deficits, and resulting misguided policy formulation. Thus a significant part of the problem is the misperception of the housing crisis that makes housing conditions in most countries, and in Kenyan urban places, appear worse than they actually are. An analysis of the available information on the housing problem indicates that:

- a) Some families lack shelter altogether and are truly homeless, while others find shelter in conditions of squalor and congestion which seriously threaten their physical and mental health;

- b) Owing to continued effects of inadequate shelter and lack of access to safe water and basic sewage disposal and sanitation facilities, the poor continue to suffer from high infant mortality rates, a low life expectancy and a high incidence of disease;
- c) Most lack security of tenure; moreover their shelters are commonly constructed on marginal lands vulnerable to natural disasters, and threat of eviction by landlords;
- d) Most have little access to transportation (either because it does not extend to their neighbourhoods, or because it costs a fortune), health, education and welfare services, and
- e) those in slums and squatter settlements lack access to inexpensive building materials and many lack the technical and organizational skills for improving their shelters (Weisinger, 1984, p.350).

Many countries have attempted to provide unrealistically high standard dwellings rather than meet the effective demand for housing. This has led to regulations discouraging the production of appropriate standard housing. It has also lead^d to the expenditure of limited public resources on high-priced housing for a small proportion of the population, and the condoning or active removal of

squatter settlements and similar housing. Such policies, combined with the limited available resources to meet the investment needs of rapid urban population growths, have given rise to substantial gaps between housing supply and demand in most areas.

This study argues that the housing problem in many places, and Kenya in particular, has been overstated, exaggerated or even misunderstood, mainly because of using inappropriate measurements of its severity or magnitude. Most people, and even some housing officers in local authorities, tend to assume or conclude simply that there exists a serious housing shortage in their urban areas. These conclusions are drawn from either mere observation and hearsay, or from old housing trends established by colonial planners. The knowledge about this "shortage" is rather inconclusive. Colonial town planners in East Africa emphasized so much on health and hygiene and the laying out of well demarcated areas of differential land-use, to the extent that any housing built out of these boundaries is not officially recognized as shelter.

This kind of framework has led most people to refer to housing shortages in terms of the physical units themselves, and subsequent magnification of the housing problem. But, as Turner puts it:

When housing is seen as a physical product , it will be judged by physical criteria alone..
..... Such measures of housing value are based on false promises (1972, p.vii).

The present study asserts that, amongst other reasons, it is the current policy failure in terms of standards that should be responsible for the misperception of the housing problem. On the other hand it would be wholly unrealistic to ascribe the present housing problem in Kenyan urban areas to standards and policy failures alone. Or to push the blame on improper measures and misprojections. Many other factors act in combination to render the problem as it is. These factors include shortage and high cost of land for housing (where available), similar problems in financial matters, lack of and shortages of building materials and many more.

This study concedes that whereas there exists a housing problem in urban places like Malindi Town, there is need to understand this problem and then appropriately ^{quantify} design estimates of its magnitude. While the urban population of a town like Malindi may be truly doubling every twenty years, it is not necessarily true that the housing problem attains the same stride in growth. This means we have to accept that just as the housing problem has grown bigger and fundamentally different, the methods for assessing this problem have to change likewise. From emphasis on quantity i.e. the physical housing product per se,

we now see a trend towards the whole environmental quality of shelter.

Past approaches to assessing the housing problem have generally taken the form of calculating a present and a future housing "deficit" relative to housing needs. That if the population of a place is 10,000, and the total number of houses available is 2,500, then, assuming that each person needs a separate house, the present deficit is $10,000 - 2,500 = 7,500$ units. For the future deficit, it will be obtained by subtracting the number of available units then from the growth in the size of the present population. But such "needs" were not related to the availability of resources, and the conclusions of such estimates were that the housing problem is so acute that "to commit resources to urban housing, especially for the poor or low-income groups was to squander those resources in a bottomless pit" (Grimes, 1976 p.6).

Though still providing a useful primary measure by which to assess the numerical size of the housing problem generally, "deficit" estimates suffer from two important drawbacks. First, problems of definition make their use on a comparative scale hazardous and often confusing. The housing stock, for example, may be represented by the number of dwelling units, by total cost of construction, or by floor space. Measures of residential density include dwellings per unit of land,

persons or households per room or per dwelling, and the proportion of land occupied by dwellings. But such physical yardsticks do not start to measure the variations in the quality of dwellings located sometimes within a few metres of one another. Noise, nearness to paved streets, frequency of refuse collection etc. have yet to be combined in standard measures of housing quality that will permit comparisons.

Secondly, traditional measures of housing "deficit" that rely on data for slum and squatter housing as indicators for inappropriate housing tend to overstate the seriousness of the housing problem. Although such housing may be "illegal" or built from traditional materials it is not necessarily of an unacceptably low standard. Much of this housing in most places provides both adequate shelter and good access to employment. Some of it is quite substantial, such as the Swahili house at the coast. To condemn all dwellings below an arbitrary standard is to complicate the task of providing a minimum of shelter to all urban families and to render the housing problem larger than it need be. So writes Mabogunje:-

One of the difficulties that has inhibited a better appreciation of.....human settlements has been the tendency to confuse the concept of shelter with that of dwelling.... This lack of an adequate theory has led to unrealistic quantifications of the dwelling stock, and to similarly unrealistic estimates of the real needs of a community. Quantification is made on the basis of a definition of a dwelling that accords with the cultural preferences of the government agencies making the definition (1978, p.31).

This cultural bias affects the results of all the analyses based on such census information. It also distorts reality when quantitative estimates are made on the so called "dwelling deficit". Yet the term "deficit" itself has connotations that tend to conceal the reality it is supposed to describe. The term, for example, "is taken commonly to imply an inadequacy in production when in fact the main problem in the area of dwelling construction is inadequacy in consumption capacity" (Mabogunje, 1978, p.31).

Another reference to the housing problem is the one which uses the affordability of prospective occupants to buy, own, build or rent their own housing units. Research in the lowest income countries (World Bank, 1975; Grimes; 1975; Adala 1978; Abrams 1964) and in Kenyan towns (Safier, 1970; Mbwagwa, 1978) suggests that the proportion of urban households currently unable to afford housing may approach or even exceed two thirds of the urban population. This measure, too, overstates the problem. Being based on the cheapest housing currently being produced by the public sector, it implies that the private sector does not produce low-cost housing. Most local and central governments and even national housing agencies have many a time not been able to provide the housing required by many. It has been the private sector that has produced cheap units which

can be rented or even bought by low-income people in urban areas. Measures which therefore gauge on the number of people able to afford the cheapest housing as an indicator of the magnitude of the housing problem appear erroneous. In practice observation has shown that the housing situation is not as bad as such calculations imply.

Significance of Study

There are many reasons for requiring an estimate of housing needs in an area. Some of the reasons are:-

- a) Reliable estimates of housing needs are an important factor in establishing housing policy and for the formulation and evaluation of housing programmes. They indicate the magnitude of the housing problem while changes in the level observed at regular intervals provide an index of the extent to which programmes and policies are meeting the housing needs of the population affected, even of small towns like Malindi.
- b) Overall national estimates, if they are based on internationally agreed-upon concepts serve as roughly comparable indicators of housing needs which may be used to aggregate and produce world-wide and regional totals.

- c) Estimating housing needs is an important normal function of the planning process, and the resultant data represent one of the many statistics required for planning purposes in a country's development programme.
- d) Estimates of housing needs provide physical planners with a useful indicator of the volume of dwelling construction likely to be accomplished under various economic conditions. Substantial estimates in countries with growing economies will suggest an increase in the volume of dwelling construction accompanied by the construction of related facilities such as shopping centres, schools etc. all of which will need to be integrated into the physical plans for urban areas, industrial and agricultural regions and for the country as a whole.
- But even with all these reasons, it is difficult to establish a complete set of rules and principles for estimating housing needs totally applicable in all parts of the world. There will always be variations and differences in the physical quantities required for housing need estimation e.g. population and household trends, resources available and the importance attached to the housing sector in a country.

Of late, national housing aggregates have become increasingly important as international agencies indicate a growing propensity to render assistance directed at the alleviation of poor housing conditions (United Nations, 1973 p.5).

Overall national housing aggregates, however, serve only as rough indicators of the housing problems. For the formulation and implementation of programmes, housing needs must be estimated for specific regions within the country. This estimate for each area should be able to provide an insight into the economic and social characteristics of the population in need of housing. A distribution of housing needs according to geographic area, and according to the economic and social characteristics of the population enables priorities to be established for the provision of housing. Such a distribution also indicates the extent to which housing needs may be met by the private sector, and the role that will have to be played by the public sector.

The results of this project work will hopefully benefit future researchers and housing analysts by providing a suggestion of using appropriate measures of the housing problem. Modifications and adaptations can then be applied in order to apply the methods in a relevant area. The study will also give information

on the housing conditions in Malindi Town, with the hope that necessary action will be taken by those concerned to try arrest the growing housing problem in the area, and to solve any bottle necks that are hindering housing provision there.

Study Objectives

1. To evaluate the current methods of assessing housing need and hopefully to suggest a better method of estimating housing needs. This is the main objective of this work, and the purpose is to estimate the actual housing problem against normative statements on the problem.
2. To see the extent of the housing problems of Malindi town generally, and to bring out important characteristics of housing in that area.
3. To suggest, wherever possible, ways and priorities for providing housing to many in the town and thereby lessening the housing problem.

Hypothesis

The main hypothesis put forward in this study is that the housing problem has been overstated due to the misconceptions about its quality, and especially the measures applied to it. Is it true that the

problem of housing is so large from the given figures that it cannot be solved at all? If the problem is as large as the calculations of housing need tend to imply, then how are people managing the problem yet most of them are unable to provide standard housing. Since most of these people still do not sleep in the open, then who is to blame for the big gap, is it the methods of calculating the problem, is it the standards restricting housing provision or is it simply that there are no funds for house-building? The study hopes to use the results from testing the hypothesis in order to answer these questions.

Scope of Study

Housing need measures the extent to which housing conditions fall below what the people consider to be acceptable living conditions. This should be in a given socio-economic set-up which allows the residents to determine what is good housing from what is poor housing. The housing needs that are being estimated in this work are those of all the people living in the study area, and of those who will come to live in this area in future. The reason is that everybody requires a house, rich or poor, wherever he may be staying. It would therefore be unreasonable to study housing needs of only the low-income people just because low-cost housing is the most problematic in urban areas. Even if the high-income people can afford housing at will it may be that some of them

need to understand the level with which they can provide themselves with proper housing.

The housing need studied in here includes that of those people who provide their own accommodation and those whose housing is provided for them by their employers. Other characteristics are also studied, such as the nature of housing provision, the current condition of houses, methods of building houses in the study area, the type and availability of building materials and the services and facilities to housing that are available in the study area.

The land issues are also discussed, in relation to the distribution of land uses and the past and future physical development priorities as available from Physical Development Plans and plans from public offices. The economic set-up is also discussed together with studies in population trends and characteristics as provided in official documents and also seen during the housing survey carried out by the author.

The time range that is used here is from 1985 as the base or initial year of calculating housing needs. This is because the additions to the housing stock prior to this time is difficult to estimate. By using 1985 as the base year it is possible to know how many

units will be required in the future years. Also, it is easier to extrapolate the estimates into 5 year periods beginning from 1985-1990, 1990-1995 and 1995-2000. The time limit covered by the estimates is therefore fifteen years from 1985.

Estimations done today for periods ahead/more than the fifteen years are likely to be erroneous since there are growing quantities of uncertain elements which will be used in the calculations. Furthermore changes are likely to occur in the basic information to the extent of making this information outdated for referring to the future.

The physical extent of the case study is confined within the boundary of Malindi town, since the rest of the Malindi sub-district is not fully urbanized. A number of reasons made the author choose the area for this particular study. First, from preliminary surveys by the author in the town, and from available statistics (Muller, 1978; Kilifi District Development Plan 1984 - 88) the housing problem in Malindi town is seemingly acute. It has an estimated population of 30,000 against a few dwelling units by the Malindi Municipal Council (two estates) and a few government quarters. The bulk is the Swahili housing, so termed "substandard" and a number of executive expensive houses owned by

Europeans and other rich people along the north and south shores of the Indian Ocean. One would like to examine the actual needs against what is seen from statistics.

Secondly, Malindi is a rapidly growing town (between 1969-1979, its population grew at a rate of 11.5% p.a) and can hence pose a good example for proper implementation of new housing proposals for the future. And the smallness of the town and its population may make data collection for appropriate housing measures less cumbersome than in congested large towns like Nairobi or Mombasa. Data on housing need estimation is difficult to collect and the bulk of it does not need to be estimated.

The study is divided into six chapters. Chapter 1 is about the introduction to the problem of housing generally, the statement of the problem to be tackled, the significance of the work, study objectives, hypothesis scope of study and research methodology. Chapter Two is about literature review on the subject of estimating housing needs. Various methods for estimating need are discussed and evaluated, and other works that have used these methods to estimate needs in other areas are also briefly discussed.

Chapter four is specific about the past and present housing situation in Malindi town. Here are tackled the condition of dwellings, how they are constructed and repaired, the shortage of accommodation, and other problems of housing related facilities and services. The information obtained in Chapter three is linked to this Chapter to provide a complete basis for calculating housing need in the next chapter.

Chapter five deals with actual application of methods for estimating housing needs. Information assembled in the previous chapters is now fed into the methods to get results of the estimates. The final Chapter six concludes with summaries and draws conclusions on the study.

Research Methodology

The information for this study was collected in two phases. First was the library sources. This process of gathering information started in July 1985. The information was obtained from literature found in the Faculty of Architecture, Design and Development Library, the Housing Research Development Unit Library and the Main University Library.

It was while reading through the literature in these places that the theme for the topic was consolidated. Library readings were synthesized mainly to extract materials that discussed housing needs assessment methods. These sources were both local and foreign. It was not easy to get all the required information at once, and therefore the library research was done continuously until the end of November, 1985.

Another aim of reading library sources was to get more information on the study area. Malindi is a famous historical, tourist and religious town but its fame is not so vivid in books. Few people have written about Malindi exclusively. It was therefore necessary to read public records about the study area.

These included the district development Plans, statistical abstracts, economic surveys and other available public records, such as the Physical Development Plan for Malindi. About three unpublished theses were also read which provided some information about Malindi.

The second stage of the research was the field survey in the study area. This was carried out at intervals between August 1985 and January, 1986. Because there was little available information on the housing aspects of the study area the field survey formed the most important part of the research. The bulk of the background information on the study area was supplied by the research assistant who is a resident of the area. So it was possible to get all the historical, geographical, socio-economic and related information from him. The housing information was also got from this assistant in the initial stages.

In most cases free discussions proved common during the study, and especially in the social gatherings like prayers at the mosques one could get very important ^{hints} on the housing situation of the area. At first it was intended to use a questionnaire to extract information but when the context of the work warranted physical checking of housing units, the housing survey sheet was preferred. Copies of both these tools are attached in the Appendices 2 and 3.

Nearly all information on the housing stock was carried out by the author alone, after the assistant left for a job. The council officials were cooperative enough to allow some of their workers to assist isolate the council houses from the rest of the houses in the town. It was also possible to have talks with the Town Clerk, the Deputy Clerk, the Treasurer, and most of all, the Engineer and the building technician at the council offices. A copy of the questions that were used in one of the discussions with the Municipal Engineer is also attached in Appendix 1. Discussions were also held with two private contractors about the rate of building activity in the town and the type of clients and houses they encounter.

There were also discussions with suppliers of building materials in order to get the prices of the materials and where the materials were obtained from. The field survey was based on physical inspection of buildings, using a housing survey sheet. In this sheet, information was being sought on the age, materials of construction, structural condition, repairs and levels of maintenance of each housing unit. There was also need to know about the accessibility, nearness to and from services and facilities for each house. These included water points, distances to shops, markets, hospitals and recreation centres, schools and so on. It was also possible to collect information on the security of the specific area, the level of noise, and the type of sewage

disposal, refuse collection and whether there were street lights or not. The purpose of this information was to streamline the suitability of each house in entering the estimates of housing need.

Once gathered, this information was presented in charts, graphs and mostly in tables for easy depiction of observations. At times the use of percentages was convenient whenever comparisons were being made. Using a score sheet for each housing unit the points scored were totalled to determine whether or not the unit is acceptable it needs repairs or is beyond repair.

Analysing the data was time-consuming because the analysis was done manually, to cover the above mentioned aspects for an estimated 4704 housing units. The analysis lasted two-months, from January to March 1986. From the results of the analysis specific aspects of the housing stock of Malindi, and of the housing need were assembled. The quantities include vacancy ratio, replacement rate, population growth rate, number of persons per room, household sizes and many more. These were then carried forward to be used in the different methods for estimating housing needs.

A number of problems were encountered in the research work. It was difficult collecting data on all the houses available in the study area. Some of the units in the European-dominated areas had to be analysed from far since they are protected by gates with dogs around. In some of the squatter areas one had to conduct the survey carefully for fear of being mistaken for a Council official who would recommend bulldozing of the houses. There seems to be little information on housing conditions in the area, except for levels of rents. Most of the people in Malindi seem to be much unaware of the processes in house markets, such that some were not aware of how many estates are owned by the Local Council. There are also doubts as to the applicability of such an individual housing survey in other congested and large areas. The amount of work involved is suited to a small area, for larger ones samples will have to be taken.

CHAPTER 2
LITERATURE REVIEW

Introduction

Numerous studies have been carried out all over the developing world on the housing problems of the majority of the people. One of the topics in housing studies that has been mentioned now and again is the subject of estimating housing needs.

Housing need "defines the number of conventional dwellings or other suitable quarters that need to be constructed or repaired in order to bring housing conditions, as of a particular point of time, up to nationally adopted standards, plus the number that need to be constructed, repaired and/or maintained to ensure that housing conditions remain at the standard level over a stated period of time" (United Nations pg. 6). In effect therefore housing need describes the desirable housing situation as opposed to what people are actually living in, or what they can afford to live in. The standards mentioned in the definition refer to those standards governed by society's cultural norms about acceptable levels of privacy, safety and health .

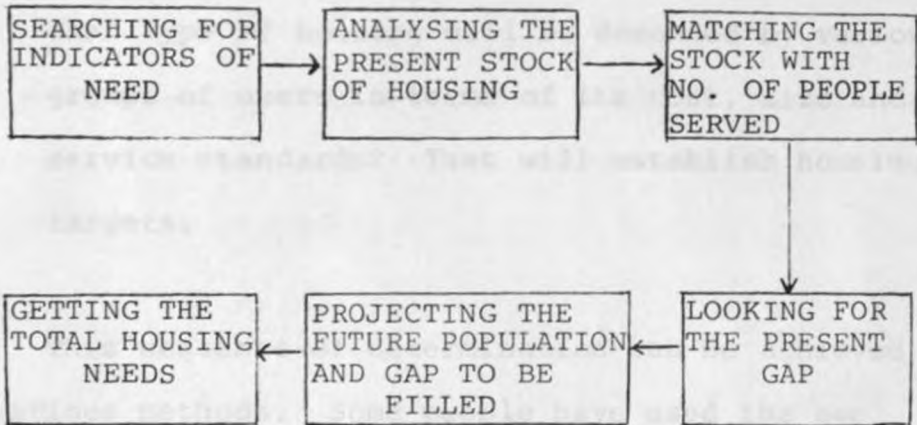
Although housing needs are always mentioned in housing papers the subject has in very few occasions played a major role in highlighting what is really

involved in demanding a house. This piecemeal approach to an important branch of study may stem from some of these reasons:

- a) While none of the existing sources of information on estimating housing need is comprehensive, they do at least represent a body of facts on the housing situation. This has made it always possible to adopt or modify the various figures available in order to obtain a picture which is at least passable, "for the time being".
- (b) The shortage of housing is so obvious that there seems to be no real need to survey housing conditions. This has delayed many governments in getting the true picture of the national housing need.
- (c) The problem of having to estimate housing needs while fulfilling a universally accepted definition of "acceptable housing" has tended to restrict most housing analysts from estimating needs. Housing needs have to be comparable over a number of places.

Many writers have given definitions of the term "housing needs," some providing the means for determining housing needs while others just give the

definition. Since all definitions merely refer to the basic housing requirements the main interest here is on the methods for determining housing needs. The process basically consists of the following steps:



Wakely, schmeter and Mumtaz (1976, p. 55) provided that in order to assess the magnitude of the urban housing problem, one has to determine:-

- (a) How many dwellings are needed at the present time to overcome the existing shortage.
- (b) Over the next say 20 years, how many of the existing dwellings will have to be replaced because they are deteriorating? This is expressed by the rate of obsolescence.

(c) How many new housing units will have to be built over the next (say) 20 years to cater for the expected growth of the city? i.e future housing needs.

(d) What type of housing will be demanded by various groups of users in terms of its cost, size and service standards? That will establish housing targets.

This sequence of determination can be achieved by various methods. Some people have used the age of the dwelling stock as an indicator of housing conditions, hence the indicator of housing need. If the form of construction of existing housing stock is known, the life span of the units can be ascertained. On the assumption that the present units have been erected at a steady rate over the preceding years, it can be assumed that the oldest houses would need replacement at the end of their life. Thus if the average life span was 50 years, the total housing stock would have to be replaced every 50 years, at a rate of 2% of the existing stock per year.

Therefore the number of houses that can be deemed habitable are those that fall within a certain age range from the time of construction, say within the economic

life of the house. Any house older than this range should be disregarded from the estimates. Duncan (1971 p.7) used this method, but was quick to note that "... the "average" age of replacement of dwellings is of limited interest when evaluating housing conditions ... After all, the age of the structure is not so important as the extent to which it has been modernised during its lifetime and the standard of maintenance it has enjoyed".

The "age criterion" is therefore useful to determine the safety of the occupants, and buildings found to be past their economic life may need alot of repairs and maintenance. But determining the average economic life of a house is not easy and the method can disregard old units which are habitable. The danger here is that estimated housing needs will be higher than what they should be. Many old units house thousands of people quite well, and omitting them from the estimates simply because they are "old" is illogical.

Turin (1967, p. 210-214) estimated Africa's housing needs using the affordability of occupants as a criteria for assessing needs. He noted the disproportion between the cost of conventional dwellings in urban areas and the income of large parts of the population to be extremely high, that "the relationship ... is such that only a small proportion of the African population can afford to pay for an urban dwelling of an acceptable standard. Either the cost of house building is too high, or that the recurrent expenditure is too high, or that incomes are too low, or the three could be working together".

Metcalf also used the affordability criteria, and found out that the rising cost of labour, building materials and land make it difficult for low and moderate income families to afford a decent home in a suitable living environment. He adds ".... there are social and economic signs pointing to higher housing costs and widening of the gap between what families can afford to pay for housing and the cost of shelter. Thus an increasing number of families will be condemned to a life in substandard, unsafe and unsanitary housing unless the cost of shelter is reduced to levels they can afford." (p. 1, 1972).

The same approach was used by Nathan of USAID (1984, p. 4) to estimate housing needs. Nathan said that the two central aspects to assessing housing

needs are the projected need for housing and the level of investment required, to enable people to buy and occupy houses. Nathan was of the opinion that determining housing needs alone is not so important without knowing whether these needs can be met or not. HABITAT agree with this method of assessing need when they give the condition that "when a large majority of the population in an urban area have extremely low incomes, the total amount of money available for housing is thus clearly very modest ... where income is highly concentrated ... the strongest commercial incentive is to produce housing for a very small segment of the population" (1976 p. 61).

This indirectly implies that by knowing how many people are unable to afford housing one can easily determine the level of housing need. Are the dwellings that would be required within the reach of the households that would stay in them? Are the households ready to accept the monthly charges that they would represent? This method therefore seems to be an important one of determining even the resources required for housing.

But Grimes argues that such a method has little success, and that it results from the failure to distinguish between housing need and effective demand.

"Need is often determined from such readily available statistics as the number of households living in slums, then is translated into the investment required to satisfy the need. The resulting numbers are so huge as to nourish the seeds of hopelessness." (1975 p. 62). Grimes further says that such an approach is highly misleading because the factors inherent in it make it difficult to compare housing needs between cities. Such factors include relative incomes, housing costs, and levels of overcrowding.

The affordability criteria therefore assumes that only those who can afford housing live in good houses, the rest are either in substandard housing or are homeless altogether. Being based on the minimum prices of public housing it assumes that the private sector does not produce cheap housing units.

Sometimes the extent to which dwellings are provided with services such as piped water supply, toilets, electricity kitchens and fixed baths or showers is taken as an indicator of housing conditions, and hence of need. This eventually determines the number of houses that are "fit" and those which are "unfit" for human occupation. This method is long standing and forms the basis for calculating housing needs from housing quality. Historically the unit for

measuring housing quality focuses on the individual housing unit. Public health legislation empowers local authorities to require the owners of insanitary properties to eliminate the defects or to demolish offending dwellings.

This method in most cases focuses attention on the worst housing units in an area. No standard is laid down. Public health officials have only to take a number of factors into account to the extent that "the house shall be determined to be unfit for human habitation if, and only if, it is so far defective in any or more of the said matters that it is not reasonably suitable for occupation in that condition" (Duncan, 1971 p. 3).

The method thus emphasizes human safety and hygiene, so that an average human should be able to live in an average good house of certain biological requirements. The supply of facilities and services are given more weight in determining the worth of a house. But this simple division of units into those which are "fit" and those that are "unfit" for habitation has a number of defects. Duncan again provides these.

1. A simple statement of conditions is given but there is no indication of the degree of "unfitness,"

nor any detailed information on the particular defects applying to the houses included in the total.

2. There is the difficulty of defining uniform standards for determining "unfitness" and ensuring that the same criteria are applied with equal objectivity in all areas.

3. Since standards in housing are rising with time for the criteria which determine "unfitness" must also be changing. This does not happen in the legislation.

4. The classification may be based on the characteristics of the individual dwelling unit. No systematic allowance is made in the procedure for environmental factors. Hence a sporadic or dispersed picture may emerge which, even if it were systematically correct, is inadequate for formulating a practical remedial policy.

HABITAT adds that data on dwelling facilities generally refer to the facilities existing in conventional dwellings which are the better equipped part of the housing stock. There is hence lack of information on facilities available in housing units

other than conventional dwellings, and where it exists, the information is available from case studies in selected areas, from which generalizations cannot be made (1976 p. 97).

Perhaps the majority of analysts who have tried to assess housing need have done so using the famous "Deficit Estimates" method. This criterion uses population figures to get the number of houses required. This is the basic method for all housing need assessment for all the need must be in terms of the "gap" existing between need and demand. And it is the easiest way of knowing that more or less housing is required.

The United Nations (1965, p. 108) illustrated how this method can be used. "The most used way is to postulate an average number of persons per household and then to divide by the predicted population growth, thus determining the number of dwellings required." In most cases housing needs are stated in terms of the difference between the number of households and the number of standard or above standard units occupied at acceptable densities in a given area and period.

