SECOND WORLD BANK/GOVERNMENT OF KENYA URBAN PROJECT

KENYA LOW-COST HOUSING BY-LAW STUDY

# DISCUSSION PAPER
# DP 1

## THE ECONOMICS OF BUILDING CONTROL

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SAAD YAHYA & ASSOCIATES

KITOLOLO & PARTNERS

HALCROW FOX AND ASSOCIATES

FOREWORD

The Discussion Papers are prepared to enable members of the Steering Committee to fully contribute in the preparation of this Study. Therefore they are not final reports but evolving stages in the process of preparing the Manual/Handbook and the Draft Final Report. As such it is intended that their contents should receive the fullest attention of the members of the Working Parties and, subsequently all members of the Steering Committee.

This Discussion Paper DPI - THE ECONOMICS OF BUILDING CONTROL deals with the economic aspects of the building byelaws system as applicable to low-cost housing. It contains a number of tentative recommendations meant to guide subsequent phases of the Study as well as policy making in general.

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## SUMMARY OF RECOMMENDATIONS

### POLICY MAKING:

1. Refine the methodology for identifying low-cost housing and for isolating the various target groups in a heirarchy of priorities, while focusing attention on households in the 10th - 60th percentile in the income distribution range.
   Develop indicators that would be stable in the long term.
2. Initiate, through the Ministry of Local Government, a nation-wide survey of local authority fire services with a view to developing proposals for improving facilities especially equipment, transport, buildings, manpower and training.
3. Define the extent to which the armed forces can assist in fire control and prevention in urban areas.
4. Assist the NHC to prepare a land acquisition programme and to create a land bank.

### PLANNING AND DESIGN:

5. Improve the design of cooking appliances and kitchens so as to minimise fire hazard.
6. Provide for the proper ventilation of kitchens.
7. Design a suitable method of storing the gas cylinder outside the house without it being stolen.
8. Provide adequate fire prevention and control service in the low-income neighbourhoods.
9. Provide adequate fire hydrants and access roads for the fire tender.
10. Widen the locational opportunities of the low-income households.
11. Develop and test suitable techniques for measuring site quality.

FINANCE:

12. Review the system for financing the construction of new fire stations and hydrants.

13. Take into account the lender's concern by reducing costs in invisible elements of the building.

14. Pay more attention to style, customer appeal and "packaging"

15. Promote the concept of fragile permanence, that is using "temporary" materials to produce durable construction.

16. Get the National Assurance Corporation, a state-owned company, to expand its fire business into the low-cost housing sector.

17. Make things easier for financiers, developers and subdividers through speedy approval of plans and less stringent conditions on infrastructure and excising of land.

18. Involve the Housing Finance Company of Kenya in lending for low-cost housing and in the design of fundable projects.

19. Review the amount of material loans from time to time to keep abreast of material prices.

20. Improve the capabilities of local authorities in the management and budgetting of infrastructure maintenance.

PROJECT IMPLEMENTATION:

21. Educate low-income families in the use of gas, paraffin and other inflammable fuels.

22. Prepare a list of approved fundis for use by house-builders; for example in a site and service scheme the list would be prepared and kept up-to-date by the project agency's representative on site.

23. Design a simple form of agreement for use between the developer and fundi.

24. Prepare a self-help construction manual with simple easily-understood specifications and details.

25. Prepare guidelines, model constitution and standing