Turin once more used the method and gave an example "For instance, if it is assumed that urban population accounts for approximately 1/6 of the total

population, that it increases at a rate of 5% per year, that the average household size is 5 persons, and that overcrowding begins when more than 2 persons share a habitable room, it is possible to estimate that between 8 and 9 dwellings would be required per year per thousand inhabitants of urban population in order to meet migratory growth and to eliminate overcrowding for a certain period of time" (1967 p.213).

Wakely says that "by subtracting the number of unsuitable from the total housing units, the existing "suitable" housing stock can be obtained. If this is compared with the existing number of households, the existing housing need can be established." (p. 56)

His argument is that one has to estimate first the number of additional households there will be in the city at a given date in the future. A crude way of doing this is to estimate the future population of the city and divide it by the expected household size at that date. Though there is a danger in such projections if the data is unreliable or inadequate, or if the projections are being made too far ahead of time, Wakely notes that "... the degree of accuracy required in forecasting housing needs is not very high. An indication of the "order of the magnitude" will suffice in most cases (p. 56). For a start, it

is enough to obtain the total number of housing units needed between now and some future date by adding the future housing need to the number which should be replaced and the number necessary to fulfil the existing housing need

Mbwagwa (1978, p. 36) used the deficit method to estimate housing needs in Eldoret. The method he used in the population projection is the linear extrapolation, using the formular

$$P_2 = P_1 (1+r)^n, \text{ where}$$

P_2 = projected population

P_1 = population at the base year

r = growth rate

n = no. of years

By dividing the present population by the average household size, the number of households is obtained. Using this the projected population is used to determine the present and even future housing needs. Like the other deficit methods, Mbwagwa's does not relate the housing need to affordability of the inhabitants. The method does not discuss the variations in quality of dwellings. Hence the "deficit" is not well defined, emphasis being only in the structural unit.

HABITAT applied an example of the method to estimate housing needs in the world (1976, p. 112). HABITAT argued that as the number of existing dwellings is related to the number of existing households, it could be assumed that this relationship is constant within the same geographical region. Consequently it is

$$\frac{D_x}{H_x} = \frac{D_y}{H_y}$$

where D_x = dwelling stock known,

D_y = dwelling stock unknown

H_x = households in D_x ,

H_y = households in D_y .

As $H_x = \frac{P_x}{h_x}$ and $H_y = \frac{P_y}{h_y}$

where P_x = population housed in D_x ,

P_y = population housed in D_y

h_x = household size of P_x ,

h_y = household size of P_y ,

the previous formula may be written

$$D_y = D_x \cdot \frac{P_y}{P_x} \cdot \frac{h_x}{h_y}$$

This formula can be used to estimate the unknown dwelling stock in a region. Taking into account the increase of population and the projections of household size and assuming that the ratio dwellings to households remains constant within the same geographical region, the above formula could be written as

$$D_n = D_1 \frac{P_n h_1}{P_1 h_n}$$

where D_1 = dwelling stock at the beginning of the period,

D_n = dwelling stock at the end of the period

P_1 = population at the beginning of the period

P_n = population at the end of the period

h_1 = household size at the beginning of the period.

h_n = household size at the end of the period.

In addition to the above requirements the method requires that a number of units should be replaced because of deterioration, demolition for such purposes as roadwidening, destruction by fire, earthquakes and other catastrophies. This information, however, is quite difficult to estimate because information is lacking and the criteria to determine fit and unfit units is arbitrary.

Although the most basic method for estimating need, it mainly focuses on the physical unit, itself, yet. Watson reminds that "Traditional methods of assessing need from local authority waiting lists, or by the projection of changes in average household size, are no longer sufficient in themselves to provide an effective basis for policy formulation" (1973 p. 6).

Watson gave an example of an assessment of need carried out in a Dudley study in United Kingdom, which used a series of population projections as a basis for the calculation of potential household projections, which in turn provided the basis for estimates of present and future housing needs. To this he says "The danger of such an assessment is that "results" become "targets" and the assumptions (on the dwelling stock quality") are forgotten." (p. 7).

This lack of appreciation of the quality of the dwelling stock and its environment by the deficit method was the subject of attack by Turner who said that "housing means both the stock of dwelling units (a noun) and the process by which that stock is created and maintained (a verb)." (1977 p. 64). This linguistic inability to separate process from product leads to "agencies to mis-state housing problems by applying quantitative measures to non- or only quantifiable realities. Only in an impossible world of limitless resources and perfect justice could there be a coincidence of material and human values (p. 65).

Working Models for Estimating Housing Needs

Drawing from the above demographic concepts in assessing housing needs a number of working models have been put forward to include other factors. The models are discussed here. The aim is to see which are the main constraints in current methods of housing needs assessment in order to come up with a relatively better method. The resulting model will then be used to assess need, and its results tested against the results of the current methods in case.

The Kuwaiti Model

The first working model is a "Model for supply and Demand for Public Housing in Kuwait " presented by Galal M. Saidi and Hassan N. Abdulbaki in 1983. The model is intended to calculate supply and demand for public housing over five year intervals and consequently the shortfall at the end of each interval.

Demand is calculated using as input the 1980 population which is used to estimate population at the end of each five-year interval. Population forecasts are based on birth and survivorship rates developed for the period 1975-1980, and reliable rates to allow for naturalization of non-Kuwaitis and assimilation of Bedu lacking citizenship. Household forecasts classified by size and income group are estimated,

based on the assumption that average household size will remain constant over the forecasting period.

Demand in each time period is estimated to correspond to the expected increase in the number of households of limited (low) and average (medium) incomes. Since not all eligible households apply for public housing an income specific rate is applied to estimate expected demand. This rate, termed Responsibility Rate (RR), is varied and the demand levels corresponding to different rates are calculated.

The expected supply at the end of each time period is totally controlled by the expected programs of the National Housing Authority (NHA) of Kuwait. The 1981-1985 NHA housing programme is used as a basis. Improvement over such programs in subsequent time intervals are assumed to depend on some policy and operational variables. These variables relate to (i) the actual rate of accomplishment of programmed five year plans (AR) and (ii) the rate of developing successive five year plans (DR).

Shortfall at the end of a specific time period is estimated to be equal to the initial shortfall in 1980 in addition to the accumulated shortfall between supply and demand during successive five-year

intervals until the end of the time period under consideration. Expected requirements for financial resources and land are estimated using standard cost and land rates developed by the NHA based on already finished projects.

And households in income group (1) could be estimated by adding all households with monthly income ranges within the required income group, thus:

$$H_{1, t+Dt} = \sum_{k \leq 1} H_{k, t+Dt}$$

The demand for houses to suit households of income group (1) is estimated as

$$D_{1, t+Dt} = RR \times (1.02)^{N-1} \times (H_{1, t+Dt} - H_{1, t}) + 0.5 O_t + 0.5 C_t$$

where O_t is demand to substitute for obsolete dwellings

C_t is demand to relieve overcrowding at year (t).

The equation means that demand is a function of the growth in the number of households of income group (1) between (t) and (t+Dt) multiplied by the rate of government responsibility for that class of households. There is allowance for vacancy ratio though this is not shown in the calculations.

The supply of houses to households of type (1) at forecasting period (N) could be estimated as:

$$S_{1, t+Dt} = AR \times (1+DR)^{N-1} \times IP_1$$

which implies that supply expected in a five-year period ending at (t+Dt) equals the 1981-85 housing programme adjusted by expected delivery development rate (DR). AR specifies the properties of the five-year program that may actually be achieved within that period.

Shortfall at the end of a time period could be estimated as:

$$SH_{1, t+Dt} = ISH_1 + SH_{1, t} + D_{1, t+Dt} - S_{1, t+Dt}$$

This implies that shortfall at (t+Dt) equals: initial shortfall in 1980, (ISH), shortfall at (t) and demand generated in (Dt) minus the supply at (t+Dt).

Results

The shortfall at the 1981-85 period includes the initial shortfall of 19491 units. At 0% Naturalization Rate (NR), RR = 1.0, AR=60% and DR = 0.%, the shortfall could be eliminated between the years 2000 and 20005. Using the same levels of variables it is expected that the shortfall of limited income housing will diminish in the year 2007. For the average income housing, the shortfall will be steadily increasing over the next 20-25 years.

But if the NHA can develop its programs by 50 and 100% in each five-year plan over previous periods, the problems of shortfall could be eliminated by the years 1992 (DR=50%) and 1990 (DR=100%) for the limited income housing and 2005 (DR =50%) and 1998 (DR=100%) for the average income housing.

And since not all average income households apply for government housing, values of 75 and 50% were assumed and investigated. Thus at $RR=0.75$ and 0.5 , $NR=0.0$ and $DR=50\%$, it is expected that shortfall will be eliminated in the years 2001 and 1997 respectively. For $DR=1.00$, the match between accumulated supply and demand will be in years 1996 and 1994 respectively.

Appraisal of the Model

1. Estimation of initial shortfall is not clearly shown and can only be derived by assuming the same demand and supply equations but at $N=1-0$. i.e. extrapolate the demand rates at 0 year.
2. Estimates are given in terms of demand and supply, then the result to mean needs. It therefore uses the "Deficit method" whose limitations were outlined above.

3. Qualitative variables of the housing units required are nowhere given, which means that only the physical product is explained. This is a limitation, unless it is assumed from general knowledge that services, facilities and welfare are well provided in Kuwaiti.
4. It only estimates housing needs in the public sector because the private housing market in Kuwait is sufficient. Yet in low developing countries housing need occurs in both public and private sectors.
5. The rates and variables used may sometimes be uncertain and difficult to pinpoint especially in countries where housing programs are minimal and the public housing sector disorganized. Some of the rates are therefore unlikely to be included when assessing need in other countries.
6. Where data is available the model is a good indicator of need, and simply gauges the exact time for eliminating housing requirements. It is simple, clear and absolutely correct in its approach since the basic unit for measuring need is the dwelling unit used by the model.

7. The model was developed bearing in mind that

a) the problem of housing in Kuwait is not one of shelter as in most developing countries, since the private housing market is sufficient.

It is rather a problem of home-ownership for government housing.

b) that almost 89% of Kuwaiti households live in single-unit housing.

c) that construction work to fulfill planned housing programmes normally faces delays because Kuwaiti building industry relies heavily on foreign labour.

The UN Model

The United Nations Model is the second model for estimating housing needs in this work. The model is in two parts combined, one for estimating accumulated needs and the other for future needs. The total need is estimated as in the equation

$$E(t) = K(E_1 + E_2 + E_3 + E_4 + E_7(t)) + E_5 + E_8(t).$$

Each of the components is explained as below.

k is the coefficient to allow for vacant dwellings but is not applicable to components E_5 and $E_8(t)$. This vacancy ratio assumes that there is always a proportion of housing units which is vacant. The ratio ranges from 2 to 3% of the housing stock.

E_1 is the number of living quarters required for households without shelter (homeless), and is expressed as $E_1 = H_1$, where H_1 is the number of households without shelter.

E_2 is the number of acceptable living quarters required for households occupying unacceptable living quarters. It is given as $E_2 = H_2 + H_3$ where H_2 is number of households occupying unacceptable living quarters, and H_3 is potential households occupying unacceptable living quarters. E_2 may also be expressed as $\frac{P_u}{S}$, where P_u is population occupying unacceptable living quarters, and S is average household size.

This can be applied where a direct count of the existing and/or potential households is not possible.

E_3 represents the number of acceptable living quarters required for households involuntarily doubled up with other households in acceptable living quarters.

E_4 represents the number of living quarters required to reduce levels of density (persons per room or area per person) in acceptable living quarters to a desired level, and is calculated as $E_4 = \frac{P_a - R \cdot d}{S}$, where

P_a = number of persons occupying acceptable quarters

R = number of rooms in acceptable housing units

d = desired density of occupation, and $d = \frac{P_a}{R}$

S = average size of households.

E_5 represents the number of acceptable living quarters in need of repairs and maintenance or replacement.

It is mainly in two parts, $E_5 = U_1$, where U_1 is the number of acceptable housing units dilapidated beyond repair and in need of replacement, and $E_6 = U_2$, where U_2 is their number of acceptable living quarters in need of structural reconditioning or for which certain essential facilities need to be provided.

$E_7(t)$ represents the number of housing units that will be required to house the projected increase in the number of households during a specified period (t), and is expressed as $E_7(t) = \frac{P_t}{S_t} - H$, where

P_t = estimated household population at the end of the period t

S_t = assumed average household size at end of period (t)

H = number of households at the beginning of the period covered by the estimates.

$E_8(t)$ represents the number of housing units that will be required to replace those which it is estimated will be lost from the inventory during a specific period (t), and given as $E_8(t) = (rU + U_3 + U_4 + U_5 + U_6)t$, where

r = percentage rate of replacement due to acceptable units becoming dilapidated during period (t). It is

computed on the basis of either the average length of life of housing units or the proportion of housing units reaching the age of replacement.

- U = total number of acceptable housing units at mid year
- U_3 = estimate of acceptable units that will be demolished because of urban and other development during (t)
- U_4 = number of acceptable units that will be demolished or lost because of disasters during period (t)
- U_5 = number of acceptable housing units that will fall out of use or be converted to non-residences in (t)
- U_6 = estimate of acceptable units that will be lost due to small units being converted into a fewer number of larger units during period (t).

Two other components E_9 (t) and E_{10} (t) are given but they are not used in the calculations.

Appraisal of the Model

1. This model is an open manual that can be varied and altered in order to be applicable any where. The agency itself did not use it to estimate needs for

any place but rather just gave the details for those who would like to use it.

2. The method can estimate both accumulated needs and future needs. It can also estimate quantitative needs aimed at reducing or eliminating overcrowding, and qualitative needs aimed at improving or replacing insanitary or obsolete dwellings. Components E_1 , E_3 , E_4 , $E_7(t)$ and $E_8(t)$ are to estimate quantitative needs while E_2 and E_5 are for qualitative needs.

3. The model estimates the totality of needs irrespective of house types, nature of provision (public or private) or preference of households for certain types of houses (single houses or shared). There is also no distinction between low, moderate or high cost (income) housing. This feature is both a limitation and a merit. At least one line of preference should be defined in house provision. On the other hand the method aims solely at estimating actual requirements for houses, it is now left to the providers of housing to decide the various types and schemes of provision.

4. The model makes it easier for the researcher to collect information relevant to the model, irrespective of house types.
5. It mainly relies on specific head count and inspection of all the components required by the model. This ensures that in the end a true picture should emerge, the survey of housing having been conducted by a person versed in housing affairs.
6. Where planned housing is available in plenty, the method of counting offers the simplest way of collecting the required data. Where this is not the case, it may be difficult to enumerate all the varieties of living quarters as required by the model. Especially for number of rooms in units and potential households in the population, these have to be estimated from known average sizes of housing units and from age characteristics in population censuses.
7. The model is able to predict even the number of units that will require repairs and maintenance, and those that will be lost from the inventory in future. This is rare in other models, and it allows an ongoing repairs and maintenance program

so that it is easy to pinpoint the number of units remaining in the stock at a time. The implication is that any housing program must consider the overall development plans for an area.

8. Questions of quality are in the definitions of what is "acceptable" and "unacceptable" housing, so that whether "physical product" or quality of housing will be brought out by how one uses these definitions. This open nature of the model offers a wide range of interpretations by different users of the model. Again this has double feelings; subjective indexes are not very reliable, yet most predetermined yard sticks in housing may not have a universal application.
9. Some components and variables overlap in their definitions e.g. E_3 , H_4 , and E_5 . The danger of this is either an underestimation or an overestimation of variables, leading to erroneous estimates.
10. Finally, the model completely excludes the concept of "effective demand" in estimating housing needs. The reason could be the strict adherence to the definition of "housing need" which disregards an

economic theory in housing. The purpose of using the requirement criteria rather than the demand factor is to eliminate the possibility of excluding some people from the estimates, using a poverty line or economic base data for determining housing needs.

The Proposed Model:

The proposed model is conceptually an ideal model for estimating housing needs. It tries to accommodate the merits of the other models and to avoid some of the demerits noted in the others. This model is similar to the United Nations model, but for a few changes and inclusions.

All the components used in the proposed model are used in the United Nations model, except that E_5 represents the number of living quarters required to replace acceptable living quarters which are dilapidated and/or substandard and beyond repair. There is also added a separate component E_6 which represents the number of living quarters which when repaired and well maintained will be occupied as acceptable living quarters.

But the most important addition is the criteria for determining what is "acceptable" from what is "unacceptable" housing. This correction hopes to alleviate some of the problems inherent in other methods

used currently. The rationale behind this is that most methods have tended to rely on strict adherence to standards for estimating housing needs, such that the results of the gap between need and demand are too large to be filled.

This does not imply a lowering of the nationally accepted standards of housing but rather it aims at considering a factor for social acceptability of housing by a people in a given area. The application of a housing needs assessment method must therefore include such a factor, which lacks in most methods. It should also not imply that needs expressed in this way will make housing problems lesser than they are, or that they will be easier to solve. The success or failure of alleviating housing problems in an area does not exclusively depend on how well the needs were assessed. The ability to supply more housing at reasonable standards and cost are the more important factors.

Though difficult to quantify and apply this factor for social acceptability of housing can lead to either underestimation or overestimation of needs, if not considered in the estimates. The factor is composed of three categories of variables:

1. structural condition of houses
2. provision or availability of services and facilities
3. situational characteristics.

The inclusion of or exclusion of a housing unit from the estimates is therefore a function of these variables. In (1) are things like age, condition of materials of construction, levels of repairs and maintenance, and rates of replacement of houses. Each variable is attested for each housing unit to see the structural worth and suitability of that unit.

In (2) are variables which determine by how far the houses are served with essential services and facilities. The services and facilities are water, electricity, telephones, sewage disposal, nearness to health facilities, schools, shops, markets, recreation facilities, community and social halls and street lighting.

In (3) are variables like accessibility and nearness to places of work, paved streets, level of noise in the neighbourhood and level of security to residents. Variables are designated in grades of quality or availability of the facility or service. For instance,

structural condition is given in terms of good, fair, poor and very poor.

Good = any unit structurally sound without defects

Fair = any unit in good condition but needing repairs

Poor = one unit that does not carry out the normal structural functions of a house.

Very poor = one unit that completely fails to satisfy minimum structural functions.

Houses found to fall in Poor or Very Poor conditions are likely to be unacceptable, unless helped by an excellent supply of facilities and services. The other variables are explained or defined in similar manner.

Levels of repairs and maintenance

Good = any unit in good structural condition

Fair = any unit not being well repaired enough to keep it in good condition.

Poor = any unit dilapidated, not receiving repairs, or any signs of repairs.

Very poor = worse than poor.

It is assumed that the level of repairs and maintenance found during the study is indicative of the quality of repairs over time.

Accessibility

Good = any unit easily reached by road or footpaths.

Fair = any unit which can be reached only with difficulty.

Poor = any impossible to be reach by car, and the car has to be parked a long distance away.

Refuse Collection

Is in terms of the frequency of collection per time.

Good = where collection is done more than three times a week.

Poor = where collection is twice or less times a week.

Very Poor or None = collection of garbage is not done at all, or garbage is left for long periods uncollected.

Water availability

0 = water is within the homestead or within a distance of less than 100 m.

1 = water is available at a distance more than 100 m.

2 = water available from a distance more than 200 m. away.

Power

Is either P for paraffin or E for electricity.

Sewage disposal

PL = Pit latrine

PF = Pit flush

F = Flush toilet

CP = Communal pit latrine

CF = Communal flush toilet

N = No toilet is provided.

Street lighting

Y = yes and N = no lights are provided.

Security is also graded as Good, Fair or Poor according to how the residents feel about their neighbourhood.

Noise

High level = housing units near a noise source e.g.
near a busy highway, airport, factories etc.

Medium level = not much noise constantly

Low level = minimum noise reaching a unit.

The other facilities are judged in terms of the distance to or from the residency. These are health facilities, shops, schools, markets and recreational facilities.

TABLE 7.1: TO SHOW MODEL COMPONENTS AND THEIR ATTRIBUTES:

N = near the homestead, less than 1km. away.

F = far, more than 1km. away from the house.

A point matrix is then employed for each of these components for each housing unit. For each characteristic of a component a score is provided in points, so that a housing unit will be found to have scored some points.

The maximum points scored are 100. The individual components are arranged in order of importance, and this determines whether to include or exclude a housing unit from the estimates. The order of importance in the analysis is given as:

Class 1 = structural condition (15 points)

Class 2 = levels of repairs and maintenance (12 points)

Class 3 = sewage disposal, water availability, accessibility (23 points).

Class 4 = nearness to hospitals, shops, markets (20 points)

Class 5 = security, power availability, nearness to schools (15 points)

Class 6 = refuse collection, street lighting, level of noise, nearness to recreation facilities (15 points).

The table below gives the breakdown of detailed attributes of quality for each unit's component.

TABLE 2.1: TO SHOW MODEL COMPONENTS AND THEIR POINT ATTRIBUTES:

| COMPONENT | | ATTRIBUTES | | | |
|-----------|-----------------------------------|---------------------------|--------------|---------------|--------|
| 1. | Structural Condition | Good=10+ | Fair=7-9 | Poor=6-4 | VP= 3 |
| 2. | Repairs and maintenance | Good=8-12 | Fair=6-7 | Poor=3-5 | VP= 2 |
| 3. | Accessibility | Good=4-6 | Fair=3 | Poor=1 | VP= 0 |
| 4. | Refuse collection | Good=5 | Fair=3 | Poor=1 | None=0 |
| 5. | Water availability | Within the homestead = 8+ | 100m=6 | 1km = 3 | 2km.=1 |
| 6. | Power | Electricity = 5 | Parafin = 3 | | |
| 7. | Streets lighting | Yes = 4 | No = 0 | | |
| 8. | Noise level | Low level = 3 | Medium=2 | High level =1 | |
| 9. | Level of Security | Good=5 | Fair=3 | Poor = 1 | |
| 10. | Distance to shops | Near=5-7 | Fair=3-4 | Very fair = 1 | |
| 11. | Distance to schools | Near=4-5 | Fair=3 | Very fair = 1 | |
| 12. | Distance to hospitals | Near=4-6 | Fair=3 | Very fair = 1 | |
| 13. | Distance to markets | Near=5-7 | Fair=3-4 | Very fair = 1 | |
| 14. | Distance to Recreation facilities | Near=3 | Fair=2 | Very fair = 1 | |
| 15. | Sewage Disposal | Private = 8 | Communal = 5 | None =0 | |

Using such a criterion it is possible to estimate the number of acceptable and unacceptable housing units on an individual basis. It is also possible to categorize units that will fall in the relevant component for use in the formula (equation) for estimating housing needs. For example in the present study area, all units scoring points below 60% are considered unacceptable. Those scoring between 60 and 70% need alot of improvement to be acceptable, and units above 70% are acceptable, except where they benefit from points scored by inferior facilities and services.

Appraisal of the model:

1. The method is perfect in deciding on the acceptability of housing units, but the processes involved in collecting the information are tedious especially for a large city.
2. It still does not include the affordability of occupants to buy, build or own houses, and hence is no different from the United Nations model.
3. It is quite subjective in its application, leaving it to the person carrying out the survey to decide on the important variables.

4. It is able to give need in terms of the "deficit" but this time the "deficit" is very well defined since the method takes consideration of the neighbourhood quality and social acceptability of housing conditions by the occupants.

After having estimated needs for a certain period one may try to guess by how much these needs will be satisfied over that specified time. Though this "guess" will lead to estimation of effective demand it can be used to postulate the ability to satisfy housing needs. Fulfillment of needs is as important as their estimation. Furthermore, guessing the fulfillment ability does not alter the estimated needs at all.

The results of such a guess should not be taken as a measure of the accuracy of the estimated needs i.e even if it will appear that the estimated needs cannot be met forever, or in the specified period, this should not imply an overestimation of needs. Likewise, when it appears that housing needs will be fulfilled within or before the predicted time, this should not mean that the needs were underestimated.

The Kuwaiti model estimated fulfillment of needs by giving figures of the required land and capital requirements. But more or so, this was done by equating

supply and demand of housing under different rates and operational variables. Thus demand is

$$D_{1, t+Dt} = RR \times (1.02)^{N-1} \times (H_{1, t+Dt} - H_{1, t}) + 0.5O_t + 0.5 C_t \text{ and}$$

Supply is $S_{1, t+Dt} = AR \times (1+DR)^{N-1} \times IP_1$. The shortfall at the end of the accounting period as

$$SH_{1, t+Dt} = ISH_{1, t} + SH_{1, t} + D_{1, t+Dt} - S_{1, t+Dt}$$

The United Nations model uses an indicator termed "index of dwelling construction in relation to estimated requirements" to measure what effect the housing programmes may have on estimated housing needs and how long it would take, at the rate of construction achieved or anticipated, to absorb the backlog of housing requirements. This indicator is formulated as $I = \frac{U_8(t) - X}{Y} \times 100$ where

Y

$U_8(t)$ = number of dwellings constructed during a three year period.

X = number of dwellings units required to meet the housing needs that have arisen during the three year period.

Y = accumulated housing needs at the beginning of the three year period.

If $U_8(t)$ equals (X) , then the number of units constructed during the three year period has equalled the housing needs which have arisen during the period. The index in this case will be 0, indicating that neither improvement nor deterioration has occurred.

If (U_8t) is larger than (X) , this implies that the number of units constructed during the three year period is greater than the housing needs which have arisen during the period and also that some of the accumulated needs have been absorbed.

If $(U_8(t))$ is smaller than (X) , then the number of units constructed in the three-year period is insufficient to meet the housing needs.

These indicators can be used in any relevant model to know how and when housing needs will be satisfied.

Conclusions from the Models

The models outlined above aim at giving ideas of how to improve on the current methods for assessing housing needs. But it may not be possible, even when very reliable statistics are available, to arrive at precise estimates of housing needs. The housing process is a dynamic and incremental one, and requirements for housing are affected by a multitude of factors, the effect of which can only be guessed.

Estimates of both accumulated and future or recurrent needs are affected by desires and attitudes difficult to assess in terms of actual need, and by various economic and social factors. Future housing requirements are most vulnerable in this respect since they are subject to changed conditions which are often impossible to predict when the estimates are made.

Even with all these models, it is unwise to imagine that housing needs of a generation can be estimated by one static method accurately and in great detail. The United Nations Manual says that "Neither high levels of accuracy nor great detail would be required for longterm estimates nor would they be feasible" (1973 p.15). Therefore any conditions or assumptions for the estimates should be constantly revised and accordingly adjusted as new trends emerge in household formations, internal migration, losses and demise of buildings etc. The models offered here are therefore not a panacea in themselves and can be altered at any time to suit the time and area for the estimates.

It can be seen from all these models that housing need assessment methods are fundamentally not different from each other in their conceptual approach. They are

CHAPTER 3

a function of both current needs and future needs. They all need population statistics in order to get the number of people lacking housing, which can then be projected into the future, at assumed population growth rates. They are also a function of the total present dwelling stock, for, by knowing how much there is today against what is required, one can easily guess how much will be needed in future. None of the methods outlined above goes about this subject without following a route near to this.

The next chapter will introduce the study area, Malindi Town and its geography. But mostly the chapter will try to investigate the information required by the methods of estimating housing needs. Once this is got, together with the past and present housing conditions, which are presented in chapter four, this will be all the necessary tools for testing each of the methods in Malindi.

CHAPTER 3

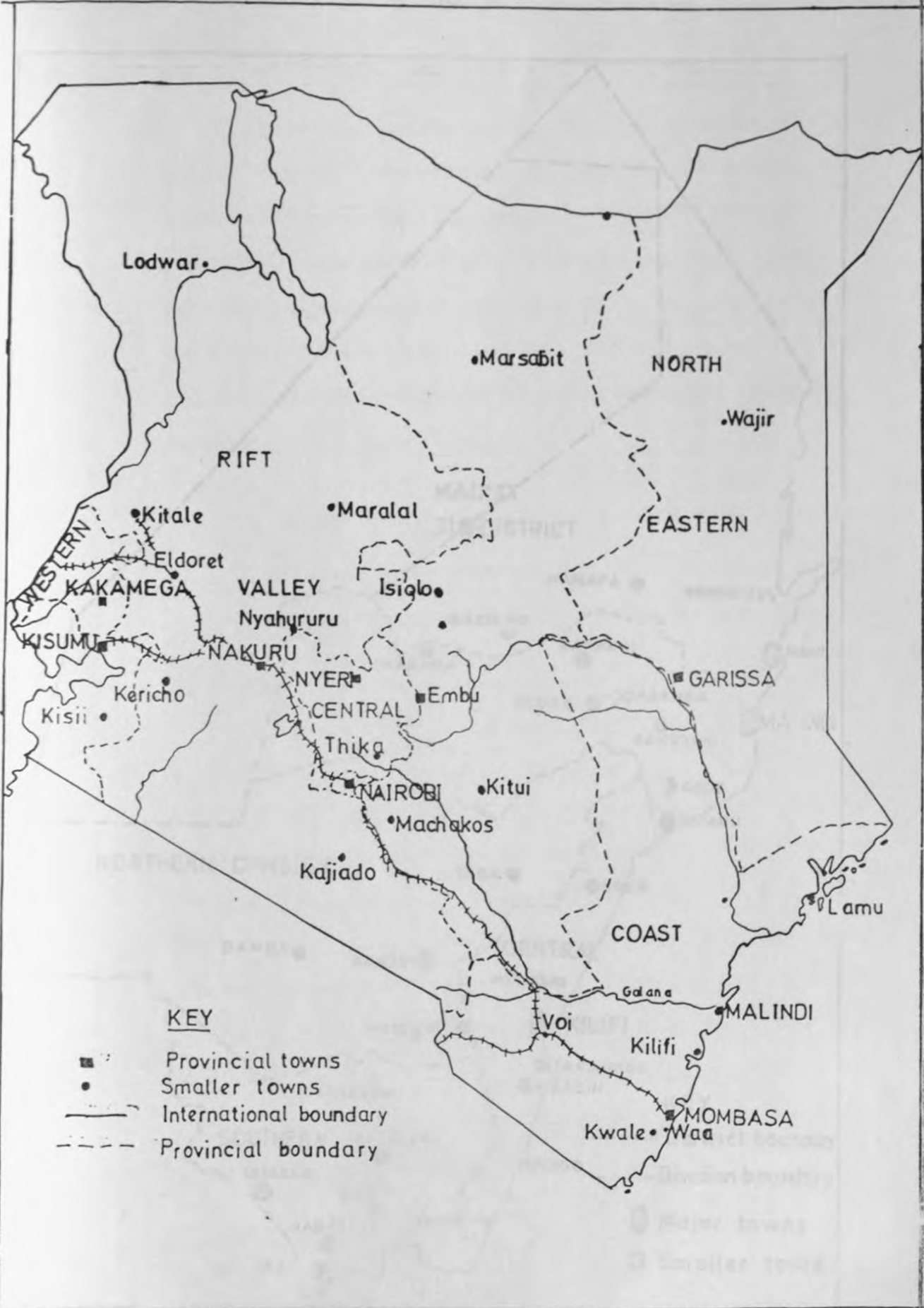
BACKGROUND TO THE STUDY AREA

History

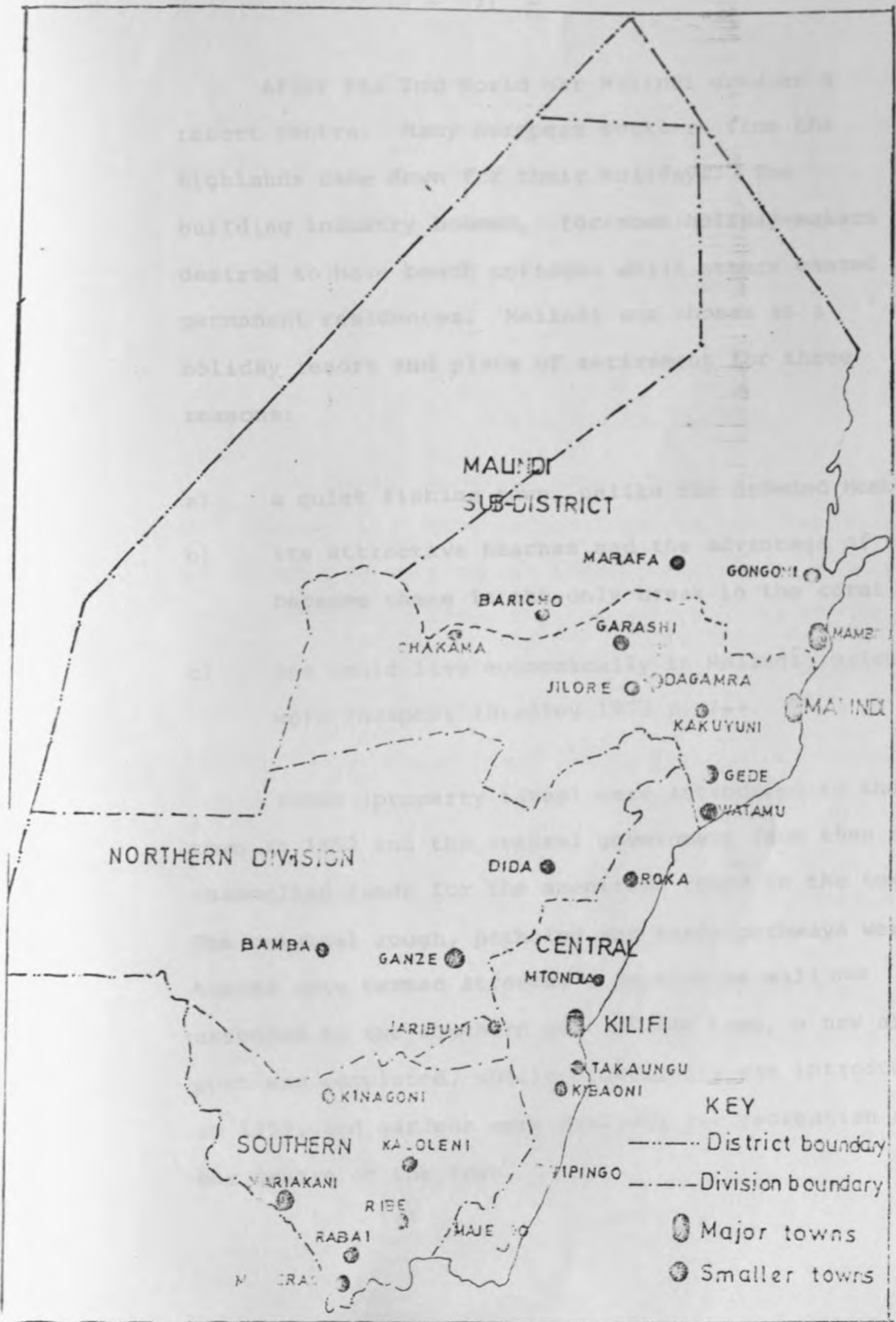
The town of Malindi is situated 120 km. north of Mombasa along the coastline of Kenya. Malindi is not very different from the other coastal settlements like Lamu, Mombasa, Tanga, Dar-es-Salaam and Kilwa. They under-went the same change in occupation by various foreign settlers, the Arabs, Portuguese, Germans and the British. Maps land 2 show the position of Malindi.

The importance of Malindi lies in the history of the town which put its name on the world historical map. Very famous settlers and rulers visited the town, including the Arab Abu-al-Fida (1273-1331), Vasco Da Gama from Portugal in 1498, Ludwig Kraph from Germany in 1845 and Sultan Majid of Zanzibar 1860. Trade between India and Malindi brought many traders and sailers hence the town grew as a centre for trade and commerce.

Malindi was officially gazetted as a town in 1903 (Bradley, 1973 p. 13). Most of the African inhabitants were Giriama, but in the early 1930s European settlers went to the Malindi sub-district as farmers. Some of those who went as holiday makers like the Bradys, opened the first tourist hotel in 1931, called Palm Beach Hotel (now the Blue Marlin). And in 1934 Commander Lawfords began his Lawford's hotel.



MAP 1. THE POSITION OF MALINDI IN KENYA



MAP 2 THE POSITION OF MALINDI IN KILIFI DISTRICT

After the 2nd World War Malindi grew as a resort centre. Many European settlers from the highlands came down for their holidays. The building industry boomed, For some holiday-makers desired to have beach cottages while others wanted permanent residences. Malindi was chosen as a holiday resort and place of retirement for three reasons:

- a) a quiet fishing town, unlike the crowded Mombasa,
- b) its attractive beaches had the advantage of surf because there is the only break in the coral reef
- c) one could live economically in Malindi, prices were cheapest (Bradley 1973 p. 16).

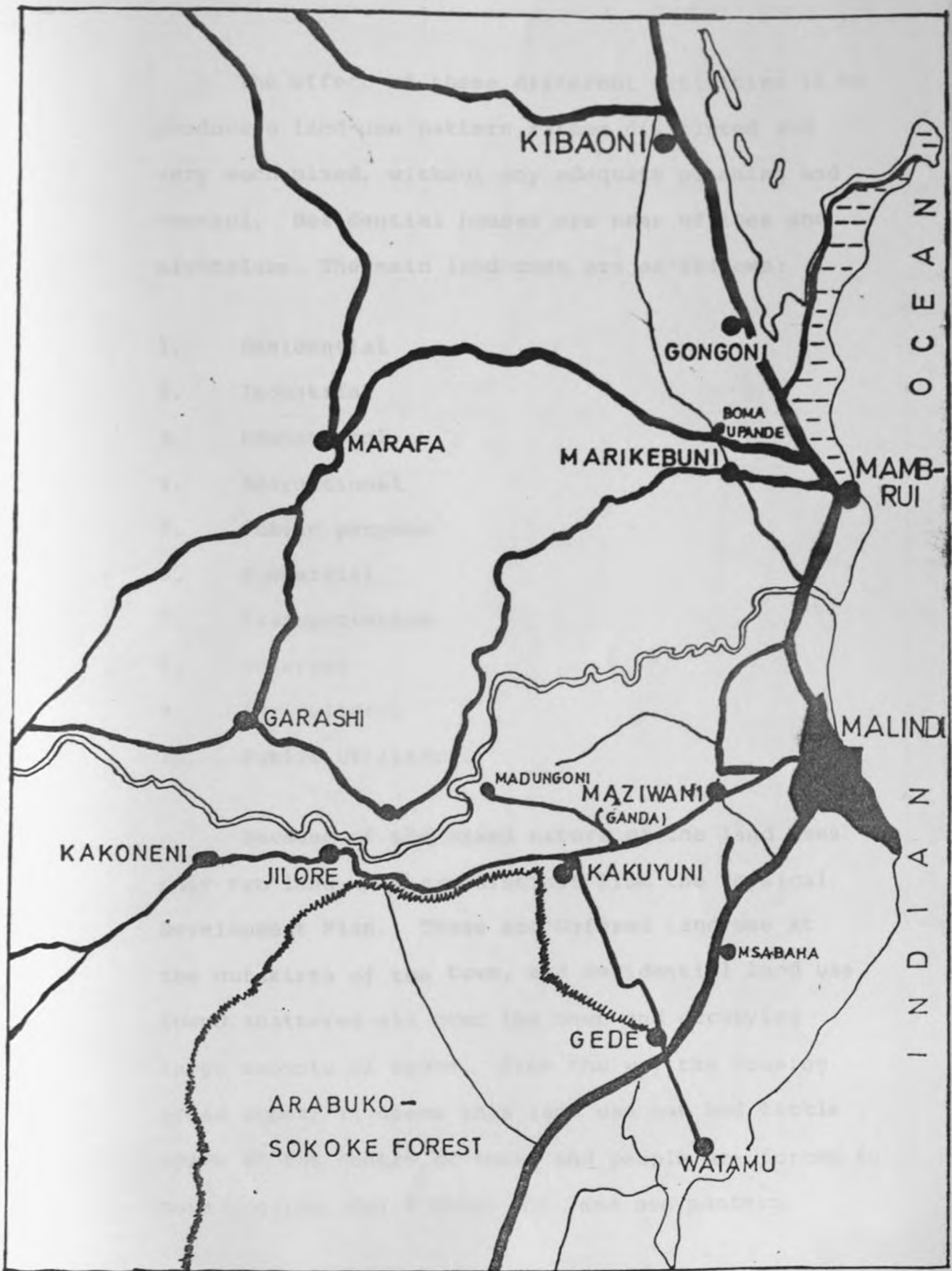
Rates (property taxes) were introduced to the town in 1952 and the central government from then on channelled funds for the amenities found in the town. The original rough, potholed and sandy pathways were turned into tarmac streets, a protective wall was extended to the southern part of the town, a new air port was completed, public electricity was introduced in 1959, and gardens were designed for recreation at the centre of the town.

Tourism is the mainstay of the economy of Malindi and accounts for creating more than 40% of the available jobs in the town, directly and indirectly. Today there are quite a number of international tourist hotels, together with allied tourist services in and around the town.

Functions of Malindi

The Kilifi District Headquarters are at Kilifi, but Malindi is a much larger town and most important functions are carried out there. Malindi serves as the main commercial centre for the entire district and is an attraction to large trading activities. Malindi also acts as a communication centre for the sub-district, a religious centre, and most importantly as a tourist centre. Map 3 shows one of the town's function.

All these features combine to make the town a busy commercial area, and therefore an ever-expanding residential area. Traders and tourists need housing eventually and thus the housing sector has benefited from the expanding of business in the town. This activity can still be evidenced by the amount of building activity going on in the town.



MAP 3. SHOWING MALINDI AS A COMMUNICATION CENTRE

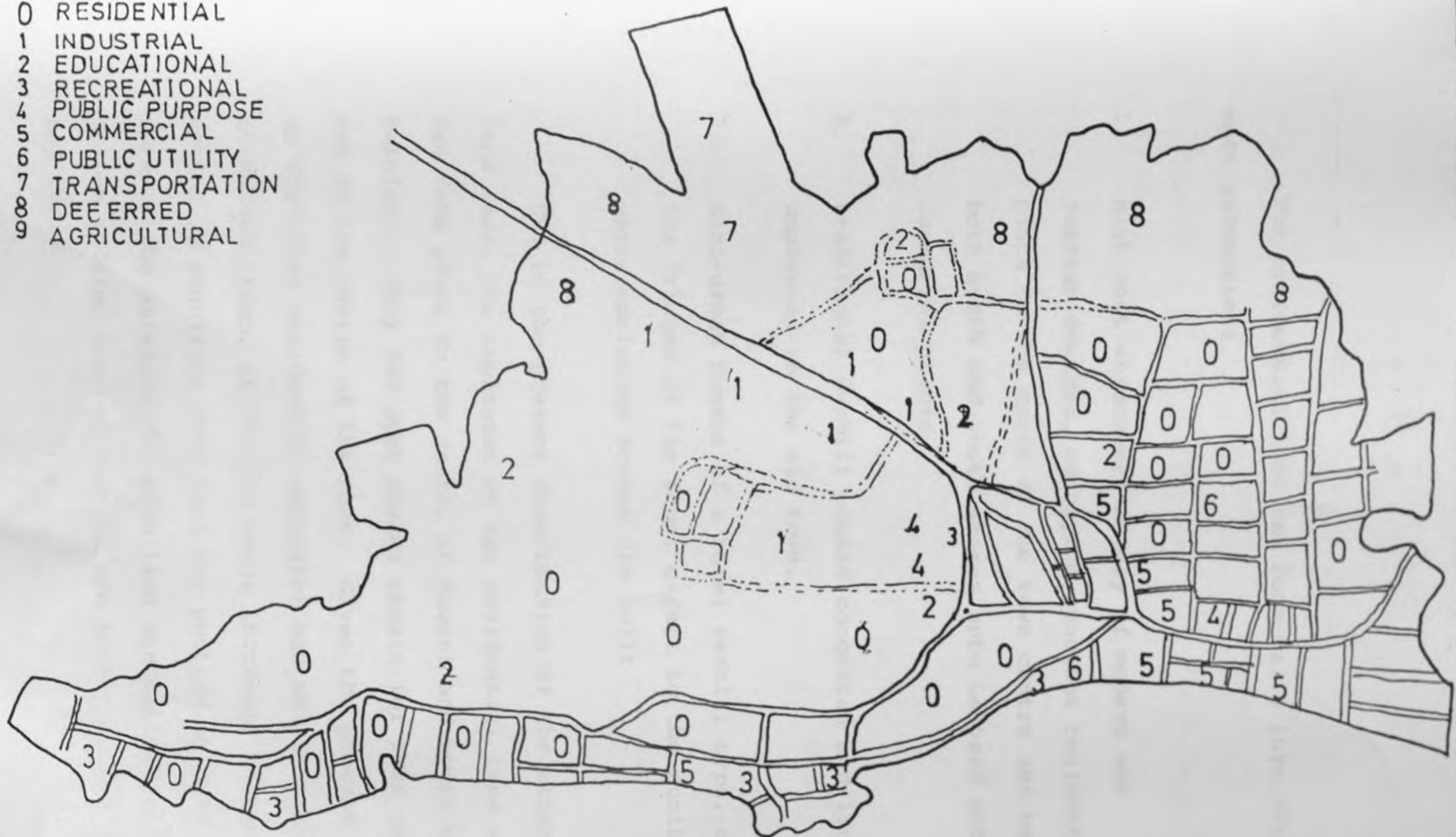
The effect of these different activities is to produce a land-use pattern rather disjointed and very much mixed. without any adequate planning and control. Residential houses are near offices and nightclubs. The main land uses are as follows:

1. Residential
2. Industrial
3. Educational
4. Recreational
5. Public purpose
6. Commercial
7. Transportation
8. Deferred
9. Agricultural
10. Public Utilities.

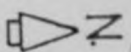
Because of the mixed nature of the land uses only two land uses are distinct from the Physical Development Plan. These are Deferred land use at the outskirts of the town, and residential land use found scattered all over the town and occupying large amounts of space. From the way the housing areas appear it seems this land use has had little space at the centre of town, and people are forced to move outside. Map 4 shows the land use pattern.

INDIAN OCEAN
MAP 4 LAND USE PATTERNS IN MALINDI

- KEY
 CLASSIFICATION
- 0 RESIDENTIAL
 - 1 INDUSTRIAL
 - 2 EDUCATIONAL
 - 3 RECREATIONAL
 - 4 PUBLIC PURPOSE
 - 5 COMMERCIAL
 - 6 PUBLIC UTILITY
 - 7 TRANSPORTATION
 - 8 DEERERD
 - 9 AGRICULTURAL



I N D I A N O C E A N



MAP 4. LAND USE PATTERNS IN MALINDI

SCALE 1:30000

The residential land use zone falls into three main categories:

1. high cost structures mostly of modern and foreign designs, occupying spacious residential plots to the north of the town centre and bordering both north and south shores upto Leopard and Casaurina points.
2. traditional swahili houses congested and largely unplanned in the old town.
3. semi-urban houses of a rural swahili type, on the fringes of the town, except to the north where exclusive houses are built.

Due to the present distribution of the other land uses, the expansion of the residential land use can take place to the south, of Maweni and north of Kaloleni. Only few open spaces remain for this land use in the centre of the town. Given the present set up therefore residential expansion has no limitations in Malindi town, if housing needs increased to the extent of requiring more land for putting up more units. The acreages for each land use pattern are given below, showing how residential use takes up much of the land.

TABLE 3.1: EXISTING LAND USES

| LAND USE | HECTARES | % OF TOTAL |
|----------------|----------|------------|
| Residential | 1332.00 | 63.43 |
| Industrial | 70.65 | 3.36 |
| Educational | 59.59 | 2.84 |
| Recreational | 21.93 | 1.04 |
| Public purpose | 25.64 | 1.22 |
| Commercial | 28.94 | 1.38 |
| Public utility | 4.81 | 0.23 |
| Deferred | 352.00 | 16.76 |
| Agricultural | - | - |
| Transportation | 204.44 | 9.74 |
| Total | 21.00 | 100.00 |

Climate

Malindi's climate is typical of the coastal climate, with low pressures and high temperatures. The climate is generally hot and humid throughout the year. Temperatures rise with the day and reach a climax in the afternoon hours, but at night they are lowered by the cool sea breeze. Conventional showers are thus common in the afternoons. The mean daily temperature average is 22°C minimum and 29.5°C maximum. Average relative humidity is 65% at 15.00 hrs,

decreasing as one moves inland. Rainfall is less than 1100 mm. per year, with two rainy seasons, one from March to May and the other from October to November.

The effect of this climatic type on houses in the town is that most houses are built with a high wall level, more than 3m especially when the house is to have a ceiling. This is to allow for more airy space above the floor and to allow cross ventilation. Windows are in most cases larger than 1m x 1m and sitting rooms are spacious, facing the direction of the breeze from the sea, or from the south. Although most houses face north, there is no one particular direction in which houses face.

Room sizes are supposed to be large, owing to the hot climate, but this is sacrificed for money by building very many small rooms for rent. These rooms measure between $2\frac{1}{2}$ x 3m and 3m x 3m. There is always a corridor in the centre of a swahili house to separate rooms and provide more air space. The houses are built with courtyards at the back and verandah at the front, so that when it is unbearingly hot indoors people shift to these outside areas for better fresh air.

The dominance of the Makuti thatch as a roof material could be attributed more to its climatic suitability than its cost. G.C.I. sheet roofs are too hot in this areas, and that is why some rich families, including Europeans, prefer Makuti for their roofs to other permanent materials, though the Makuti is a less durable material.

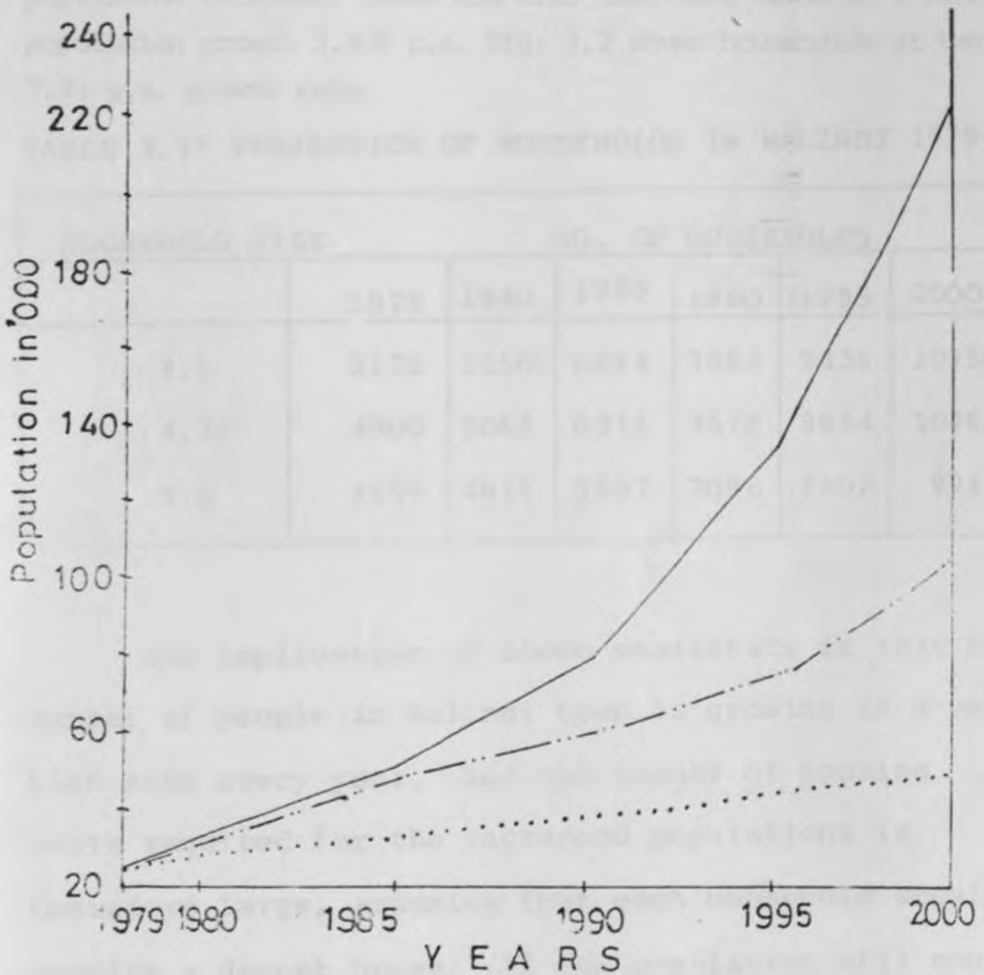
Population

The population of Malindi town in 1969 was 10,757 and by 1979 this had grown to 23,275. This is an increase at a rate of 11.5% p.a. which is one of the highest rates of urban growth in Kenya. Assuming the 11.5% rate for the future, there are 44,724 people in 1985, and this will rise to 77,076 in 1990, about 132,830 in 1995 and upto 228,912 people in the year 2000. For the national average growth rate of 7.9% p.a. for urban areas, the population projections are shown in Table 3.2, together with those of the Kilifi district rate of growth of 3.43% p.a. The graph in Fig. 3.1 illustrates this further.

TABLE 3.2 POPULATION PROJECTIONS FOR MALINDI TOWN AT DIFFERENT GROWTH RATES

| RATE | YEARS | | | POPULATION | | |
|-----------|--------|--------|--------|------------|---------|---------|
| | 1979 | 1980 | 1985 | 1990 | 1995 | 2000 |
| 11.5% p.a | 23,275 | 25,952 | 44,724 | 77,076 | 132,830 | 228,912 |
| 7.9% p.a. | 23,275 | 25,114 | 36,730 | 53,719 | 78,566 | 114,906 |
| 3.43% p.a | 23,275 | 24,073 | 29,984 | 35,491 | 42,010 | 49,726 |

FIG.3.1 GRAPH TO SHOW GROWTH OF MALINDI'S POPULATION FROM 1979 TO 2000



KEY

..... Population growth rate of 3.43% p.a

- . - . - Population growth rate of 7.9% p.a

———— Population growth rate of 11.5% p.a

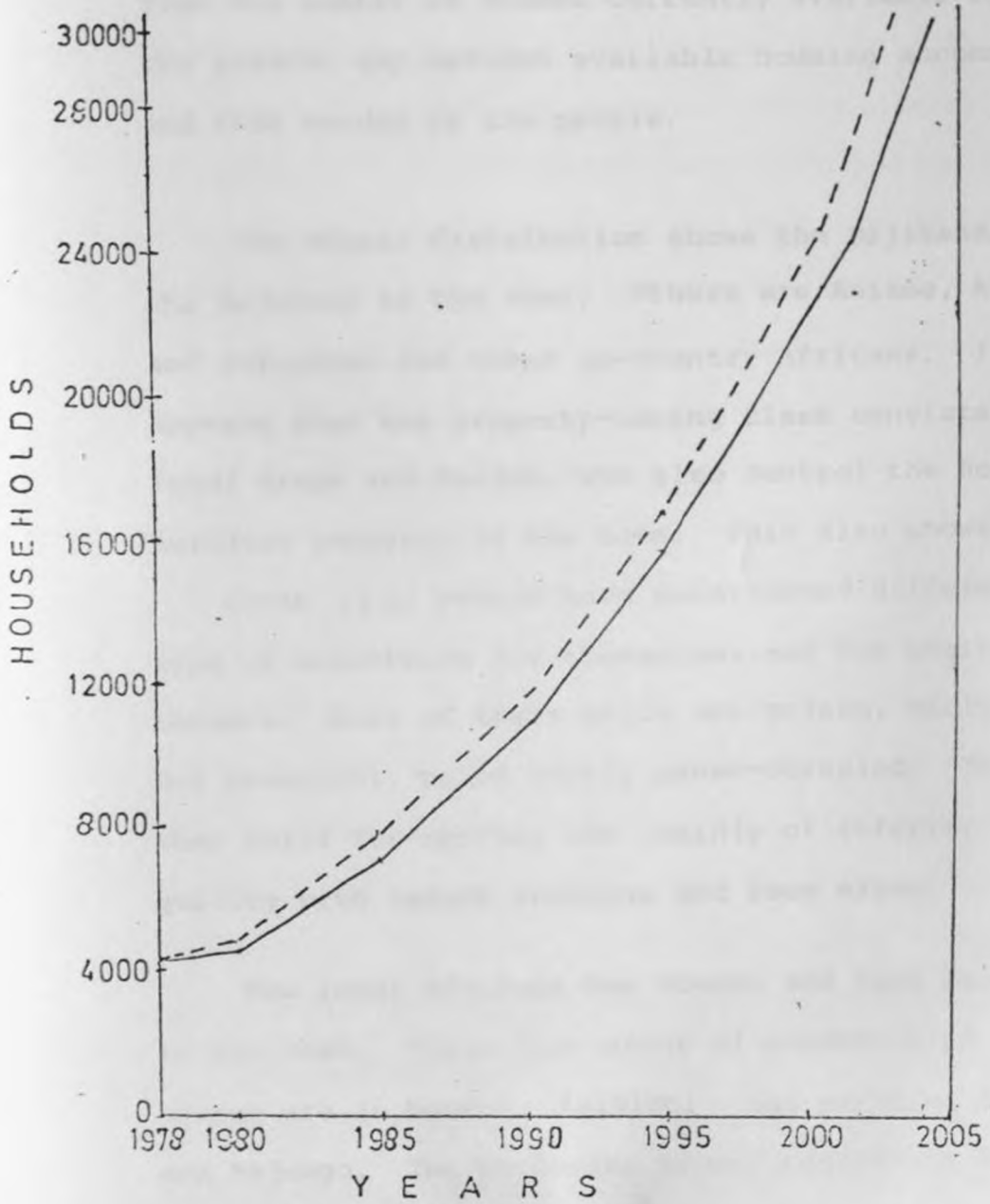
In 1978 when the population of the town was 18800, there were 4178 households, giving an average household size of 4.5. At an increased household size there should be more households owing to the population increase. These are also tabulated below at a rate of population growth 3.43% p.a. Fig. 3.2 shows households at the 7.9% p.a. growth rate.

TABLE 3.3: PROJECTION OF HOUSEHOLDS IN MALINDI 1979-2000

| HOUSEHOLD SIZE | NO. OF HOUSEHOLDS | | | | | |
|----------------|-------------------|------|------|------|------|-------|
| | 1979 | 1980 | 1985 | 1990 | 1995 | 2000 |
| 4.5 | 5172 | 5350 | 6663 | 7887 | 9336 | 10950 |
| 4.75 | 4900 | 5068 | 6312 | 7472 | 8844 | 10468 |
| 5.0 | 4655 | 4815 | 5997 | 7098 | 8402 | 9945 |

The implication of these statistics is that the number of people in Malindi town is growing at a very high rate every year. And the number of housing units required for the increased populations is therefore large, assuming that each household should require a decent house. If the population will continue to grow at these rates in future then a substantial amount of resources will be required to house the people. Housing needs rise with increases of household members for there are new potential household members added, and each of these will soon need a separate house.

FIG. 3.2 GROWTH OF HOUSEHOLDS IN MALINDI 1978-2005
AT POPULATION GROWTH RATE OF 7.9% p.a



----- Average household size as 4.75

————— Average household size as 5.0

It is a matter of observation in this town that the on-going building process does not provide the number of houses required for the population increase. Even the number of houses currently available reflects the present gap between available housing accommodation and that needed by the people.

The ethnic distribution shows the Mijikenda to be the majority in the town. Others are Asians, Arabs and Europeans and other up-country Africans. It appears that the property-owning class consists of the local Arabs and Asians, who also control the house building industry in the town. This also shows how these rich people have constructed different type of structures for themselves and for their tenants. Most of their units are modern, exclusive and beautiful, being mostly owner-occupied. Those they build for renters are mainly of inferior quality with lesser spacings and room sizes.

Few local Africans own houses and land parcels in the town. Their main areas of constructing houses are in Maweni, Kaloleni and parts of Barani and Majengo. The Europeans supply housing to satisfy their client-type housing needs, and these are found in the north and south shore lines. Tourists find accommodation in the many cottages and lodges, bungalows for rent and tents along the beach front.

Employment and Incomes

By 1983 there were 4075 people in gainful wage employment out of a potential labour force of about 19900, which is only 22% of the labour force. That means out of the total population only 15% are engaged in wage employment. And the level of employment has since been declining due to the competition faced by the tourist industry from other tourist services elsewhere e.g. at Watamu and the lower coast. A case in point is the recent closure of two of the oldest hotels in Malindi, the Lawfords and Blue Marlin.

Because of the low level of wage employment the majority of the people are either unemployed or underemployed. But some find jobs in businesses. Which therefore implies that most people cannot afford decent housing easily, and that a very small number of people are able to build, buy or own their own houses. The rest rent rooms in cheap houses or build their own houses using other ways of raising incomes, but these houses take long to complete. The dominant mode of construction using the Mtomo type enables a slow building process while the owner occupies part of the completed unit.

KEY

- 1 STARDUST NIGHTCLUB
- 2 TROPICANA CLUB
- 3 LAWFORDS HOTEL
- 4 BLUE MARLIN HOTEL
- 5 EDEN ROCK HOTEL
- 6 SULI SULI RESTAURANT
- 7 SINDBAD HOTEL
- 8 ROBINSON ISLAND CLUB
- 9 PALM TREE HOTEL
- 10 WANANCHI DAY & NIGHTCLUB
- 11 I LOVE PIZZA RESTAURANT
- 12 OZ IS BED & BREAKFAST
- 13 TRAVELLERS INN
- 14 BAOBAB CAFE
- 15 SILVERSANDS CAMPING SITE
- 16 DRIFTWOOD CLUB
- 17 THE UMANDE RESTAURANT
- 18 PRESENT STADIUM
- 19 SHOWGROUND
- 20 AIRPORT



MAP 5. MAIN TOURIST SPOTS AND PLACES OF ENTERTAINMENT

SCALE 1:30000

The failure or poor performance of the USAID Tenant purchase housing scheme in 1978 illustrates the fact that most people are unable to afford decent housing at high costs. This scheme, which lies near the current sites and services plots, was a joint venture with the National Housing Corporation (NHC) in 1976. The original aim of the project was to build a cheap house in accordance with the minimum national standards (two-bedrooms, a kitchen and toilet and shower) which the lower middle income group could afford to buy on tenant purchase terms, and would use for owner-occupation.

It was calculated that the Kshs. 800/- to Kshs. 1,000/- income group could afford to buy this house, if between 30% to 40% of household income was spent on monthly payments. But the Ksh. 40,000/- cost of construction made this aim difficult to achieve. The scheme became very unpopular amongst the local people. Being the first of its kind many people were not impressed by its eventual gains. This lack of understanding of the tenant purchase finance system among the non-property owning class of Malindi has been cited as one of the main obstacles to the project (Muller, 1978 p. 15).

Some of the main reasons given for the unpopularity of the scheme to the people were:

1. The deposit was too high and could not be raised within a short period.
2. The monthly payment of Ksh. 325/- was too high.
3. The payment period of 26 years was too long, and the owner by then will be too old to enjoy the house.
4. Rooms were too few and too small, especially for families, compared to larger rooms in swahili houses.
5. There would be lack of privacy because of the absence of an internal courtyard, which forms an essential element in the coast building style and is important in local domestic life.
6. The eventual cost of over Kshs. 100,000/- was too high for the real value of the house. Considering its size the house was hardly worth Kshs. 40,000, comparing it with swahili units. To have to pay 60,000/- more for it, could not be an attractive proposal.

7. The closeness of the toilet to living/sitting room and kitchen in strict coastal and Islamic tradition can be very embarrassing.

In the final analysis it was decided to change the 32 units from tenant purchase to rental scheme. The rent levels would have to be manipulated so as to compare favourably with those in the centre of the town, whose houses are mostly swahili type.

If the present trends prevail in future, then the number of house renters will be increasing every year. Given the population rates at this time without a corresponding growth and revival of job opportunities in the town many units will be deteriorating at a higher rate, with people continuing to be accommodated in cheap and poor quality housing.

What can be inferred from these aspects is that housing needs in Malindi are currently being satisfied with very limited resources for the majority of the inhabitants. And the bulk of housing supply is provided by few of the rich. Any housing needs assessment method in Malindi town is likely to encounter a huge backlog of needs if it uses the affordability criteria. Since almost everybody is at least housed, after a fashion, there is need to look for other ways of assessing the present and future housing needs in the area.

Physical Infrastructure

For a town like Malindi to function properly there must be an adequate supply of a network of infrastructure. These are mostly provided by the local authority or the central government or by parastatal organs of the central government.

Water Supply

Sabaki River (Galana) which empties its waters to the ocean a few kilometres north of Malindi is the main source of water supply to the town. Pipe works run across the town centre in order to serve both the old town and the north and south European dominated areas.

Sometimes there is a serious water shortage in the town to the extent that taps run dry for long periods. This is a great obstacle to the development of the town. But in some sections of the old town, at Shella and Kwa Jiwa there are some old wells which serve the people during times of water shortages. Similar wells though smaller are also found south of the Maweni area.

Most of the tap water in town is scattered evenly so that all houses are within fair reach of the nearest public taps. Those who are

able have installed piped water into their houses and this is the case with the shore areas. In the far outskirts traditional water holes and some seasonal streams help to ease the water problem which may occur.

Sewage Disposal and Drainage

There is no public sewage disposal system in the town. Domestic waste and soil waste is disposed of either by septic tank in the case of hotels, tourist residences and buildings of permanent construction, or by pit latrines, characteristic of the swahili houses which are the dominant in the town. There is only one line of sewage disposal, from Sophia to the sea, mainly to serve the modern centre. There is doubt as to whether the dominance of septic tanks and pit latrines will be toppled in the near future.

Electricity

Malindi town is well supplied with power from the main line from Mombasa. Extensions to the system should not be a problem in future. But this power is mainly concentrated in the old town centre, the modern centre and in the north and south European areas. Other important areas served with power are those near or along Mombasa Road, the

Communications
airport and nearby industries. There is no power in Maweni, Kaloleni and at the sites and services scheme. Even at the centre of the town there are many housing units that do not have electricity power installed in them. Streets lighting, which is supplied and maintained mainly by the Municipal Council is scattered over the town, just like the electricity power is. Many of the areas served with electricity enjoy the benefit of streets lighting.

Telephone Service

This service seems to be the least established in Malindi. Though not restricted to particular sections of the town, the service is generally of poor standard and strong complaints are always made about it. Now, a new post office and an exchange house have been opened in the town, and this will perhaps help reshape the service.

Garbage Collection

This is also another Municipal undertaking. Using tractors, the Council collects garbage on weekly or daily basis in the most accessible areas. This service is strictly limited to the town centre and the important tourist areas, otherwise places like Kisimo Ndogo and Maweni are rarely served.

Communications

The present skeletal network of tarmac roads in Malindi barely serves the needs of motorists and pedestrians. Traffic in both cases has increased tremendously, resulting to fast wearing out of the few good roads available. Most of the good and relatively new tarmac roads traverse the north and south shore areas, with the Mombasa-Lamu road dissecting the town centre. The rest are mere footpaths and unpaved rough pot-holed streets in old town.

The above information on physical infrastructure of Malindi town is necessary to note when studying housing needs in such an area. "Housing needs" do not mean the requirement for the physical housing unit alone. The human living environment is composed of various factors and events which make it very important to have a good supply of infrastructure. Housing itself is a complex dynamic product whose main processes include the above said services and facilities. It would therefore be quite improper to carry out an assessment of housing needs without regard for the available physical infrastructure.

All these have a bearing on the final results of the assessment. Water supply, for instance, determines the amount of water that everybody consumes, and a knowledge of this quantity today can help to know the

future requirements given a certain known rate of population growth. How large are the sizes to be installed in future, how many water taps should be installed per 1000 inhabitants today, and in future? What of the supply from wells and springs, is this likely to persist and supplement the tap water or will it diminish in future when the population will have risen? These are some of the important points for analysing the water sources in the study area.

The same goes with sewage disposal and drainage of foul and soil waste. One has to know whether the present system is adequate and suitable to the people. If not then ways and means should be devised in order to make provision for more and better sewage disposal devices for the future. On the other hand the success or failure of the system devised determines, for some part, the suitability of the housing unit served by the system as an acceptable or unacceptable house. Any house served with a poor sewage disposal system, or with none at all is likely not to meet the requirements of an acceptable house, though this depends on what the social standards say about the sewage system.

The rest of the infrastructure: telephones, electricity, communication (road) networks, street lighting are also important to the determination of

acceptability or non-acceptability of a house. These, together with other services like nearness to shops, schools, markets, hospitals and recreation facilities combine to perform the same functions described above.

And the rationale for the knowledge of these services and facilities is to see whether existing residential areas are served with enough facilities or not. None of these elements alone is most crucial to determine enough facilities. A combination of all these makes the whole procedure more logical. Houses being assessed short of these services are likely to lead either to an underestimation or an overestimation of needs.

The distribution of these services and facilities is also important since there should be a relation between these services and the major residential areas. The town of Malindi has two distinct sections: the first is predominantly Arab and Asian oriented, catering for their needs and lives; and the second part is mainly intended to serve the tourists and European residents.

The old town which serves the local and Asian-Arab population forms the central base of Malindi. It consists of numerous tightly packed clusters of

swahili houses built without any planning or layout control, but joined by a network of narrow foot paths and unpaved streets. This area houses about 75% of Malindi's population. The services and facilities (infrastructure) must therefore correspond to the proportionality of the population density. A survey conducted in the town shows that this area is not well served with services and facilities.

The implication is that most of the houses in this section, which are predominantly swahili type, are likely to be termed "unacceptable" in the assessment of housing needs. This situation is more pronounced in the two areas of Maweni and Kaloleni (Kisimo Ndogo) where, apart from the few taps available, there are no other major infrastructural facilities.

Land Ownership

Land uses have been discussed above to show how residential land use competes successfully with the other uses. It is also necessary to know who owns the land and how the ownership pattern is organized. Being the place where houses are put on the availability of land measures the ability to expand the present residential areas when future housing needs are estimated.

Except for a few areas the land within Malindi town is held under freehold title. These titles are a continuation of the existing land ownership system at the time the sultan of Zanzibar controlled the famous "10-mile coastal strip". The titles were protected at independence in 1963.

The present land is in two categories, private and public. Most of the public land came from land compulsorily acquired by the government, from unclaimed areas and land donated to the Council or Government. The Council owns about 300 acres.

Land in the town centre has been subdivided into many plots by landlords. In the old town, a plot measuring approximately 15x30 metres (0.045 ha.) may be sold between Kshs. 30,000 and Kshs. 50,000, depending on whether the buyer is local or foreign. There are presently no more vacant plots for sale in the centre of old town.

In the north and south areas bordering the shores a number of plots are on sale to whoever can afford. Most of the buyers here are rich Europeans and other people who need the plots for erecting separate accommodation. The price of land plots in these areas depends on the level of services and facilities on the plot, and also on the distance of the plot from the

beach. In any case it is said that one cannot buy an acre in these areas at less than Kshs. 150,000.

Outside the main town centre land units are comparatively larger, though lacking the essential services and facilities. The shortage of very cheap plots, houses and rooms in the centre of the town is thought to be the cause of the expansion of Kisimo Ndogo and the establishment of Maweni. See plates 3 and 4 on page 138.

For one to buy or rent land in the town the present requirement is that a subdivisional plan must be made by the Government Physical Planning Department, that the land must be surveyed by a licensed surveyor and the subdivision approved by the Commissioner of Lands. But fulfilling this process takes a long time and results to much higher land prices, hence people use other means. Uncontrolled development is therefore still going on in the town.

Controlled development is currently taking place in the large plots owned by Asian or Arab landlords who are either developing the plots themselves or subdividing to buyers who will develop them. In such cases plots should be expensive. Examples include Malindi Estate, West of Majengo, and the area south of the district hospital.

From the above information on land it can be said that land for housing construction both in the public and private is available, though most of it outside the old town centre. This land is only available either for rent or for buying.

Also, the price of land appears to be high. Given the fact that only a few people are wage earners there is reason to believe that most people cannot afford to buy their own plots, for putting up residential houses. And yet housing needs land, to be built on.

The resulting assessment of housing needs must therefore realize that though more units will be required to house the projected increase of population land for this purpose is not easy to get cheaply. The method of assessment must consider the problem of land in Malindi town. Public land is available but this is mostly for public purposes, or for houses belonging to civil servants only. Housing needs expressed in terms of affordability of occupants will suggest that most people cannot buy their own plots in the town.

Conclusion

The purpose of this chapter was to introduce the study area, Malindi Town, and then see how to carry out the aims of the study. A number of features are found to characterize the place. In relation to housing needs assessment the area offers a good site for this purpose.

The population characteristics indicate that the majority of the population is composed of the local Giriama, but that the main groups who are building the majority of the houses are not the Giriama. They are the Arab-and Asian-originated people. Since these two types of people have had a dominant influence on the Giriama and other local tribes, the type of houses required by both are similar i.e the swahili design houses. This means that if one assumes that this pattern will continue in the deep future, the main needs and supply for housing will be related to the living habits of these people and the type of house they prefer.

There are the European residents who, though a minority, occupy the largest residential areas in the most beautiful plots along the beach. Their effect is to raise the prices of land because they mostly need separate plots. The number of these people is

increasing, hence their future housing needs should be expected to demand more land. Their house designs are mostly foreign to this place, with each person trying to build houses of the design or materials found in one's country of origin.

There is also an influx of upcountry Africans who are engaged in trades and construction work. Presently these find accommodation in local houses. But in future they will try to build houses of designs other than the swahili type in order to suit their tastes. An example of this is seen in the sites and services schemes, where designs other than the swahili type are seen. Future housing supply should therefore consider the various designs for the different types of people living in Malindi.

Infrastructure has been found to be abundant, but the quality is not the best. Some of the improvements need to be made by the public and local authorities, such as garbage collection, street lighting, water availability etc., while others are to be borne by the people themselves. The results of housing needs estimation depend very much on the presence and quality of the available infrastructure, services and facilities. The present network of these seems incapable of satisfying the people's

requirements. For the future, efforts should be made to improve the state of affairs; or else there will be a danger of environmental degradation, which affect the results of the estimates.

The assumptions regarding the society's standards of acceptability of housing units seem to have stayed in this area for a long time. The evidence of this is that the swahili house has been dominant for a long time now, from the days Vasco da Gama visited Malindi and even earlier than this. For how much longer these standards will remain one cannot predict, but presumably there cannot be major changes for the next fifteen years. The knowledge about these standards should be a key element in the estimation of future housing requirements.

In terms of the economy there seems to be increases in small trades and other private commercial concerns but the gainful wage employment is still not yet satisfactory. And the supremacy of the tourist attractions is endangered by rival resort places, such as the the nearby Watamu Bay beaches. Unless the business cycles produce an income distribution enough to enable households purchase decent accommodation, the housing

sector will continue to deteriorate. Housing needs will therefore always be in excess of supply, and estimation of these needs in future will only be helping to add injury to the current estimates.

Finally, land for the various land uses has been found to exist in and around the town. Though land uses are intermixed it is easy to notice that residential land occupies the largest area of the resource. Since there are huge chunks of land deferred, there seems to be no immediate fear of missing land for housing. It is the affordability of houses by occupants that will increase their congestion on cheap plots and unserviced areas.

Now that the background information has been obtained on the population, social life, economy, climate and many others the next thing is to look into the past and present housing conditions of Malindi. This will enable the collection of the remaining type of information necessary for calculation of needs in an area. The success or failure of assessment work will very much depend on what was found on housing during the survey period. This information therefore reinforces the one in this chapter three in order to enable the work of calculating current housing needs and the future supply

CHAPTER 4

HOUSING IN MALINDI

History of Housing

Housing need is the extent to which housing conditions fall below the levels considered necessary for health, privacy and the development of normal family life conditions. Before one can start estimating housing needs it is important first to analyse the past and present housing conditions in an area in order to project any arising future needs.

The past conditions of Malindi's houses are very much tied to the history of the town. In 1498 when Vasco Da Gama visited the place, the town then extended along the waterfront from just north of the Portuguese Chapel to the pillar tombs. The present ruins at the Silversands were outside the town hall (Bradley 1975, p.4).

The town was comfortably laid out and the streets were narrow in typical Arab fashion; the closeness of the buildings was considered advantageous to the shoppers who would be protected from the glaring sun. See Plate 7.

The houses were rectangular in shape and narrow in width because the flat stone roofs were supported by mangrove poles which did not exceed 9ft. (270cm.)

in length. Coral stone was used for building; and was often white-washed. Verandahs were common, covered with palm thatch (makuti).

Because of various problems Malindi declined as a town between 1591 and 1860. When Krapf visited the town in 1845 he had to make his way through thick vegetation that had by then covered the town completely. He also found that the water wells which used to supply water were filled with rubbish; and that no one was living in the town.

In 1861 the town was re-built by Sultan Seyyid Majid of Zanzibar. New houses were constructed next to the old ruins. Most of these were the common mud and wattle (mtomo construction) type with makuti thatch rooves. Today, this is still the type of construction preferred by the majority of coastal people around Malindi.

With the abolition of slave trade, the town once again declined throughout the 1880s. Just before... Ist World War it was a very unattractive town, as portrayed in C.W. Hobley's description:

Malindi is a dilapidated native town with a certain portion of stone buildings all more or less in disrepair; even the mosque shows signs of want of care. There is no special portion of the town laid out as a....

bazaar. Roads in the modern sense are almost non-existent, there are a number of narrow crooked lanes whose surfaces are scoured out by rain. The water supply is derived from wells of varying degrees of saltness and contamination. There are a number of plots in the town covered with rubbish and bush (Bradley, p.12 & 13).

With the coming of the European settlers the town was rebuilt once again, to take the present appearance. The existing housing types are not much different from the ones seen by Da Gama, Krapf or Majid, save for the European bungalows and a few modern units. The majority of the houses still bear the rectangular box-like design. This design is not only found in Malindi but in the entire coastal line, from Lamu to Kilwa in the southern Tanzanian coast.

The reason for the homogeneity of this house type over such a vast geographic area seems to be that these areas were equally ruled, influenced and dominated by the Arabs, whose Islamic faith led to the Swahili type design. The population had similar cultural tastes through the dominating influence of the Arabs.

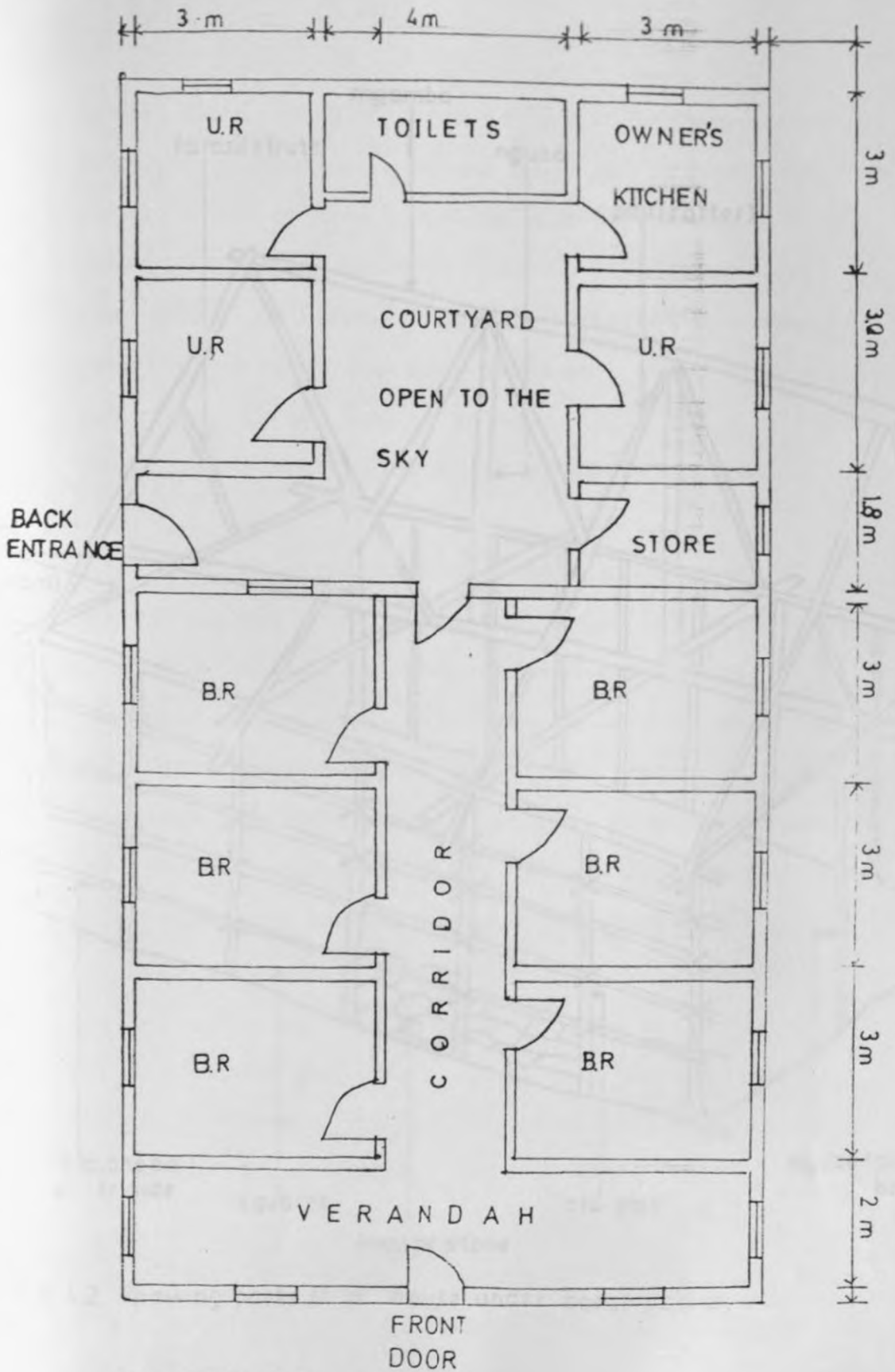
"Swahili house" is therefore a generic term used to describe the most common urban and rural house type along the East African Coast (Stren, 1978 p.33). Among its distinctive features are a rectangular design, a covered verandah at the front, independent rooms leading off the main central corridor, a courtyard (often enclosed) to the rear, and utility rooms

usually including a store, a toilet and cooking room) adjoining the courtyard in the back.

There are many variations in the design of the houses. The houses are in different sizes, with various numbers of rooms, ranging from two bedrooms to as many as twelve, the utility rooms inclusive. Fig. 4.1 shows an example of a swahili house design.

Upto the recent past most swahili houses were constructed entirely of traditional, locally available materials: mangrove poles, mud and wattle, and stones and makuti. Using these materials the different parts in the construction of the houses can be seen in Fig. 4.2 and Plates 1 and 2. The local names for these various parts are also given in Fig. 4.2. It is seen that the wall cladding materials are placed in the squares created by the intersection of the fito and zio poles.

FIG. 1 AN EXAMPLE OF A SWAHILI HOUSE DESIGN, MALINDI



BR = BEDROOM
U.R. = UTILITY ROOM

SCALE 1:100

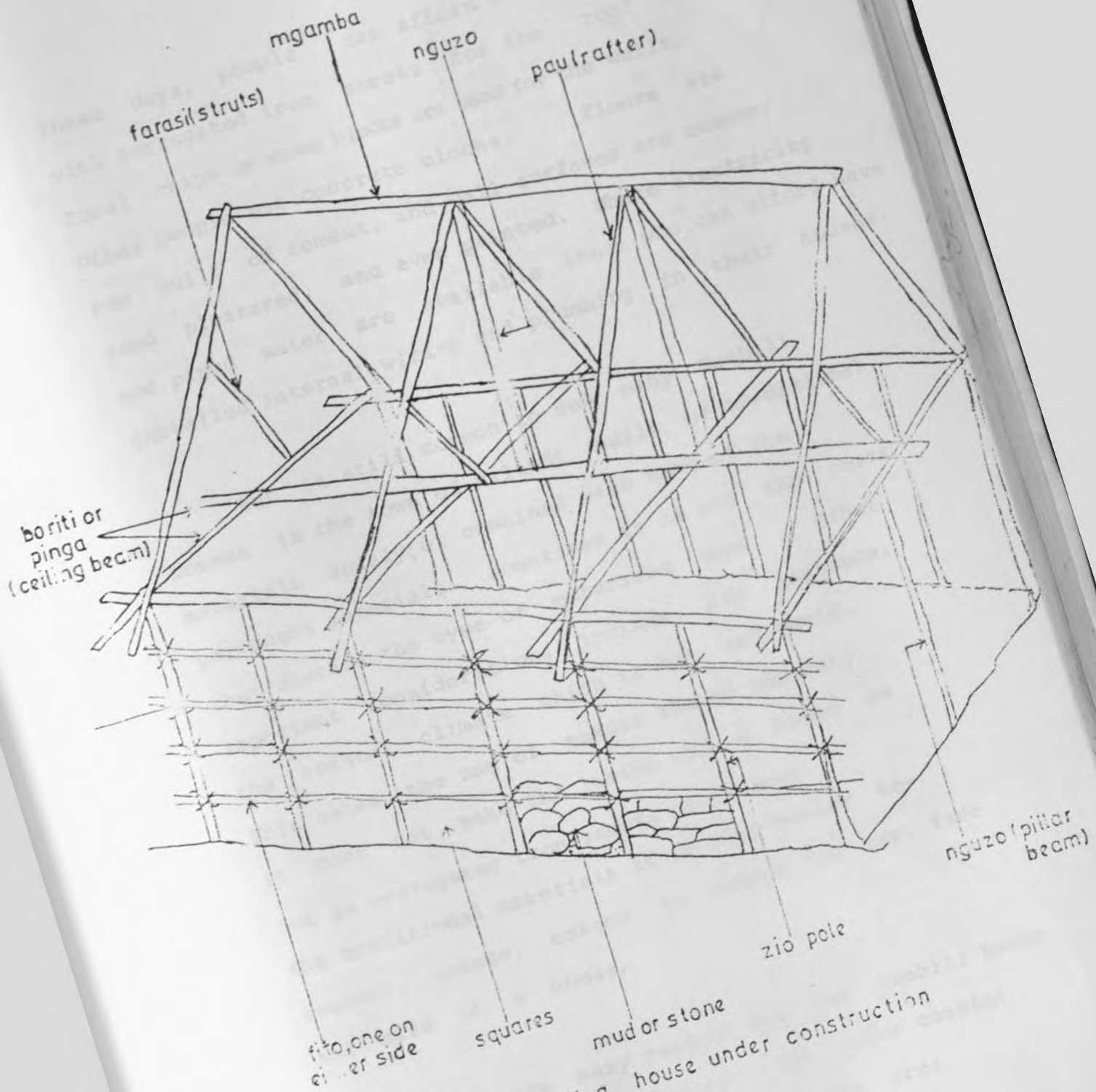


FIG. 4.2 Showing parts of a house under construction

These days, people can afford to replace makuti with corrugated iron sheets for the roof cover. Coral chips or stone blocks are used for the walls. Other people use concrete blocks. Floors are now built of cement, and wall surfaces are cement/sand plastered, and even painted. Where electricity and piped water are available those who can afford have installed internal wiring and plumbing in their houses.

But it still common to see many Swahili houses in the town of Malindi built of traditional materials solely, or combined with some of the permanent materials. Sometimes it is not the costs that dictate the type of materials used. Other important considerations include, for instance, the coastal climate which is hot and humid. This makes the use of makuti thatch popular; it does not make the inside of a house as hot as corrugated iron sheets would. With the traditional materials it is also easier to convert, change, extend or reduce the use, face and size of a house.

There are many reasons why the Swahili house is so widely used in Malindi and other coastal areas of East Africa. Some of these are:

1. The simple design of the house is appropriate as far as the social life of

The Swahili house is relatively low and the Coast people is concerned. The enclosed courtyard at the back, which is open to the sky is "popular both with Muslims who do not wish their women to be freely exposed to outsiders, and with lodgers and houseowners who are concerned with security and privacy in neighbourhoods" (Stren, 1978, p. 34). Most life activities such as washing dishes, children, clothes, laundry activities etc. are carried out in this place. When it is unbearingly hot inside the house this space may be used for sleeping.

2. Landlords find the swahili house suitable because of the spatial independence of the individual rooms which facilitates renting rooms to lodgers without undue inconvenience to the owners' households.

3. The inner spaces and verandahs, and the space in the courtyard provide access to good air circulation in the house. Especially if built of traditional materials, swahili houses can be relatively cool.

4. The Swahili house is relatively lower in its initial costs of construction compared to other types of houses. This relative cheapness is due to the type of materials used and also the simple straight box-like design; which does not require sophisticated construction. A four-bedroomed Swahili house built of traditional materials can cost no more than Kshs.20,000 in Malindi yet a similar modern house of permanent materials could cost well over Kshs. 140,000/=. This cost could increase with the size of the house. But if other permanent materials are used the Swahili unit may not be cheaper than the modern units. Due to short durability of its traditional materials it requires heavy maintenance over time, and may in fact make it the more expensive after all.

Up to recently the Swahili house was not accepted as a good permanent house officially, especially in urban areas like Mombasa. The reluctance (or dilemma) to accept Swahili house as a form of acceptable legal housing structure is rather puzzling. One would have expected that after serving the coastal people for generations this type of house would receive an overwhelming approval from the official standards. Probably this

reluctance emanated from the type of materials used to construct these houses: mud, poles and makuti, which seem to be of low durability, requiring heavy maintenance and having a poor appearance especially when worn out.

The conclusion drawn from this information is that the housing situation in Malindi today differs a bit from what it was centuries ago. Modern houses are on the increase and new designs are brought by foreigners. But the swahili house continues to be heavily relied upon in order to provide the lowest cost housing in the town and its surroundings. And because of the lack of proper official prohibition guidance the majority of the houses are still being built of the traditional materials used since Vasco da Gama visited the place.

Housing needs should therefore be assessed bearing in mind that although new types of modern structures are slowly coming up in the town, there

reluctance emanated from the type of materials used to construct these houses: mud, poles and makuti, which seem to be of low durability, requiring heavy maintenance and having a poor appearance especially when worn out.

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Housing needs should therefore be assessed bearing in mind that although new types of modern structures are slowly coming up in the town, there

is still heavy reliance on old type houses for accommodation. The method employed for the estimates is likely to allow the majority Swahili units into its components; otherwise all the results will point to enormous deficits. The age of these units should also be considered because units, though built of traditional materials, seem to have stayed for many years.

Methods of house construction in Malindi

Different types of house structures are found in Malindi town, ranging from single-room huts to three-storeyed flats. There are therefore similar methods of construction for these structures. Materials of construction are either the local ones or those brought to Malindi from other parts like Mombasa and Kilifi.

Materials and their costs

For the foundation materials used are earth and mud or stones and concrete; depending on the type of structure and the area on which it is put up. In some areas no deep foundations are necessary since such areas are stony, like in Maweni and Shella, and areas bordering the north and south shores of Malindi.

For the walls, poles, quarry stone, stone chippings, limestone blocks and concrete blocks are available. Mud or earth is also greatly used with stone chippings to make walls. A wall built of stone and mud, or one of stone chippings and cement matrix is what is called "Mtomo" construction.

Roof material available here are mostly the palm leaves (makuti), grass in some cases, corrugated iron sheets, i slate, different types of roof tiles, asbestos and flat roof materials. The wide use of makuti, even by some Europeans is partly due to its favourable thermal qualities and partly due to its ready availability. Coconut trees from which makuti are obtained is an indigenous tree of the coastal region. With an exception of a few expensive and rare materials like marble, wood tiles, slate and flat roof components the rest of the materials are available in the town and nearby, either from stockists or from the area of origin or manufacture.

Some of the materials are laid down in the table below, together with estimates of their prices and places of availability. Given these prices,

Table 4.1 COSTS AND ORIGIN OF BUILDING MATERIALS IN MALINDI.

| Material | Price | Place where available |
|-------------------------|--|---------------------------------|
| Earth, mud | Very low, | Locally |
| Sand | Shs.450-500/= per truck load | Ngomeni, Casaurina Masabaha |
| Stones | Shs.300-350/= per truck load | Locally, Msabaha and Ngomeni |
| Quarry Blocks | Shs.2/= to 3/50 per stone, less Transport cost | As above |
| Concrete Blocks | Shs.5/= to 7/= per block | Locally, Kilifi and Mombasa |
| Makuti | Between Shs.15/= and 30/= per scope | Locally, Kilifi, Kakoneni, etc. |
| Cement | Controlled price | Stockists |
| Zio for walls | Shs.120/= -140/= per score | Lamu, Kurawa, Tarasaa, Forests |
| Fito, to support Zio | Shs.10/= - 15/= per score | - Ditto - |
| Pau (Rafters) | shs.140-160/=per score | - Ditto - |
| Pinga or Boriti (Beams) | Shs.400-440 per score | - Ditto - |

There is not such a difference between the current in the European-dominated areas costs of construction range from Kshs. 80,000 to over Kshs. 6000,000/-. For the servants' quarters costs are also high. Being built of standards to match the taste of the plot owner rather than that of the servant, these units cost between Kshs. 30,000 to Kshs. 50,000 to build.

For the modern type houses in Old Town, there are various sizes and types, from bungalows to flats. Costs of construction here range from Kshs. 80,000 to above Kshs. 600,000. In the swahili units, including huts, costs of construction range from Kshs. 350/- for a one-roomed hut to Kshs. 60,000 for a complete swahili house. Costs are affected by the type of building materials used and the period taken for the construction.

It therefore appears that savings and help from friends and rural area relatives may be one of the ways the local low-income people use to construct their houses. At the going rates of construction costs even the two-roomed swahili unit can only be managed by a few. But people themselves in housing. If the council can build more housing units for the low-income people, then it will have lessened the housing needs of the majority of the people.

Methods

There is not much difference between the current methods of building houses in Malindi and those prevailing at the beginning of the century. There are both traditional and modern methods of constructing houses.

As for the modern methods, these are familiar. Registered architects, surveyors and contractors are invited to a project and each party does its job. Such type of method in Malindi is used for government houses, council houses and houses for some of the rich.

Traditional methods of construction are much more widespread in Malindi. These are used mainly for the building of huts, long stores and swahili houses. The sequence of steps in the traditional modes of house construction is shown in Fig. 4.3 to 4.8.

One of the commonest mode of construction is the "mtomo". Stones are inserted in the squares created by the poles. A cement/sand mixture is used to keep the stones in place and provide a course on which to place other stones (Fig. 4.6). The cementing matrix need not necessarily be of cement/sand, mud alone can also be used. When well built and plastered the mtomo wall looks as good as the walls of either quarry blocks or concrete blocks. Skilled and experienced local artisans have built steady and beautiful mtomo walls at times. During the survey in Malindi the author needed great care to distinguish between a plastered wall of mtomo and that of plastered quarry blocks or concrete blocks.

DIAGRAMS TO SHOW THE SEQUENCE OF STEPS IN THE CONSTRUCTION OF HOUSES USING TRADITIONAL MATERIALS IN MALINDI

FIG.4.3 Zio poles in holes in the ground

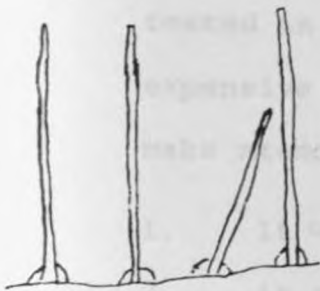


FIG. 4.4 Fito are tied to the zio to form squares

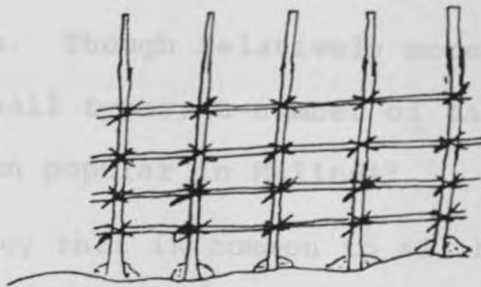


FIG.4.5 Mud hounds are placed in between squares (mud & wattle)

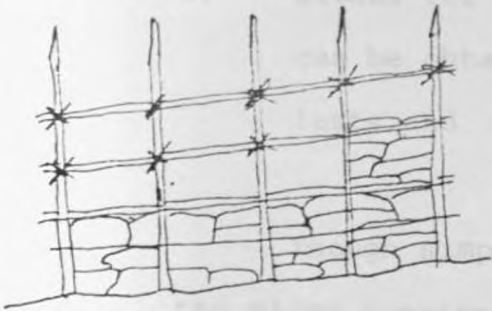


FIG.4.6 Or stone chippings could be cemented (mtomo)

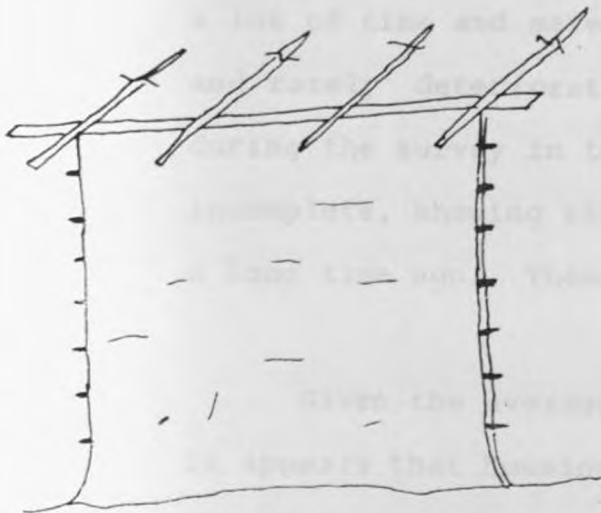
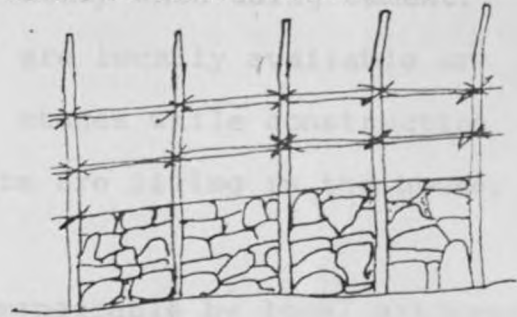


FIG.4.8 A Swahili unit being roofed. The walls are plastered neatly

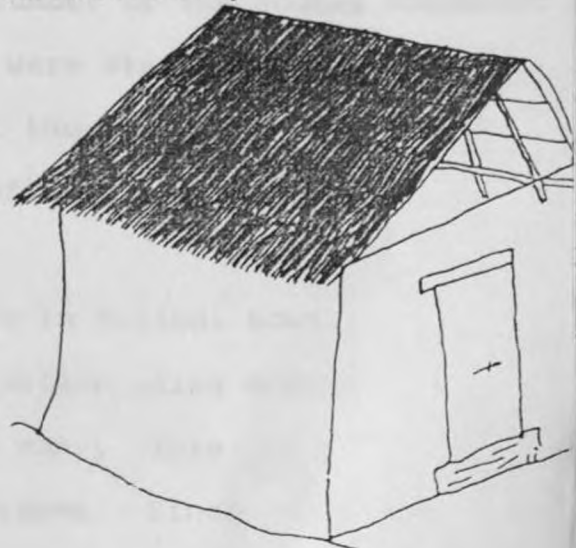


FIG.4.7: A complete plastered wall of either mtomo or mud & wattle

In practice a "mtomo" wall could be a bit thicker (180 mm) than that of quarry blocks (150 mm) because it is a double wall of poles and stone on both sides of the same pole framework. Most people think that a "mtomo" wall of stone and cement is much stronger than other types of walls. The truth of this has not been tested in laboratories. Though relatively more expensive than other wall types, a number of factors make mtomo construction popular in Malindi:

1. It uses technology that is common to all builders
2. it can allow one to build slowly while living in the house, especially when using cement.
3. stones for "mtomo" are locally available or can be obtained in stages while construction lasts and occupants are living in the house.

Though simple and manageable by local artisans the mtomo construction is much tedious and consumes a lot of time and materials. Its durability is good and rarely deteriorates. A number of the houses inspected during the survey in the area were standing incomplete, showing signs that they were abandoned a long time ago. These were of mtomo construction.

Given the average incomes in Malindi town, it appears that housing construction using modern materials is very expensive to many. This is especially so in the initial stages. Since there are ways of constructing houses slowly, in stages e.g. using

the mtomo mode of construction, housing supply to the majority of people in Malindi will continue to be implemented through the use of traditional materials because they are initially cheaper. Houses can be built of modern materials but at a slow pace that may not match the pace of housing demand.

Provision of Housing in Malindi

The distribution of housing is in three main groups the government and council owned housing, the old urban centre, and finally a mixture of approved and unapproved development of housing on private land at the outskirts of the town Map 6 gives the main residential areas.

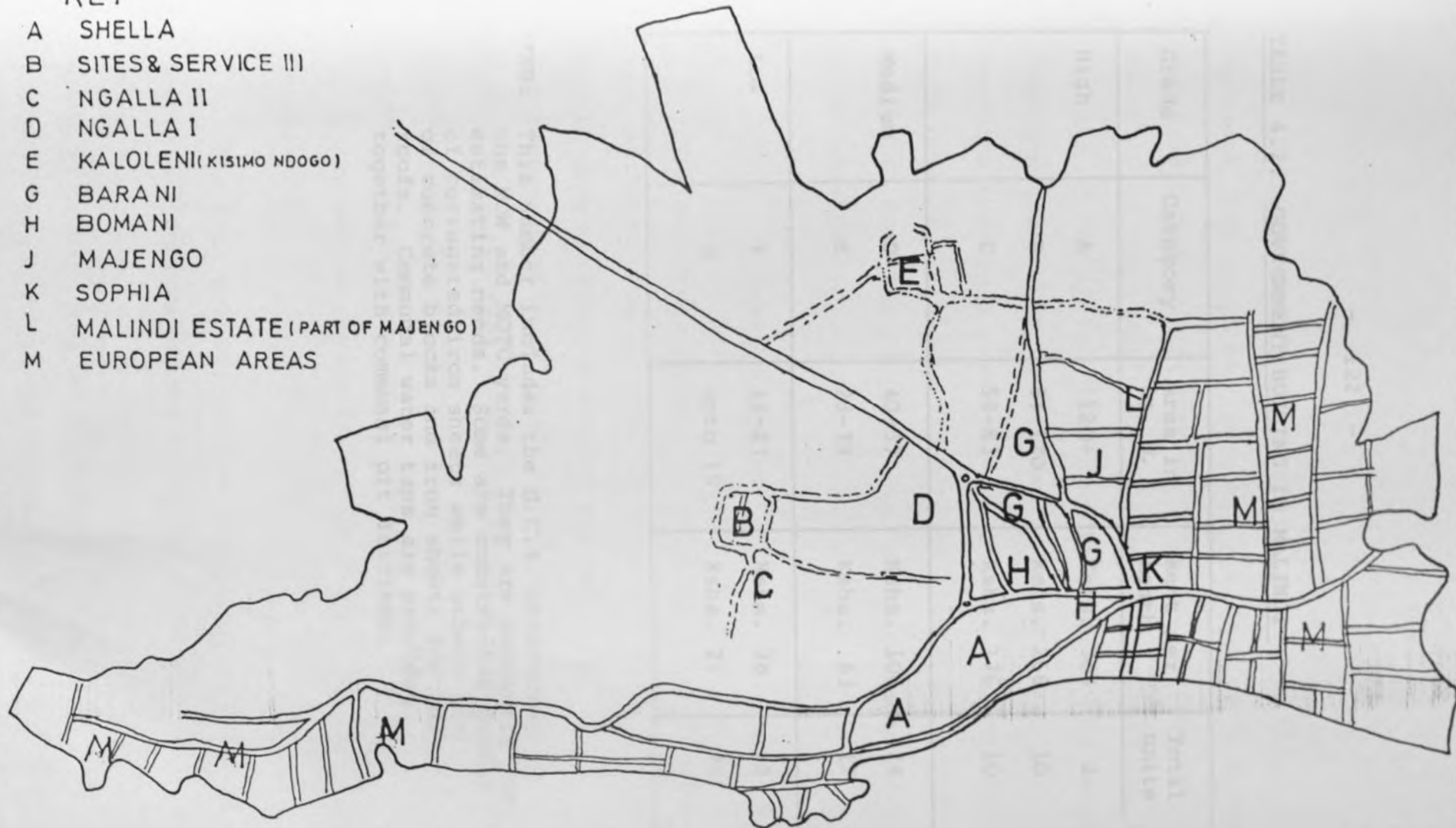
Government Housing

Government quarters are not found in one place. They are scattered all over, even to places near Leopard Point and the hospital. These quarters are administered by the District Officer, through a housing clerk. The Ministry of Works, Housing and Physical Planning Office carries out repairs and maintenance in these quarters.

There are three main categories of government houses in the town. Within each grade there are categories depending on total floor area. Table 4.2 summaries these units.

KEY

- A SHELLA
- B SITES & SERVICE III
- C NGALLA II
- D NGALLA I
- E KALOENI (KISIMO NDOGO)
- G BARANI
- H BOMANI
- J MAJENGO
- K SOPHIA
- L MALINDI ESTATE (PART OF MAJENGO)
- M EUROPEAN AREAS



I N D I A N O C E A N

MAP .6. MAIN RESIDENTIAL AREAS IN MALINDI

SCALE 1:30000

TABLE 4.2: GOVERNMENT HOUSING IN MALINDI

| Grade | Category | Area in sq. m. | Rent per month | Total units |
|--------|----------|----------------|----------------|-------------|
| High | A | 120+ | Kshs. 304 | 2 |
| | B | 84-120 | Kshs. 266 | 10 |
| | C | 58-83 | Kshs. 176 | 10 |
| Medium | D | 40-57 | Kshs. 106 | 24 |
| | E | 28-39 | Kshs. 63 | 12 |
| Low | F | 16-27 | Kshs. 38 | 65 |
| | G | upto 15 | Kshs. 26 | 96* |

*NB: This number includes the G.C.I. structures in the MOW and MOTC yards. They are necessary for estimating needs. Some are constructed purely of corrugated iron sheets while others are of concrete blocks and iron sheets for the roofs. Communal water taps are provided together with communal pit latrines.

Owing to the large increasing number of civil servants, the government quarters are few than required. There is congestion in some of these units, and the majority of those built in traditional materials are in a state of disrepair. Some have been completely deserted. Examples are in the administration police lines and near the municipal yard. There is great need to supply more housing in this sector because people are currently forced to look for their own accommodation in privately built estates.

| | | | |
|--|--|--|--|
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Council Housing

The Municipal Council of Malindi, like any other such authority, is expected to provide housing to the inhabitants within its area of jurisdiction. Unfortunately this is rarely the case. Although the town is growing fast, with an equivalent high population growth rate, housing provision by the council is far below the level required to house council workers, let alone the entire population of the town. See Plate 6 on page 139.

The main housing schemes which are fully under the council's control are Ngala Estate I and II. Phase I consists of 32 houses built of concrete blocks, asbestos roofs and semi-detached. These were opened in 1972. Phase II is the former USAID Tenant Purchase Scheme.

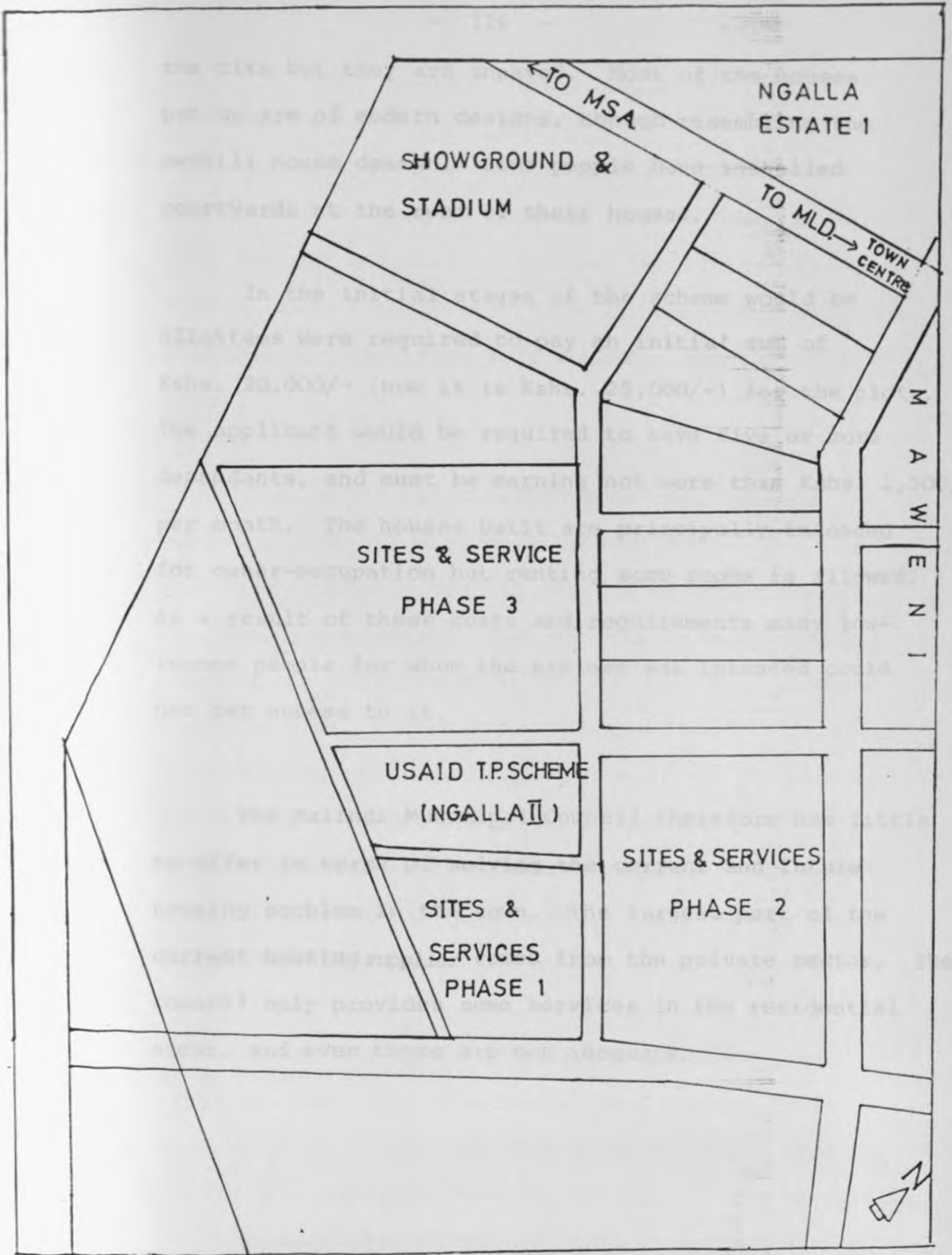
In addition to this, there are some 12 simple houses, constructed of stone blocks and G.C.1 roofs near the municipal yard. These are two-bedroomed each, and renters pay Kshs. 150/= per month. The table below summarises the council housing situation.

Table 4.3 COUNCIL HOUSING IN MALINDI

| GRADE | No. OF ROOMS | RENTS (P.M.) | TOTAL UNITS |
|-------------|--------------|---------------|-------------|
| High cost | 3 | Kshs. 450+ | 2 |
| Medium cost | 1, 2 | Kshs. 350-450 | 64 |
| Low cost | 3 | Kshs. 150/= | 12 |

There is a sites and service scheme jointly undertaken by NHC and the municipal council. The NHC gives out plots on government land. Allotees pay Kshs. 300 per month for 25 years for the plots. They are to build houses with approval of the NHC. There are three phases : Phase I has 53 plots, Phase II 104 plots and Phase III has 148 plots. These are shown in Map 7.

So far only Phase III is off the ground, 122 plots were found to be built on, at least from the foundation level. The only service available on the site is water, and those who can afford connect pipes to their individual houses. There are also gully traps for collecting foul water and sewage, and these are provided the moment the foundation is laid down. Roads are found in and around



MAP 3.7 LOCATION OF SITES & SERVICE SCHEMES

the site but they are unpaved. Most of the houses put up are of modern designs, though resembling the swahili house design. Some people have installed courtyards at the rear of their houses.

In the initial stages of the scheme would be allottees were required to pay an initial sum of Kshs. 20,000/- (now it is Kshs. 25,000/-) for the plots. The applicant would be required to have five or more dependants, and must be earning not more than Kshs. 1,500/- per month. The houses built are principally intended for owner-occupation but renting some rooms is allowed. As a result of these costs and requirements many low-income people for whom the project was intended could not get access to it.

The Malindi Municipal Council therefore has little to offer in terms of solving the current and future housing problem in the town. The largest part of the current housing supplier comes from the private sector. The council only provides some services in the residential areas, and even these are not adequate.

The council admits that providing housing is one of its basic duty, especially for the fame the town has acquired abroad and locally. The present houses in the town are few, some are old and lacking proper facilities. The council is not happy over this situation. Its major obstacle to providing more housing appears to be money.

Private Housing in Malindi

The major financial sources of Malindi Municipal Council are many but collection is slow, and this is partly due to lack of an effective collecting machinery. Some of the main sources of revenue are plot rates (@ 6% of U S V), license fees for dogs, carts etc. In the 1985/86 financial year the council earned £140,845 out of the expected £ 203,555. There are plans to get money for housing from Kenya National Assurance Company, NHC, Housing Finance Company of Kenya (HFCK) and Savings and Loans Kenya Limited, but these are not yet certain.

Given the above situation, public housing projects for the low-income people seem to be expensive for this class of people, such that they are raided by higher-income groups. And the council itself cannot provide enough housing, though there are indications that even if it could, this housing would be expensive for most people in Malindi. Even the house allowance of Shs. 250/- the Council pays

to its lowest worker may see most of these workers out of reach of the houses. If funds will not be available for housing in the near future then the Malindi Council will have to accept swahili housing to be a major supplier of accommodation for solving the future housing needs.

Private Housing in Malindi

Since the public housing available is itself hardly enough to satisfy housing needs of all civil servants in Malindi town, the private housing sector then is the main supplier of housing. This sector can be summarized as being composed of three divisions:

- a) high cost structures occupying a large area of spacious residential plots to the north of the town centre, and bordering both north and south shores,
- b) traditional swahili houses congested and largely unplanned upon land at the centre of the town, in Maweni and Kaloleni,
- c) modern type structures owned by local rich people, found in Old Town and its borders.

See Plate 10.

times similar to the European area houses, though these are necessarily not on individual separate plots. They range from huge maissonettes and bungalows to flats, even at the centre of the town. A number of these units are found in the old town and south of the hospital, but a good number are found in Malindi Estate, an area developed by Malindi Estate Limited west of Majengo and Sophia. There are about 345 such units, most having all the essential services and facilities.

The last category is the Swahili house class. These are found exclusively in Old Town and the two suburbs of Kaloleni and Maweni. Much about these houses has been said. They are varied in their level of services. Some have water and electricity installed in them, with improved pit flush toilets. These are those in the centre of the town and mostly owned by rich people. Others lack such services but are positioned near water and other facilities

Related to these and occurring in the same areas are "long stores" and huts. "Long stores" are simply Swahili units, but they consist of a row of individual rooms under one roof, ranging from three to eight rooms per unit. They resemble the backyard utility rooms of the main Swahili units. Illustrations are given to show this type of unit.

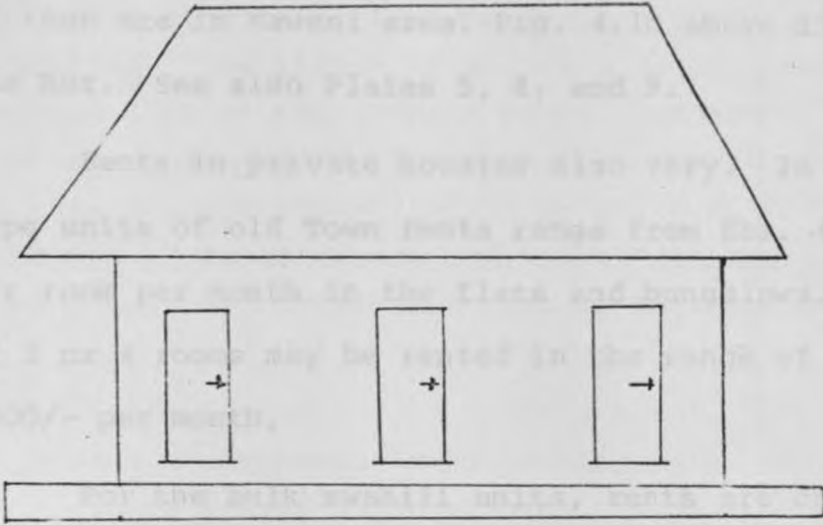


FIG 4.9 A three room long store. Each room opens to the outside and is independent.

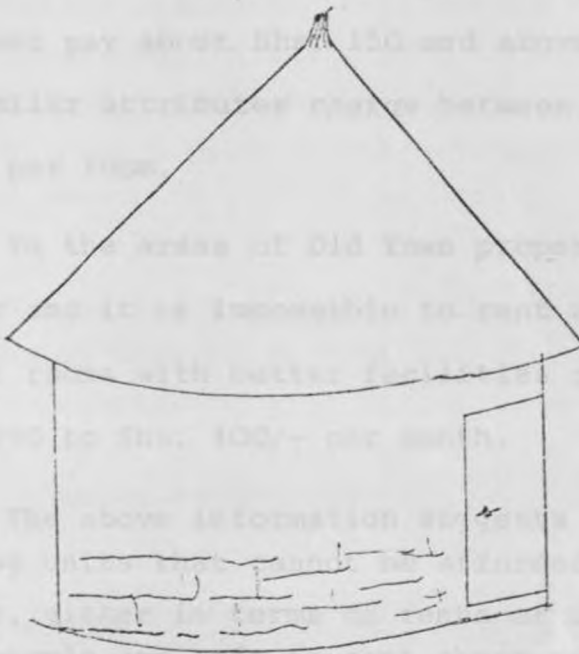


FIG 4.10 Diagram to illustrate one of the many huts in Maweni, Malindi

Huts are structures similar to swahili units. Most of the huts lack services and facilities and the majority of them are in Maweni area. Fig. 4.10 above illustrates the hut. See also Plates 5, 8, and 9.

Rents in private housing also vary. In the modern-type units of old Town rents range from Shs. 400/- to 600/- per room per month in the flats and bungalows. An apartment of 3 or 4 rooms may be rented in the range of Sh. 1200 to 1800/- per month.

For the bulk swahili units, rents are charged according to the services and facilities and also the size of the room. The cheapest rooms can be rented in Kaloleni and Maweni, ranging from shs. 40 for back stores to shs. 85 for long store rooms. The cheapest rooms measure about $3m \times 4\frac{1}{2}m$. For a room with a cemented floor and a water connection on the plot one must pay about Shs. 150 and above. Those swahili units of similar attributes charge between Kshs. 200 to 250/- per month per room.

In the areas of Old Town proper rent levels are much higher and it is impossible to rent a room at $3m \times 3\frac{1}{2}m$. For larger rooms with better facilities rents range from Shs. 250 to Shs. 400/- per month.

The above information suggests that there are many housing units that cannot be afforded by majority of the people, either in terms of rents or costs of construction. Most people are left to rent cheap rooms in poor quality housing in the town centre, or in small rooms in the back stores. Or else they move to Maweni and Kakoleni where rents are cheapest. Those who are not in wage employment but live in rooms in old town must be doing so at the expense

of other household requirements.

Private housing has therefore been found to provide the majority of the accommodation space in Malindi Town, with public housing playing a very small part. This points out that housing shortage is large, and that the present housing units must be facing huge densities of occupation. The effect of all this is to reduce the economic life of the present units, and since repairs and maintenance are hardly a routine process in urban areas, the rate of replacement should be quite high. Overcrowding in houses produces stress and ill-health and public housing must be increased to remove this potential danger.

In the estimation of housing needs, the methods employed will encounter many housing units that could otherwise be termed unacceptable. These units, however, need to be analysed properly to test their worth and suitability to act as indicators of housing supply and need. Since there are a few public units barely serving 2000 people, and an equal number being served by the European-area units, how do the rest of the people house themselves? The answer to this should not suggest that housing standards should be lowered in order to accept more swahili units into the estimates, rather it should just indicate that whatever type of housing desired, people need shelter above their heads. The quality in such a case is secondary.

The tables 4.4, to 4.7 give a summary of the main findings on housing in Malindi. Table 4.8 summarizes the results from the housing survey to determine the suitability of individual units to enter the components for estimating housing needs.

Table 4.4 HOUSING UNITS BY RESIDENTIAL AREA

| AREA | COMPLETE UNITS | INCOMPLETE UNITS (Under construction) | TOTAL |
|----------------|----------------|---------------------------------------|-------|
| Barani | 508 | 17 | 525 |
| Shella | 531 | 29 | 560 |
| Bomani | 231 | 6 | 237 |
| Majengo | 267 | 22 | 289 |
| Kaloleni | 1419 | 55 | 1474 |
| Maweni | 880 | 15 | 895 |
| European areas | 498 | 42 | 540 |
| Ngalla I & II | 64 | 0 | 64 |
| Site & Service | 59 | 63 | 122 |
| Total | 4455* | 249 | 4704* |

*NB: The figure 4455 refers to complete standing units.
4704 includes 249 units that are under construction.

Table 4.5 HOUSING BY ROOFING MATERIALS

| AREA | ROOF MATERIALS | | | | | | | | TOTAL |
|-----------------|----------------|--------|----------|------------|-------|-----|-------|-------|-------|
| | MAKUTI | G.C.I. | ASBESTOS | FLAT ROOFS | TILES | TIN | SLATE | GLASS | |
| Barani | 151 | 316 | 2 | 38 | 0 | 1 | 0 | 0 | 508 |
| Shella | 194 | 258 | 10 | 62 | 7 | 0 | 0 | 0 | 531 |
| Bomani | 82 | 96 | 5 | 41 | 5 | 0 | 2 | 0 | 231 |
| Majengo | 102 | 146 | 4 | 14 | 0 | 1 | 0 | 0 | 267 |
| Kaloleni | 1092 | 291 | 6 | 2 | 2 | 21 | 1 | 4 | 1419 |
| Maweni | 799 | 66 | 0 | 0 | 0 | 4 | 0 | 11 | 880 |
| European Areas | 57 | 110 | 116 | 42 | 152 | 0 | 21 | 0 | 498 |
| Ngalla I & II | 0 | 0 | 64 | 0 | 0 | 0 | 0 | 0 | 64 |
| Sites & Service | 0 | 55 | 4 | 0 | 0 | 0 | 0 | 0 | 59 |
| Total | 2477 | 1338 | 209 | 199 | 166 | 27 | 24 | 15 | 4455 |

Table 4.6. HOUSING BY WALL MATERIALS

| AREA | QUARRY BLOCKS | CONCRETE BLOCKS | MTOMO CEMENT | MTOMO MUD | MUD & WATTLE | GRASS | G.C.I. | TOTAL |
|--------------------|------------------|--------------------|-----------------|--------------|-----------------|-------|--------|-------|
| Barani | 299 | 44 | 80 | 75 | 2 | - | 25 | 525 |
| Shella | 308 | 53 | 71 | 128 | - | - | - | 560 |
| Bomani | 140 | 36 | 33 | 28 | - | - | - | 237 |
| Majengo | 137 | 29 | 60 | 63 | - | - | - | 289 |
| Kaloleni | 153 | 33 | 273 | 665 | 348 | 2 | - | 1474 |
| Maweni | 24 | 10 | 152 | 340 | 365 | 4 | - | 895 |
| European areas | 253 | 287 | - | - | - | - | - | 540 |
| Ngalla I & II | 0 | 62 | - | - | - | - | - | 62 |
| Sites & Service | 95 | 27 | - | - | - | - | - | 122 |
| Total | 1409 | 581 | 669 | 1299 | 715 | 6 | 25 | 4704. |

Having got the total number of housing units it is also important to know how many units are still under construction. This is to gauge the rate of construction going on in Malindi, though this is difficult to achieve in a short period like one year.

Table 4.7. INCOMPLETE UNITS & LEVEL OF INCOMPLETION REACHED

| AREA | LEVEL REACHED | | | |
|--------------------|---------------|--------|------|-------|
| | FOUNDATION | WINDOW | ROOF | TOTAL |
| Barani | 8 | 2 | 7 | 17 |
| Shella | 16 | 3 | 10 | 29 |
| Bomani | 3 | - | 3 | 6 |
| Majengo | 8 | 4 | 10 | 22 |
| Kaloleni | 29 | 12 | 14 | 55 |
| European areas | 17 | 13 | 12 | 42 |
| Maweni | 6 | 3 | 6 | 15 |
| Ngalla I & II | - | - | - | - |
| Sites & Service | 41 | 16 | 6 | 63 |
| Total | 128 | 53 | 68 | 249 |

Table 4.8 RESULTS FROM HOUSING SURVEY

| COMPONENT | ATTRIBUTES | | | TOTAL UNITS |
|--------------------------------|---------------------|--------------|------------------------|---------------------|
| | GOOD | FAIR | POOR | |
| Repairs and Notice Maintenance | Good 3036 | Fair 581 | Poor 838 | 4455 |
| Accessibility | 4351 | 65 | 288 | 4704 |
| Sewage Disposal | Flush 1236 | Pit 2835 | Communal 116 | None 268 4455 |
| Availability of water | Inside 2203 | 100m 2029 | 200m 112 | Far 111 4455 |
| Power Supply | Electricity 1956 | | No Electricity 2499 | " |
| Streets Lighting | Near 1498 | Far 3206 | | 4704 |
| Distance from shops | Near 4139 | Far 565 | | " |
| Distance from Hospital | 2339 | 2365 | | " |
| Distance from markets | 4128 | 516 | | " |
| Distance from schools | 4105 | 599 | | " |
| Distance to Recreation | 2576 | 2128 | | " |

NB: Near = within 1km. from house. Far = more than 1km. away.

From this table it is clear that most housing units are near services like schools, markets and shops. There is also need to add up all the attributes explained earlier in order to get the exact number of units to fit into the model. This is through the point matrix system. Using this method it was possible to conclude that:

- a) 918 living quarters are unacceptable i.e all those scoring less than 60 points.
- b) that the number of living quarters needing repairs to be acceptable is 979.
- c) that there are 281 acceptable quarters which are currently dilapidated, substandard and beyond repair.
- d) that 838 housing units are in poor state of repairs.
- e)g that 3036 housing units are in good state of repairs.
- f) that 581 housing units are in fair state of repairs.
- g) that about 2277 are acceptable housing units.

These are now the important factors to be taken into account when applying the methods for estimating housing needs in Malindi. Together with population statistics, studies on household etc. they form the prerequisite for estimation of housing needs. There are other derived quantities required in the needs assessment. They include average household size, number of persons per room, number of rooms per house etc., but these are provided elsewhere and especially before putting in the values into the methods for the exercise. The next chapter will therefore use these statistics, apply them in the relevant manner for different methods of estimating needs and then the results will conclude the study.



Plate 1: A swahili house under construction in Maweni.
The finished wall is of "mtomo" mud.



Plate 2: A completed mud and wattle house with Makuti
roof in Majengo, Malindi. At the back is the
courtyard and utility rooms.



Plate 3: Huge land expanses are found in the town for house construction. This area is just off Mombasa Road.



Plate 4: A view of central Malindi Town, at Barani. Note the closeness of the houses and the similar designs.



Plate 5.: A "long store" in Kaloleni, built of concrete blocks and G.C.I. On the right is the toilet.



Plate 6: Council houses near shella. These are two-roomed each and occupied by Council workers.



Plate 7: One of the streets in Kaloleni. The Mango tree in the background serves as a market for the neighbourhood.



Plate 8: Some units are completely beyond repair, like this utility store near Barani.



Plate 9: One of the many huts in Maweni. This one is two-roomed and built of traditional materials. These huts are scattered over large areas of Maweni.



Plate 10: Example of one of the modern houses coming up at the outskirts of Malindi old town.

CHAPTER 5

ESTIMATING HOUSING NEEDS IN MALINDI

From the information collected during this housing survey in Malindi, various aspects of housing have been observed. Since the various characteristics of housing in Malindi have been analysed in previous chapters only summarized values are now given, which will then be used to provide the basis for calculating housing needs in the town.

The major aim of this project work was to come up with a method for estimating housing needs in Malindi, and to investigate whether this model can be applied elsewhere, after appropriate modifications to suit that specific area. The three key elements for the exercise have now been described. The study area is Malindi town, the methods have already been mentioned, and the housing conditions in Malindi have already been described. What remains now is to feed the information on housing characteristics into the model to analyse the implications of the results.

Household Information and Derived Rates

The population of Malindi in 1978 was 18800 and the household size was 4.48, giving 4,187 households then. Today the population has risen to more than 29,948 and the household size is assumed to have risen to 4.75 because of the increased population size.

There are therefore 6312 households in the town, of these 4601 (72.9%) are low-income, 574 (9.1%) are medium income and 1137 (18%) are high-income households.

The number of households per house is $\frac{6312}{4455} = 1.42$.

This highly conceals the real density of occupation for there are many units having more three households each. And the average number of houses per household is $\frac{4455}{6312} = 0.7$, while the average number of persons

per room is $\frac{29984}{17564} = 1.71$ which is lower than the

national figure of 2.5. But this does not mean that there is no overcrowding in Malindi. The figure 1.71 has been brought by the presence of large houses owned by rich Asians, Arabs and Europeans, yet being occupied by few people. The population growth rate used here is 3.43% p.a.

The average number of rooms per house is given as 3.94. The average life of houses in Malindi has been assumed to be 40 years, since most of the building materials are not very long wearing like the permanent materials. The rate of replacement is thus $\frac{100}{40} = 2.5\%$ p.a.

The construction rate of houses has been calculated from information that new houses constructed in Kenyan urban areas have of late only accommodated 20% of increased households per year (statistical Abstract, 1984, p. 133). For Malindi the figure is 0.9% p.a. The vacancy ratio is estimated as 2%.

Estimating Housing Needs Using Current Methods

Age of Houses as an Indicator of Needs

Age has sometimes been used to determine the number of housing units falling out of use, after old houses have fallen out of use these remaining are the ones that can be used in the estimates. The ages of houses in Malindi town are given in the table below.

TABLE 5.1: AGE OF HOUSES IN MALINDI

| AGE | 5 YEARS & UNDER | 5-9 YRS. | 10-20YRS. | ABOVE 20YRS. |
|---------|-----------------|----------|-----------|--------------|
| % | 24.3 | 29.8 | 20 | 26 |
| Numbers | 1082 | 1327 | 891 | 1155 |

Source: Statistical Abstract 1984, p.138.

The useful life for a dwelling in Malindi can be assumed to be 20 years. The number of units that can be counted as habitable are therefore $1082+1327+891 = 3300$ units. These 3300 units house only 4675 households, the rest of the households would thus be said to be lacking accomodation since the 1155 units are "too old" to be habitable. There would therefore be 1636 households in need of housing and these people would currently be doubled up or crowded into the 3300 units. This implies a need for 1155 housing units presently in order to house the population to today's standards in Malindi. Since even if these 1155 were added to the stock today there would still be a shortage of housing, the present need should hence be more than 1155 units.

TABLE 5.1 HOUSING NEEDS ASSESSMENT BY AGE CRITERIA

By the year 1995 when the population of Malindi will be about 42010 (@ 3.43% growth rate p.a), giving 8402 households (@ 5 persons per household), the number of housing units will be lower by the amount of 891 units that will then be above 20 years old. At the present construction rate of 0.9% p.a there will have been added 417 units. Total number of units less than 20 years old will be 2826, against 8402 households. Hence 4389 households will be lacking housing, and their need will be 3072 units. By the year 2000 those lacking housing will reach 5749 households. The tables below summarize all the future needs.

TABLE 5.2: HOUSING NEEDS USING AGE CRITERIA:
NUMBER OF UNITS REQUIRED

| YEAR | DEMAND | SUPPLY | SHORTFALL |
|-------|--------|--------|-----------|
| 1985 | 5830 | 3300 | 2530 |
| 1990* | - | - | - |
| 1995 | 7215 | 2826 | 4389 |
| 2000 | 8799 | 3050 | 5749 |

1990* In this year it is impossible to determine units reaching the age of 20. The basis of using 20 years as the useful life of houses in Malindi is that out of the 2098 units that were found either needing repairs or in a dilapidated state, most were beyond the age of 20 years.

TABLE 5.3 HOUSEHOLDS AFFECTED BY AGE CRITERIA

| YEAR | THOSE WITH HOUSES | THOSE WITHOUT | TOTAL HOUSEHOLDS |
|------|-------------------|---------------|------------------|
| 1985 | 4675 | 1636 | 6312 |
| 1990 | - | - | - |
| 1995 | 4013 | 4389 | 8402 |
| 2000 | 4196 | 5749 | 9945 |

This would suggest that the housing problem will be getting bigger as houses are growing older, because it is impossible to replace all those units "getting old" at the age of 20 years.

2. Affordability of Inhabitants as a Measure of Needs

This measure implies that for each household to live comfortably the household must be able to afford the house they are living in. Affordability means that the household can either buy, own, build or rent a house and still be able to live in a good economic budget. There are in Malindi about 1137 (18%) high-income households, 574 (19.1%) medium income households and 4601 (72.9%) low-income households.

| YEAR | HIGH INCOME | MEDIUM INCOME | LOW INCOME |
|------|-------------|---------------|------------|
| 1985 | 1137 | 574 | 4601 |
| 1990 | - | - | - |
| 1995 | 1137 | 574 | 4601 |
| 2000 | 1137 | 574 | 4601 |

This means that there are 1711 households (574 + 1137) only which can afford proper housing. And the rest 4601 households are unable, initially, to afford housing at all. Even though they are in need of housing, the 'Affordability' method excludes them completely. The method implies that the demand for housing is only 1711 houses, which therefore underestimates the need for housing. It therefore measures housing need in terms of effective demand, and hence excludes all the population which does not have the means to build, or buy housing. Accordingly, if the whole population is to live in houses they can afford to rent, buy, build or own comfortably, then a large amount of housing investment is required in Malindi, given that houses can be built at costs ranging from Kshs. 30,000 to Kshs. 600,000.

The "Affordability" method hence underestimates the need for housing by the amount of households it excludes from the effective demand. The extent of the 'affordability' criterion and the level of understimation are shown in the table below.

TABLE 5.4 HOUSING NEEDS BY AFFORDABILITY

| YEAR | ABLE HOUSEHOLDS | UNABLE HOUSEHOLDS | HOUSING DEMAND | UNDERESTIMATED NEEDS |
|------|-----------------|-------------------|----------------|----------------------|
| 1985 | 1711 | 4601 | 1711 | 4601 |
| 1990 | 2025 | 5073 | 2025 | 5073 |
| 1995 | 2397 | 6005 | 2397 | 6005 |
| 2000 | 2837 | 7108 | 2837 | 7108 |

3. "Fit" and "Unfit" Method of Estimating Needs

In Malindi there are about 1650 houses built of permanent materials and served with all the services required by the residents. Materials here include quarry blocks and concrete blocks for the walls, and G.C.I., slate, asbestos and flat roofs for the roof coverings. Another 236 houses are built of permanent materials but lack some of the essential services and facilities, or are very far from them. There are also about 1711 houses which are built of semi-permanent materials, some served with others not served with facilities and services. A total of 858 houses are illegal, not approved, not serviced, and standing on illegally occupied land. These are units in and around Maweni residential area which is a squatter settlement.

| YEAR | HOUSES "FIT" | HOUSEHOLDS SERVED | OVERCROWDING HOUSEHOLDS | HOUSES FIT |
|------|---|-------------------|-------------------------|------------|
| | <p>The "Fit" and "Unfit" criteria implies that only those houses built of permanent materials and served with facilities and services can be considered acceptable. There are about 1886 such units in Malindi, and the rest 2569 are unacceptable and unfit for human habitation since they are either illegal or built of less permanent materials. To meet the present situation of housing demand in the town about an equivalent 2569 units are required, and yet the present need is not fully satisfied.</p> | | | |

If each household is to have its own house either owner-occupied or rented but built of permanent materials and served with all services and facilities, then about 6312-1886 i.e 4426 such units represent the housing need in 1985, to cater for the population lacking "fit" housing. Assuming a construction rate of 0.9% per year the number of permanent houses that will be available in 1990 is 1972, occupied by 2800 households. Subsequent increases in stock of permanent "fit" houses and the housing deficits are given in the table below. Since there are fewer number of "fit" houses for the households served, the extent of overcrowding in these units is also shown, assuming that each household should have a house.

TABLE 5.5 HOUSING NEEDS: "FIT" AND "UNFIT" METHOD

| YEAR | HOUSES "FIT" | HOUSEHOLDS SERVED | OVERCROWDING HOUSEHOLDS | HOUSING NEED |
|------|--------------|-------------------|-------------------------|--------------|
| 1985 | 1886 | 2672 | 786 | 4426 |
| 1990 | 1972 | 2800 | 828 | 5126 |
| 1995 | 2062 | 2928 | 866 | 6340 |
| 2000 | 2156 | 3062 | 906 | 7789 |

4. Estimating Housing Need Using "Deficit" Estimates

"Deficit" estimates imply that each household should have a house, and that the number of houses required is therefore $H_p - H_{st}$, where

H_p refers to the number of households at a period, and H_{st} refers to the number of houses available at the time.

These "deficit" estimates, which do not consider the supply and provision of services and facilities to a house show that if the current 6312 households in Malindi (4.75 household size) are to consume each a house of 3.94 rooms in order to be comfortable, then the deficit is 6312 - 4455 i.e 1857 houses. The figure below shows the calculations for all the 5 years periods upto the year 2000.

TABLE 5.6: HOUSING NEED USING "DEFICIT" CRITERIA

| YEAR | NO. OF HOUSEHOLD | HOUSING STOCK | DEFICIT |
|------|------------------|---------------|---------|
| 1985 | 6312 | 4455 | 1857 |
| 1990 | 7098 | 4659 | 2439 |
| 1995 | 8402 | 4873 | 3529 |
| 2000 | 9945 | 5095 | 4849 |

Another interesting method to use for estimating housing needs is the one referred to earlier in literature review. This is the method provided by HABITAT. The method assumes that the relationship between number of dwellings existing today and existing households is constant, and given as

$$\frac{D_x}{H_x} = \frac{D_y}{H_y}$$

where D_x = dwelling stock known

D_y = dwelling stock unknown

H_x = households in D_x

H_y = households in D_y

$$\text{But since } H_x = \frac{P_x}{h_x} \text{ and } H_y = \frac{P_y}{h_y},$$

where P_x = population housed in D_x

P_y = population housed in D_y

h_x = household size of P_x

h_y = household size of P_y , then the formula

$$\text{to use may be written as } D_y = D_x \frac{P_y}{P_x} \cdot \frac{h_x}{h_y}$$

Applying this formula in Malindi town to get the number of unknown dwellings in the future, we have:

$$D_y \text{ in 1990} = 4455 \cdot \frac{35491}{29984} \cdot \frac{4.75}{5} = 5010 \text{ units.}$$

$$D_y \text{ for 1995} = 5010 \cdot \frac{42010}{35491} \cdot \frac{5}{5} = 5930 \text{ units}$$

$$D_y \text{ for 2000 (year)} = 5930 \cdot \frac{42010}{42010} \cdot \frac{5}{5} = 7019 \text{ units.}$$

Because the method does not show how to calculate the present housing deficit, it means that the housing need in each time period will be lower by this uncalculated element. This element can be assumed to be $6312 - 4455 = 1857$.

Estimating Housing Needs Using the Kuwaiti Model

This model uses the criteria of housing demand and supply to reflect the amount of housing required and supplied. Housing need is thus expressed in terms of the shortfall between available houses and those that are actually needed. The method for calculating present day demand has not been clearly stated but can be derived from the final equation. And most of the other rates and variables for the equations are just inherent in the model, not clearly shown how they have been used. The demand for houses to suit households of a certain income group (1) is estimated as

$$D_{1, t+Dt} = R.R \times (1.02)^{N-1} \times (H_{1, t+Dt} - H_{1, t}) + 0.5O_t + 0.5C_t$$

which simply means that demand is a function of the growth in the number of households of income group (1)

The demand for houses in Malindi Town in the year between time (t) and (t+Dt) multiplied by the rate of 1990 is estimated as $0.9 \times 1.02 \times 6312 + 0.5 \times 2.5\%$ government responsibility for that class of households. Since the contribution of the public sector in providing housing in Malindi town is very low, the RR is 1-RR, where 1-RR will represent the private rate of responsibility for providing housing, because about 93.68% of the current units are privately owned. The demand to substitute for obsolete dwellings is taken to be the replacement rate of 2.5%.

The current demand of houses in the town for all households can be estimated as

$$(1-RR) \times (1.02)^0 \times (6312) + (0.5 \times 2.5\%).$$

The demand to relieve overcrowding given in the model as C_t is not applicable here since the 1.71 persons per room figure is lower than the official 2.5 persons per room in Kenya. It is then $(0.9 \times 1 \times 6312) + 0.0125$, which gives 5681 housing units. And supply is currently 4455 houses, the shortfall is therefore presently 1226 houses. In terms of houses required by each income group, low-income households require

$$(0.9 \times 1 \times 4601) + 0.0125 = 4141 \text{ housing units.}$$

Medium - income households on their part would require

$$0.9 \times 1 \times 574 + 0.0125 = 517 \text{ units and high-income}$$

households today require about $(0.9 \times 1 \times 1137) + 0.0125$ i.e 1023 housing units.

The demand for houses in Malindi Town in the year 1990 is estimated as $0.9 \times (1.02)^{5-1} \times 7908 - 6312 + 0.0125$ which gives 1555 additional units required, and for the year 1995 the calculation is $0.9 \times (1.02)^{10-1} \times (8402 - 6312) + 1.25\%$, assuming the same growth rates of population, and also holding other similar rates constant. The table below gives the complete information upto the year 2000 for each income-group (household type).

TABLE 5.7: HOUSING DEMAND BY THE KUWAITI MODEL FOR DIFFERENT GROUPS

| YEAR | LOW INCOME HOUSEHOLDS | MEDIUM INCOME HOUSEHOLDS | HIGH INCOME HOUSEHOLDS | TOTAL DEMAND |
|------|-----------------------|--------------------------|------------------------|--------------|
| 1985 | 4141 | 517 | 1023 | 5681 |
| 1990 | 5275 | 659 | 1302 | 7236 |
| 1995 | 6914 | 863 | 1707 | 9484 |
| 2000 | 10059 | 1256 | 2483 | 13798 |

These results are only for the rates given above. For high rates the figures will be even higher. The Kuwaiti model also calculated supply of housing as $S_{1,t+t} = AR \times (1+DR)^{N-1} \times IP_1$, where AR is the achievement rate of housing programmes in the area of the estimates, D.R is the rate of development of these programmes over

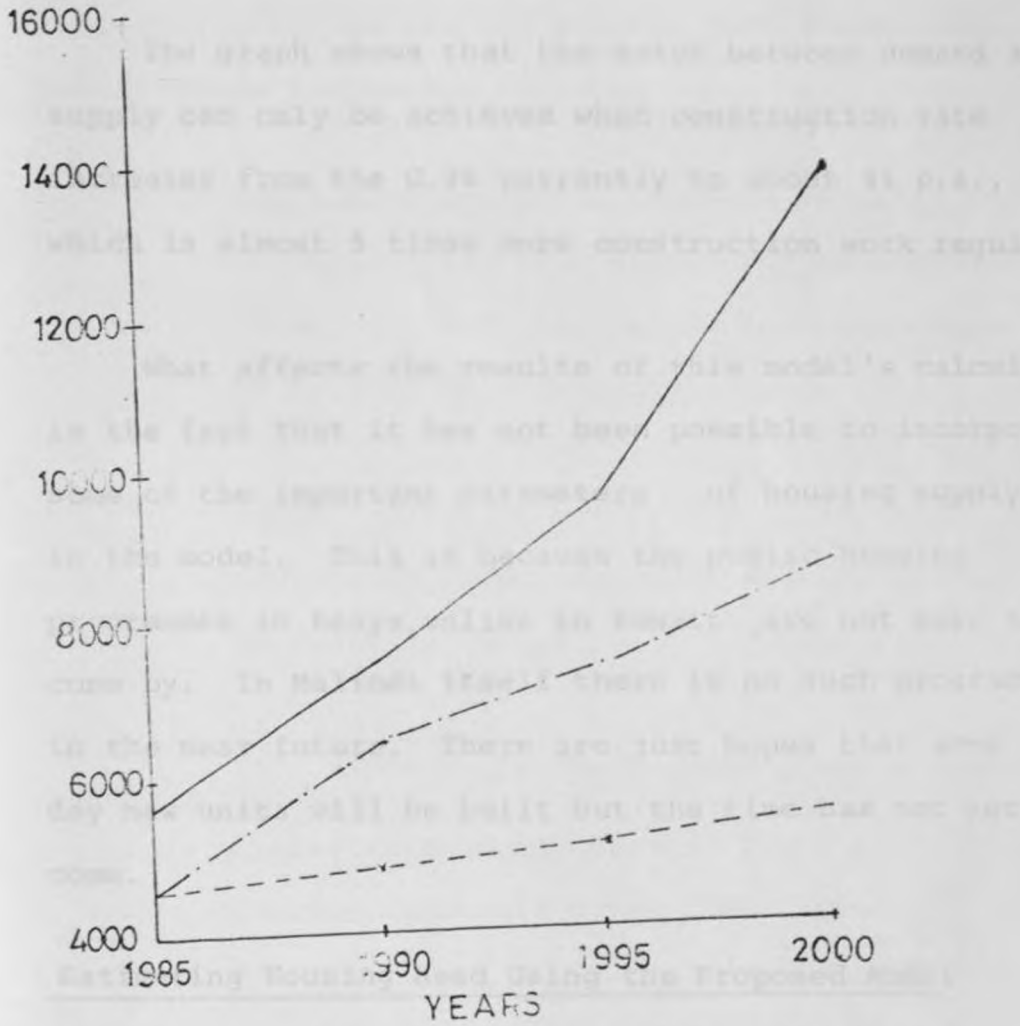
subsequent 5 year periods, and IP_1 is the housing programme for a certain income group of the population. In the Malindi case there is currently no public housing programme hence IP_1 is not applicable. Even DR and AR are not applicable because it is difficult to gauge the private construction programmes.

But we know that the construction rate is 0.9% p.a and therefore supply of housing can be calculated from the formula $(1+0.9\%)^N \times$ existing stock. This gives 4659 units for 1990, 4872 units by 1995 and upto 5096 in the year 2000. It is now easy to get the shortfall of demand at the end of each accounting period. The initial shortfall in 1985 was 1226 units. By 1990 it will be 2577 units and by 1995 it will reach 4612 housing units. Summaries of these figures are given below.

TABLE 5.8: THE KUWAITI MODEL: SUPPLY & DEMAND OF HOUSES IN MALINDI

| YEAR | DEMAND | SUPPLY | SHORTFALL |
|------|--------|--------|-----------|
| 1985 | 5681 | 4455 | 1226 |
| 1990 | 7236 | 4659 | 2577 |
| 1995 | 9484 | 4872 | 4612 |
| 2000 | 13798 | 5096 | 8702 |

FIG.5.1 THE KUWAITI MODEL : GRAPH TO ILLUSTRATE HOW SUPPLY OF HOUSING IS RELATED TO DEMAND IN MALINDI



———— Demand for housing
----- Supply at current construction rate
- . - . - . Supply at construction rate 4% p.a.

To match supply and demand, it is seen that the housing problem cannot be arrested in Malindi in this century, given the rates as explained. The graph Fig. 5.1 can show this.

The graph shows that the match between demand and supply can only be achieved when construction rate increases from the 0.9% currently to about 4% p.a., which is almost 5 times more construction work required.

What affects the results of this model's calculations is the fact that it has not been possible to incorporate some of the important parameters of housing supply in the model. This is because the public housing programmes in Kenya, unlike in Kuwait, are not easy to come by. In Malindi itself there is no such programme in the near future. There are just hopes that some day new units will be built but the time has not yet come.

Estimating Housing Need Using the Proposed Model

This model has been borrowed from the United Nations method for estimating housing needs outlined earlier. Rather, the proposed model is similar to the UN model, save for the addition of a criteria to distinguish acceptable from unacceptable housing units in a more careful manner. A part from this

the model is not far from the parent UN model. The latter is open to modification, indicating where they are likely to be made while the former has applied the necessary modifications and criteria to be applicable in the present study area. The essential ingredients for estimating housing need using this model are as follows:

;

E_1 = the number of living quarters required for the homeless. This number may be negligible since only very few people have been seen to fall in this category.

E_2 = number of living quarters required for households occupying unacceptable living quarters, given as

$$\frac{P_u}{S}, \text{ where } P_u \text{ is the proportion of households living in unacceptable quarters, and } S \text{ is the average household size. This gives } \frac{918}{4455} \times 29984$$

4.75

which amounts to 1301 units. This is multiplied by 0.7, the number of houses/household to give 911 units.

Component E_3 = number of living quarters required to provide separate accommodation for involuntarily doubled up households with other households in acceptable living quarters. This component does not apply in the Malindi study area for doubling up to this type is uncommon.

Component E_4 = number of living quarters required to reduce levels of density in acceptable living quarters to a desired level. This component does also not apply to the study area for the density of occupation is lower than the nationally fixed figure of 2.5 persons per room.

Component E_5 = number of living quarters required to replace acceptable living quarters which are dilapidated or substandard and beyond repair, and these have been found to be 281 housing units.

Component E_6 = the number of living quarters which when repaired and well-maintained will be occupied as acceptable houses, found from survey to be 979 houses.

Current housing need is therefore calculated as

$E_{cn} = 1.023(911+979)+281$, which gives a total of 2208 houses required currently in Malindi Town.

To estimate future housing needs, two components are provided.

Component $E_7(t)$ = the number of housing units which will be required to house the projected increase in the population during a certain period of time (t).

This is given as

$$\frac{P_t}{Y_t} - H,$$

where P_t is estimated population in house- holds as of the end of period (t)

Y_t = is the average household size at end of period (t), and

H is the number of households at the beginning of the period covered by the estimates.

The calculation for the year 1990 is therefore

$$\left(\frac{35491}{5} - 6312\right) = 786 \text{ housing units.}$$

For the year 1995, the calculation is $\left(\frac{42010}{5} - 6312\right) = 2090$

housing units, and for the year 2000 the calculation is

$$\left(\frac{49726}{5} - 6312\right), \text{ which gives } 3633 \text{ units.}$$

Component $E_8(t)$ = the number of houses required to replace acceptable living quarters lost during a certain period of time of estimation. This period is taken as 0 for the initial year. $E_8(t)$ is given as

$(rU + U_3 + U_4 + U_5 + U_6)^t$, where

r is 2.5%, as the replacement rate per annum.

U = total number of acceptable housing units at present needs components E_1, E_2 and E_3 are the relevant mid-year, found to be 1279 units.

U_3 = estimated acceptable houses that will be demolished because of urban development e.g the units in Kaloleni which are likely to be demolished to allow for the expansion of the airport. The figure here is 450.

U_4 = estimated acceptable houses that will be demolished or lost because of disasters, taken to be 1% i.e. 25 units.

U_5 = estimated acceptable units which will fall out of use during the period (t) , and these are 2.5% of total acceptable units 64 units.

U_6 = estimated acceptable units that will be lost due to small units being converted to larger but fewer houses, also taken to be 1% i.e. 25 units.

$E_8(t)$ is therefore calculated as from this information as $(2.5\% (1279) + 450 + 25 + 64 + 25) = 596$ units.

| YEAR | TOTAL HOUSING NEED | ADDITIONAL NEED |
|------|--------------------|-----------------|
| 1985 | 3000 | 1700 |
| 1985 | 3000 | 1700 |
| 2000 | 3000 | 1700 |

The last two components $E_7(t)$ and $E_8(t)$ represent the estimation of future housing needs, while for the present needs components E_2 , E_5 and E_6 are the relevant ones. Hence the equation for the present need is $E_p = K(E_2 + E_6) + E_5$, and for the future need $E_f = K(E_7(t)) + E_8(t)$. To get total need for the future the two parts can be combined as $E = K(E_2 + E_6 + E_7(t) + E_5 + E_8(t))$. The vacancy ratio K is an addition of vacant units to the housing stock for the relevant calculation. In the case of Malindi with 2% vacancy ratio, the value is therefore 1.02 or 102% $(E_2 + E_6 + E_7(t) + E_5 + E_8(t))$.

Using these equations the present housing need in Malindi town is found to be 2208 units. The results of calculations for future housing needs and additional needs in each period are shown in the table below.

TABLE 5.9: FUTURE AND ADDITIONAL NEEDS FOR MALINDI USING PROPOSED MODEL

| YEAR | TOTAL HOUSING NEED | ADDITIONAL NEED |
|------|--------------------|-----------------|
| 1985 | 2208 | - |
| 1990 | 3606 | 1398 |
| 1995 | 4937 | 1331 |
| 2000 | 6510 | 1573 |

The rates that have been used here are those of population growth rate at 3.45 per year, household size 4.75 for 1985, and 5 for the years 1990 and onwards. But the 3.43% population growth rate is low for an urban area like Malindi. It is the rate for the whole Kilifi District. Yet the population of Malindi Town between 1969 and 1979 grew at a rate of 11.5% per annum (Kilifi District Development Plan 1984-88 p. 11). But this rate was subsequently reduced by the expansion of tourist resorts in the lower north coast and the Diani tourist complex south of Mombasa in the late 70s and early 80s. The actual population growth rate for Malindi can thus be taken to be 7.9% p.a., like the national figure for such urban areas. Applying this rate to the study of housing needs, and in order to avoid the possible underestimation of Malindi's population in 1985 the population should have been 36730, in the year 1990 it will be 53719, about 78566 in 1995 and about 114906 in the year 2000. The number of households is 7733 in 1985 (@4.75 persons per household), 10743 in 1990, 15713 in 1995 and about 22981 households in the year 2000. All these are at 5 persons per household i.e. from 1990 onwards.

At these rates the number of persons per room goes up from 1.71 to 2.09 for 1985, the number of persons per house rises to 8.2 for 1985 instead of 6.73 and likewise the number of households per house moves up to 1.74 from the 1.42 one.

Applying these rates in the Kuwaiti model, the demand for houses in Malindi is given as in the table below:

TABLE 5.10: HOUSING NEED BY THE KUWAITI MODEL:
POPULATION RATED @ 7.9% p.a

| YEAR | DEMAND | SUPPLY | SHORTFALL |
|------|--------|--------|-----------|
| 1985 | 16960 | 4455 | 2505 |
| 1990 | 9893 | 4659 | 5234 |
| 1995 | 15109 | 4872 | 10237 |
| 2000 | 22097 | 5096 | 17001 |

The same rates applied to the proposed model, it is found that need is all the years is increased, as seen below.

TABLE 5.11: HOUSING NEED BY THE PROPOSED MODEL;
POPULATION RATE @ 7.9% p.a.

| YEAR | TOTAL HOUSING NEED | ADDITIONAL NEED |
|------|--------------------|-----------------|
| 1985 | 2416 | - |
| 1990 | 6083 | 3667 |
| 1995 | 11153 | 5070 |
| 2000 | 18560 | 7413 |

The table below provides this information. If the same 7.9% p.a. growth rate of the population is applied with the other variables constant, the housing needs gotten by the methods of age criteria, affordability of inhabitants, the "Fit" and "Unfit" method and the "Deficit" methods, it is found that the housing needs increase in magnitude but at the same proportion as the increase of the 7.9% p.a rate from the one of 3.43% p.a.

The purpose of using different rates is not just to calculate housing need endlessly, but rather it is to bring out the true picture of the magnitude of the estimates. This implies that even if the value of the rates is varied the housing need will still persist in the same proportion as before changing the rates.

In order to get a good comparison between the different methods and hence to determine the best indicator of housing need it is necessary to convert all the results obtained to a common factor. This can be done by using the amount of additional need for each successive period of forecasting. The total of these cumulative needs will indicate the measure of the magnitude of the housing problem.

The table below provides this information clearly. The present housing need is also included since any eradication of the shortage will start with the current shortage. Taking the proposed model as the base, variance of each of the other methods from the proposed model has been calculated in percentages, as shown in the table.

TABLE 5.12; ADDITIONAL HOUSING NEEDS USING ALL METHODS

| METHOD | ADDITIONAL | | NEED IN 5-YEAR PERIODS | | | VARIANCE FROM PROPOSED MODEL |
|--------------------------|------------|------|------------------------|------|-------|------------------------------|
| | 1985 | 1990 | 1995 | 2000 | TOTAL | |
| Age criterion | 2530 | - | 1859 | 1360 | 5749 | +11.4% |
| Affordability | 1711 | 314 | 372 | 440 | 2837 | -56% |
| "Fit" and "Unfit" Method | 4426 | 700 | 1214 | 1449 | 7789 | 19.6 |
| "Deficit" | 1857 | 3153 | 920 | 1089 | 7019 | 8% |
| Kuwaiti Model | 1226 | 1351 | 2035 | 4090 | 8702 | 32% |
| Proposed Model | 2208 | 1398 | 1331 | 1573 | 6510 | 0% |

From the information collected during the housing survey, there are only about 1787 rooms in the units lying in the north and south shores, mainly serving the elite and most of the European residents. The total number of houses including the servant's quarters is 498. And these areas house only 10% of the population of Malindi, while the rest 90% are crowded together in the densely populated Old Town and in the peripheral areas. These people are seemingly crowded together, with their houses near each other. In the European areas (north and south shores) the houses are separate, on individual plots fenced and protected by the owners.

This analysis suggests that there are three types of need for housing in Malindi. First, the demand for housing by the elite and European residents (mostly high income people) is a demand for plots of land on which to build separate individual houses. That is, the elite European class and even other rich people's demand for housing is a function of the demand for land plots. If one needs a house he just buys or hires a plot in the area and then puts up a house, or two of them, depending on his wish. Then he constructs servants' quarters to accommodate people who will be working for him, albeit from the African population in the surrounding Old Town.

Second, the demand or need for a house by the middle-income and other rich Asian and Arabic groups is a demand for a separate house, either owner-occupied or rented. And this house can either be on a separate plot alone, or situated on land with other houses, whether these houses are of the same type or of the swahili type. The bulk of these people are found in the fringes of Old Town, to the west, north and south east. If some one in this category cannot find the individual house, he would rather live in a flat. Thus majority of these calibre of people unable to get separate houses and on individual plots are found to occupy the many storeyed houses and flats in old town and on the fringes, sometimes near the north and south European-dominated areas.

There are some of these people living in swahili houses, but they live as owner-occupiers but not as renters of some rooms. If they rent a swahili type of house then they prefer renting the whole unit. It is therefore the majority of these people who are the landlords and house owners in Malindi town, being mostly of Asian and Arabic origin. Some of them have houses in the sites and service schemes, or plots on which they hope to construct houses either for owner-occupation or for rent.

TABLE 5.14 DERIVED QUANTITIES AT DIFFERENT LEVELS

The third category of housing need in Malindi is the demand for rooms for renting. This represents the majority of housing need in the area because the people affected are unable to buy land for houses. They are also unable to build, buy or own their own individual houses. Their only resort is to rent rooms from landlords and houseowners exclusively in the crowded Old Town and in suburbs like Maweni and Kisimo Ndogo. Their housing need is catered for by the swahili houses and huts. If they can afford a house, the house is either a hut (owner-occupied) or mostly a swahili house built of the traditional materials. And this house may even be in squatter areas or in the Kaloleni area to the west of the town.

Since the need for housing within the European dominated area is reflected in demand for land plots, their housing need can be kept aside in the estimates. It is now possible to estimate need for the other types of residents.

Applying the 7.9% rate of population growth for Malindi, it is found that the average number of persons per room is 2.1 in the swahili houses, 1.65 in the modern units in old town (belonging to the second category of residents), and 4.4 in the public housing. The average households per house is thus 1.85 in the swahili houses, 1.51 in the modern units and 1.24 in public housing. This information is summarized below:

TABLE 5.13: DERIVED QUANTITIES AT DIFFERENT GROWTH RATES IN EACH HOUSE CATEGORY

| QUANTITY | TYPE OF HOUSE | @3.43%p.a pop. rate | @7.9%p.a. pop pop. rate |
|----------------------|---------------|------------------------|----------------------------|
| Rooms per house | Swahili | 4.19 | 4.19 |
| | Modern | 4.35 | 4.35 |
| | Public | 1.33 | 1.33 |
| | European | 3.59 | 3.59 |
| Persons per room | Swahili | 1.72 | 2.10 |
| | Modern | 1.35 | 1.65 |
| | Public | 3.57 | 4.40 |
| | European | 1.50 | 1.86 |
| Households/ house | Swahili | 1.51 | 1.85 |
| | Modern | 1.23 | 1.51 |
| | Public | 1.01 | 1.24 |
| | European | 1.14 | 1.40 |

TABLE 5.14: DISTRIBUTION OF PEOPLE IN UNITS @7.9% P.A. POPULATION RATE

| HOUSE TYPE | NO. OF PEOPLE | NO. OF UNITS |
|------------------------|---------------|--------------|
| Swahili | 29202 | 3315 |
| Public | 1743 | 297 |
| European | 3315 | 498 |
| Modern (in Old Town | 2470 | 345 |
| Total | 36730 | 4455 |

TABLE 5.15: DISTRIBUTION OF HOUSEHOLDS BY HOUSE TYPE
@ 7.9% POPULATION RATE

| HOUSE TYPE | NO. OF HOUSEHOLDS | | | | |
|------------|-------------------|------|-------|-------|-------|
| | YEARS | 1985 | 1990 | 1995 | 2000 |
| Public | | 367 | 510 | 746 | 1091 |
| Modern | | 520 | 722 | 1056 | 1544 |
| European | | 698 | 969 | 1344 | 1867 |
| Swahili | | 6148 | 8541 | 12493 | 18272 |
| Total | | 7733 | 10742 | 15713 | 22981 |

Using the Kuwaiti model the needs for housing in the different groups can be calculated as follows:

Need for swahili house occupants

$$(0.9 \times 1 \times 6148) + (0.5 \times 2.5\%) = 5540.$$

The current supply is 3315, hence in 1985 is 2225 units.

Modern house residents:

$$(0.9 \times 1 \times 520) + 0.5 \times 2.5\% = 469$$

Current supply is 345 hence need in 1985 is 124

Public housing residents:

$$(0.9 \times 1 \times 367) + 0.5 \times 2.5\% = 332$$

Current supply is 297 hence need in 1985 is 35.

For the year 1990, the need for those in swahili units will rise to 2334, for those in modern houses it will be 197 units and for the public sector residents need will be 139 houses. In 1995 corresponding figures are 3855, 326 and 230 respectively, these rising to 5636 houses for the swahili house residents, 476 for the modern housing people and 337 for the public housing residents by the year 2000. Taking the construction rate of 0.9% p.a there will be a supply of 35 units every year, so that for every time period demand is reduced by this amount of supply, though it is difficult here to know how many of the new units added are swahili type, public or modern type of houses for the middle income group.

Using the proposed model the initial or accumulated need for housing in 1985 remains 996 since most of the units and households affected in the individual components of the equation are only those in houses excluding those in the European-dominated areas. For the future housing need it is found that 2738 units will be needed in 1990, 4522 in 1995 and about 6612 units in the year 2000. The bulk of these units will be needed by the occupants of swahili housing and those in the public sector housing.

CHAPTER SIX

SUMMARY AND CONCLUSIONS

Summary

In this project work the main aim was to come up with a method for estimating housing needs. This method would be one which relied on the physical product and also the socio-economic environment of the Malindi neighbourhood. The ability to consider acceptability of a housing unit using this criteria has been the main addition to the other methods for estimating housing needs. As stated earlier, this technique of using a point matrix scheme to get a score for each housing unit in order to determine its acceptability, does not in any way contribute to a lowering of housing standards. It is a fair and rigorous way of analysing the housing conditions; there are good existing houses which remain vacant, while others which are not so good are being sought for.

Using the point scheme to determine housing quality has enabled this work to feed in the housing information into the various methods that have been advanced by other researchers and academicians in the past. It was intended to study these methods, use the information obtained in Malindi to estimate housing need and then compare these results with the results

from the proposed model. This exercise has been done in this chapter and the comparison between the results is the one which will test the study hypothesis advanced in this work, that though there exists huge housing problems, these problems have in most cases been overstated. The reasons for the exaggerations stem from lack of understanding the main areas of emphasis when measuring quality, and more precisely, from the misconceptions about determining housing needs. These have led many people into referring to the housing problems as "bottomless pits" or mysterious monsters that have defied all possible solutions.

The question now is: from the results obtained in the various methods of estimating need, and from the proposed model's results, has the hypothesis been proved, disapproved or unchanged? And for whatever answer, how does this reflect on the actual problems of housing in the study area, and in Kenya generally?

The results of the various calculations are shown in the table below. Some methods have calculated the shortfall, or the deficit, or the housing units required, all these represent housing need. For the "fit" and "unfit" criteria methodology (a) has used the rate in Malindi presently of 0.7 houses per household methodology (b) has used the official 1 house per household

rate. In the "Deficit" Estimates, (a) refers to the ordinary deficit methodology, while (b) is the one provided by HABITAT in 1976. And in the last two models, (Kuwaiti and the modified), (a) stands for needs when the population rate used is 3.43% p.a (b) is when this rate for Malindi is at 7.9% p.a.

TABLE 6.1 SUMMARIZED RESULTS OF CALCULATING HOUSING NEEDS IN MALINDI USING DIFFERENT METHODS

| METHODOLOGY | | HOUSING NEED IN 5-YEAR PERIODS | | | |
|-----------------------------|----|--------------------------------|------|-------|-------|
| | | 1985 | 1990 | 1995 | 2000 |
| 1. Age criteria | | 1155 | - | 3072 | 4024 |
| 2. Affordability | | 1711 | 2025 | 2397 | 2837 |
| 3. "Fit" & "Unfit" criteria | a. | 3098 | 3588 | 4438 | 5457 |
| | b. | 4426 | 5126 | 6340 | 7788 |
| 4. "Deficit" | a. | 1857 | 2439 | 3529 | 4849 |
| | b. | 1857 | 5010 | 5930 | 7019 |
| 5. Kuwaiti Model | a. | 1226 | 2577 | 4612 | 8702 |
| | b. | 2505 | 5234 | 10237 | 17001 |
| 6. Proposed model | a. | 2208 | 3606 | 4937 | 6510 |
| | b. | 2416 | 3873 | 5070 | 7413 |

NB: All methods from No. 1 to 4 use population growth rate of 3.43% p.a

The results from Table 5.12 show that housing need in 1985 was projected to be of highest magnitude by the "fit" and "unfit" method, and this is the case in the year 2000, except for the result of the Kuwaiti model in that years. The low value from the Age criterion is probably due to the impossibility of estimating for needs for year 1990. And the high figure for the Kuwaiti model could stem from the fact that not many of its variables were applicable in the study area. The Affordability value shows an underestimate of needs.

Computations of annual need over the fifteen - year period (1985-2000) give results corresponding to the pattern in Table 5.12. The computations show that the proposed model gives an annual need of 434 units and the Kuwaiti model gives an annual need of 580 housing units. The rest of the results are shown below.

TABLE 6.2: ANNUAL HOUSING NEEDS USING ALL METHODS FOR YEARS 1985-2000

| METHOD | ANNUAL HOUSING NEED |
|-------------------|---------------------|
| Age | 383 |
| Affordability | 189 |
| "Fit" and "Unfit" | 459 |
| "Deficit" | 467 |
| Kuwaiti Model | 580 |
| Proposed Model | 434 |

This suggests that the proposed model has provided the least annual need bearing in mind it has taken care of many factors of quality about the living

environment of the occupants, as opposed to the Age method. The 434 annual figure is more realistic in that case, and can be affordable by a combined effort of public and private housing construction. At the average cost of say, Shs.60,000/- per house in Malindi, about Shs. 26 million is required annually to ease the housing problem. If this is achieved every year, the housing problem can be eliminated by the end of the century in Malindi.

The results therefore show that the proposed model, having given the lowest estimates in almost all cases and against the other methods, has proved a relatively better method for estimating housing needs in Malindi town. In this respect the hypothesis advanced in this study that housing needs have been exaggerated in magnitudes has been proved right. However, there would be slight differences in the results from the Kuwaiti model had it been possible to apply some of the rates and variables in that model to the study area. But given that the so mentioned rates are determined by the supply constraints to housing, these results would not make much difference.

And it also appears from the results of the calculations that the method of estimating housing need by the "fit" and "Unfit" method is the least in credit. The affordability of inhabitants method shows that most of the people in the low-income bracket are ...

able to draw some energy and money from somewhere and be able to put up a house. And it also reflects the fact that it is not always the wealthy who supply low-cost housing. In most cases these supply land on which people can construct their houses. They themselves like to stay in good houses away from any tenants.

It is also observed that whether the housing units in the north and south bordering shores are excluded or included into the calculations of need for the entire town, the results are not much different, and the pattern of the results remains the same. This implies that the housing need of the people in the shore-bordered areas is either of a completely different nature as observed earlier, or that it constitute a very small proportion of the total housing need or both. And the division of needs into different income groups does also not alter the pattern of results. Neither does it favour the affordability criteria to be a better estimator in that respect. Housing needs remain in the same proportions by whatever method used to estimate them. At one stage the rate of population growth was changed from 3.43% p.a to 7.9% p.a to reflect the true nature of population growth in the town. This did not affect the pattern of results at all. And it also did not change the position of one estimator with

another, i.e one estimator did not become better than another. The new rate only helped magnify the results, which then implies that with more growth in population per year, holding the other variables constant, the housing problem will continue to gallop at even higher magnitudes.

The graph which was used to try match need with supply of houses indicates that the rate (0.9%) of construction of new dwellings in Malindi town is much lower than even the replacement rate of 2.5% p.a which means that there are likely to be more units falling out of use than those added into the stock. The net result is a lowering of the housing stock by almost 1.6% per year. At these rates it can be implied that every year the amount of new housing added only manages to accommodate less than 15% of the increase in new households in the town.

Results on the pattern of need according to provision of housing i.e public, modern units in old town and swahili house provision show that for the public housing the number of persons per room is highest (3.57, and 4.40), while the average rooms per house is the lowest (1.33) compared with the other types of houses. This could probably explain why it is the public officials and employees who complained much about the housing problem in Malindi. Their units are simply not enough and they feel the bite

of the shortage earliest.

But the calculations showed a very low level of need by the public sector; namely that 35 houses will be needed in 1985, 139 in the year 1990, 230 houses in 1995 and about 337 units by the year 2000. This shows that either the number of civil servants in Malindi is increasing very fast with the establishment of new ministerial departments in the area, or that there has been a long period of no construction of houses for the employees. It could also arise from the number of unfit houses, that were found to be temporary shelters at the Ministry of Works yard, and at the transport yard. Yet their housing need is greatest since even the private sector supplements them with accommodation.

Conclusion

There are two main parts to the conclusion of this research work. One is on the methods of estimating housing needs, which is the more important, and the other on the general housing situation of Malindi town.

1. (a) The proposed model has been found to be a better estimator of needs in this area than all the other methods. However, the method may only be applicable in the case of Malindi alone. There is therefore need to use such a model

in another urban area, taking greater care to modify it whenever necessary. The conclusion to be drawn from here is that when calculating housing needs, one should carefully analyse each housing unit, not only as a physical product, but also as a package of services surrounding the house. Need is that which people appreciate about and are able to modify in their own ways.

- (b) Assumptions regarding quality of houses should be tailored to the particular local setting of the area covered by the estimates. For instance, the swahili house, or the Mtomo construction though inferior to the official permanent houses and methods of construction have served thousands of people who would be lacking housing if they were to be provided with standardized housing.
- (c) The fact that the study hypothesis has been proved right should not be taken to imply that this is a remedy to the housing conditions in the area. Neither should it be assumed to mean that the housing problem is small in magnitude. The methodology is just a measure of the extent of the problem, but the housing problems persist and are increasing from the results shown above. The role of this

methodology was just to highlight the necessary parameters to be considered when estimating housing need; like the one of Age and affordability of occupants. These could be combined with deficit method, or "fit" and "unfit" method could be linked up with affordability method to measure housing needs more precisely.

- (d) Unless a mathematical model, or a mathematical equation is used virtually, no single method for estimating housing need would be completely correct.
- (e) Deficit estimates, though defective in nature, form the basis for calculating needs, and any methods used for needs assessment must at least use the deficit method sooner or later in the calculations. The dwelling unit is essentially what constitutes the ultimate housing environment, though services and facilities go along with it to make the living environment a better place. So the success or failure of using the deficit estimates depends on how one is going to look at it; whether as a deficit in numbers, in quality, in quantity, or affordability, or in both quantity and quality.

(f) There are a number of demerits inherent in the proposed model. First, on a large scale, it may be unworkable because it is labourious and needs plenty of time to collect data. Secondly the method is a bit difficult to use in areas where housing types are differentiated. In the Malindi case most units in one place looked similar and could be seen to have the same characteristics, even in levels of repairs and maintenance. This may not occur in other areas. Thirdly, some of the rates and components in the model need better clarification, because most may not work, or will have to be derived from other quantities.

2. (a) The housing demand in Malindi is of three types: the demand for plots by the rich; the demand for separate housing units, even if crowded in the old town, for the less rich people, and a demand for residential rooms by the majority low-income people. Each of this element needs to be provided separately in order to satisfy housing need.

- (b) The housing problem in Malindi appears to exist in two forms. On the one hand its a problem of poor quality dwellings, built of non-durable traditional materials and appearing old in appearance. To

the extent that there are many units but public workers and most medium income people would not like to live in them. Some of the rooms are too small e.g. the back stores of the main swahili units, some hardly measuring $2\frac{1}{2} \times 2\frac{1}{2}$ metres. Quantity accommodation for the tenants is sacrificed for profit maximization motives of the landlord who would like to put up many rooms. in order to earn as much rent as possible.

- (c) We can look at this issue in another way: as a problem of cultural organization of the people. Most of the landlords and residents are either Coast Arabs, Asians and the local Mijikenda people who are strongly entrenched into the Islamic way of life. This closed community life does not allow free mixing with other religious sects, especially for women, and has a lot to contribute to the nature of housing problems. Most moslems would not like their ways of life tampered with by the people they regard as foreign, the up country people. Therefore houses may be overcrowded or underoccupied depending on the nature of the landlord.

- (d) However low quality they may be the swahili units seem to be the main type of accommodation in the town. Rather than ask for their removal, the officials concerned should seek their improvement by using modern and more permanent materials. Even the construction industry should

help in improving the quality of the swahili units.

- (e) There is a prevalent habit in the use of local materials in Malindi reflecting the cheapness of these materials, their ready availability, and their traditional preferences, weather and air conditioning qualities. There should be more research towards the improvement of the application of these materials in Malindi and other coastal towns, so as to make the swahili house more durable because it seems the Swahili house will remain dominant in the future along the coast.
- (f) People should shun despising the local materials. As the HABITAT Conference of 1976 concluded "The reasons for considerable neglect of the use of traditional materials appears mainly psychological. For example, mud, which is the most common material.. has become a symbol of poverty.. and aid agencies .. would like to provide houses for the poor in cement and steel, as such houses are symbols of status." (Weisunger, 1984 p.349-350). Former Tanzanian President Mwalimu Julius Nyerere once wrote in 1977 "... the widespread addiction to cement in building houses is a kind of mental paralysis," (also quoted by Weisunger) and urged planners and builders to consider mud and other local materials for housing construction.

BIBLIOGRAPHY

Topics for further research

The subject of housing needs is a broad one and cannot be tackled exhaustively in a single volume like this one. The following topics offer good areas for further research:

1. A method of estimating housing needs with more emphasis on the affordability of inhabitants and environmental quality of the houses.
2. A study into ways of improving swahili houses so as to make them better and more durable at the coast. The current swahili houses have rarely received official approval even though they offer adequate accommodation.
- *3. The impact of the proposed expansion of Malindi airport on the housing situation in Malindi.
4. An investigation into the relationship between expansion of tourist services and housing needs in any one tourist town.
5. The relationship between urban transportation and urban residential location.
6. Factors that households consider in deciding to live in a certain place.

BIBLIOGRAPHY

- ABRAMS, C. Man's Struggle for Shelter in an Urbanizing World. Massachusetts: MIT Press, 1964.
- Housing in the Modern World. London: Faber and Faber, 1969.
- ADALA, P.A. An Economic Study of the Urban Housing Market in Nairobi. Unpublished M.A. Thesis University of Nairobi, 1978.
- ANGORE, P. Commercial Core, Malindi. Unpublished M. Arch. Thesis, University of Nairobi, 1972.
- BRADLEY, M.E. The History of Malindi: A Geographical Analysis of an East African Coastal Town from Portuguese Period to the Present. Nairobi: East African Literature Bureau, 1973.
- Malindi, The Historic Town on Kenya's Coast. Nairobi: Marketing and Publishing Ltd., 1975.
- CHADHA, S.S. Civic Facilities, Malindi. Unpublished M. Arch. Thesis, University of Nairobi, 1972.
- DAKHIL, F.H. et. al., (ed.) Housing Problems in Developing Countries. IAHS Conference, Dhubai, 1978 New York: John Wiley and Sons, 1978.
- DESCLOITRES, R.; REVERDY, J.C.; DESCLOITRES, C. L 'Algeria des Bidonvilles. Paris-La Haye: Mouton, 1961.
- DUNCAN, T.L.C. Measuring Housing Quality: A Study of Methods. University of Birmingham Centre for Urban and Regional Studies, 1971.

- FANSECO, J. Housing Finance in Developing Countries. The Hague Netherlands. International Federation for Housing and Planning, 1971.
- GRIMES J.N.R., O.F. Housing for Low-Income Urban Families: Economics and Policy in the Developing World. Baltimore: John Hopkins University Press, 1976.
- HABITAT & U.N. STATISTICAL OFFICE. Global Review of Human Settlements. New York: Pergamon Press, 1976.
- HALL, P. ed. Issues in Urban Housing. Middlessex, England: Penguin Books, 1978.
- HOEK-SMIT, M.C. Socio-Economic Characteristics of Low-Income Groups in Urban Areas in Relation to their Housing Demand. Nairobi: HRDU, 1977.
- HUTTON, J. ed. Urban Challenge in East Africa. Nairobi: East African Publishing House, 1970.
- JORGENSEN, N.O. Housing Policy Guidelines for African Countries. Housing Research and Development Unit, University of Nairobi, 1978.
- LACONTE, P. ed. "The Environment of Human Settlements: Human Well being in Cities. Habitat International Journal Vols. I & II, 1976.
- MABOGUNJE, A.L.; HARDOY, J.E.; MISRA, R.P. Shelter Provision in Developing Countries: The Influence of Standards and Criteria. New York: John Wiley & Sons, 1978.
- MACLENNAN, D. Housing Economics, New York: Longman Inc., 1982.

- MBWAGWA, R.K. The Impact of Industrial Growth on Housing in Eldoret, Unpublished M.A. Thesis (Planning), University of Nairobi, 1978.
- METCALE, R. Estimating Housing Assistance Requirements and subsidy Costs. Washington D.C.: USAID, 1972.
- MICHAEL, SUFIER in Urban Challenge in E. Africa, edited by John Hutton Nairobi: East African Publishing House, 1970.
- MULLER, Report on a USAID/NHC Housing Project in Malindi. Housing Research and Development Unit, University of Nairobi, 1978.
- NATHAN, R.R. Preparing a National Housing Needs Assessment. Washington D.C.: USAID, 1984.
- NEHANIV, B. Some Aspects of Urban Development in New Nations. United Nations Regional Planning Mission, 1968.
- NEVIT, A.A. The Economic Problems of Housing. New York: Macmillan (St Martins Press), 1967.
- PATNERSHIP, S.C. Third World Urban Housing. Wartonford, England: Building Research Station, 1977.
- REPUBLIC OF KENYA. Kilifi District Development Plan 1984/88 Government Printer.
- _____, National Development Plan, 1970-1974.
- _____, National Development Plan, 1974-78
- _____, National Development Plan, 1979-83
- _____, National Development Plan, 1984-88.

ROURK, P.W. & ROSCOE, A.D. An Assessment of National Housing Needs Affordability in Kenya, 1983-2003.

USAID SAID G.M. & ABDULBAKI, H.N. "An Assessment of of Supply and Demand for the Public Sector Housing in Kuwaiti," International Journal for Housing and Its Applications Vol. 8, 1984.

SATTERTHWAITE, D. Ed. Three Years After Habitat: Human Settlement Policies in Selected Developing Countries. London & Washington: International Institute for Environment and Development, 1979.

STREN, R.E. Housing the Urban Poor in Africa: Policy, Politics and Bureaucracy in Mombasa. Institute of International Studies, University of California, Berkeley, 1978.

TOWN PLANNING DEPARTMENT: Housing in Mombasa, Nairobi: Ministry of Lands & Settlement, 1969.

TURIN, D.A. "Housing in Africa: "Some Problems and Policy Issues" in Economic Problems of Housing, ed. A.A. Nevit. New York: Macmillan Press, 1967.

TURNER, J.F.C. & FICHLER, R. eds. Freedom to Build. New York: Macmillan & Co., 1972.

TURNER, J.F.C. Housing by the People. New York: Pantheon Books, 1977.

UNEP: Review of the Priority Subject Area: Human Settlements & Habitat. New York, 1977.

UNITED NATIONS. Housing in Africa, 1965.

_____, The Social Impact of Housing: Goals, Standards, Social Indicators and Popular Participation. 1977.

_____, Estimating Housing Needs, 1973.

WAKELY, P.I.; SCHMETZER, H.; MUMTAZ, B. Urban Housing Strategies: Education and Realization. London: Pitman Publishing Limited, 1976.

WATSON C.J. et. al. Estimating Local Housing Needs. University of Birmingham Centre for Urban and Regional Studies, 1973.

WEISINGER, R. "Housing The Third World's Poor" in International Journal for Housing and its Applications Vol. 8. 1984.

WORLD BANK "Anatomy of a Third World City" in The Urban Edge. Vol. 8, 1984.

_____, Housing: Sector Policy Paper, 1975.

APPENDIX 1

QUESTIONNAIRE ADMINISTERED TO THE TOWN ENGINEER,
MALINDI MUNICIPAL COUNCIL

1. What is the housing policy of the Council of Malindi?
2. Is there a housing shortage?
3. Does the council own its houses?
4. What types of tenure of house ownership do exist within the town? (owner-occupation, private rental, public rental etc.).
5. Generally what are the rents charged by renters, and what are the rates charged by the Council?
6. Has the Council earmarked specific areas for housing estates only, or can anybody put up a house anywhere?
7. What services does the Council provide to house-owners and residents of the town?
8. What is the response for modern standardized houses against the prevailing Swahili-design houses?

APPENDIX 2

QUESTIONNAIRE INTENDED FOR RESEARCH IN MALINDI

1. DESCRIPTION OF STRUCTURAL UNIT

(a) TYPE OF UNIT (i) Bungalow (ii) Flat
(iii) Swahili Hut.

(b) OWNERSHIP (i) Private (ii) Government
(iii) Local Authority (iv) Parastatal
(v) Company.

(c) SCHEME (i) Mortgage (ii) Tenant Purchase
(iii) Rental (iv) Sites and Service
(v) Unauthorized.

(d) NO. OF ROOMS (i) Complete (ii) Incomplete
(iii) Owner- Occupied (iv) Rented
(v) Vacant.

(e) RENTAL INCOME LAST MONTH -----

(f) AGE, (i) Less than 5 years (ii) 6 to 10 years
(iii) 10 to 20 years (iv) Over 20 years
(v) Unknown

(g) MATERIALS OF CONSTRUCTION

FLOOR (i) Earth (ii) Wood (iii) Cement/sand
(iv) Concrete tiles.

OUTER WALLS (i) Bricks (ii) Bricks (iii) Stones
(iv) Concrete (v) Mud & Wattle
(vi) Mtomo (vii) G.C.I.

ROOF: (i) Thatch (ii) Tin (iii) Tiles
(iv) G.C.I. (v) Asbestos sheets.

2. FACILITIES

a) PIPED WATER SUPPLY (i) Inside (ii) Within 100m
(iii) Beyond 100m. (iv) None

b) HOT WATER Yes No

c) TOILET FACILITIES (i) Private flush (ii) Private
Pit (iii) Communal Flush (iv) Communal
Pit (v) None.

d) KITCHEN FACILITIES. (i) Private (ii) Communal
(iii) Other

e) TELEPHONE (i) Yes (ii) No

f) LIGHTING FACILITIES (i) Electricity
(ii) Parafin Lamp.

g) GARBAGE DISPOSAL (i) Private dustbin
(ii) Communal dap (iii) Other

h) CLEANLINESS OF STREETS (i) Clean (ii) Some garbage
(iii) Very dirty.

(i) DISTANCE TO PUBLIC AMENITIES

0 = Near 1 = within 100m
2 = 100 1km. = far.

3. SOCIO-ECONOMIC CHARACTERISTICS

a) HOUSEHOLD HEAD NO. ----- OCCUPATION -----

b) SEX: Male ----- Female ----- Renter -----
Owner-occupier -----

c) EDUCATION LEVEL OF HEAD

No Schooling ----- Primary ----- Secondary -----
University -----

d) NO. OF HOUSEHOLD MEMBERS

Below 15: Males ----- Females ----- Total -----
Above 15: Males ----- Females ----- Total -----

e) INCOME AND EXPENDITURE

Gross monthly income (Kshs) No. of Contributors

Under 500 -----

501 to 1000 -----

1000 to 3000 -----

4000 to 6000 -----

Over 6000 -----

Total monthly income.

f) HOUSEHOLD EXPENDITURE LAST MONTH

Food ----- Indifferent + Good
Rent -----
Household requirements -----
Transport -----
Clothing -----
Water and light -----
Other -----
Total -----

g) OPINION ABOUT PRESENT STRUCTURE

- | | Reasons |
|----------------|---------|
| 1. Worst | |
| 2. Fair | |
| 3. Indifferent | |
| 4. Good | |
| 5. Best. | |

h) TYPE OF ALTERNATIVE STRUCTURE REQUIRED -----
REASONS -----

i) OPINION ABOUT THE NEIGHBOURHOOD ON:

| | <u>Reasons</u> |
|----------------------|----------------|
| Security | |
| Physical environment | |
| Human environment | |
| Recreation | |
| Noise | |

1. Worst
2. Fair
3. Indifferent
4. Good
5. Best.

j. NORMAL MODE OF TRAVEL TO WORK/TOWN

- (i) Foot (ii) Bicycle (iii) Private Car
(iv) Matatu (v) Bus (vi) Motorbike.

197
15
—
212

APPENDIX 3: HOUSING SURVEY SHEET

ESTATE/AREA

Age. Materials Condition Type Ownership Rep.&Mtce. Access. Ref. H₂O Power Sew. Strs. Schs. Hosp. Shops. Markt.Recr. Nz. Sec.

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LIBRARY

| | | | | | | | | |
|------------------|---|-------------------------|-------|---|-----------------|-------|---|-----------------------|
| Rep.&Mtce. | = | Repairs and Maintenance | Sew. | = | Sewage disposal | Mkt. | = | Market |
| Access. | = | Accessibility | Strs. | = | Street lighting | Recr. | = | Recreation facilities |
| Ref. | = | Refuse Collection | Schs. | = | Schools | Nz. | = | Noise level |
| H ₂ O | = | Water | Hosp. | = | Hospital | Sec. | = | Security. |

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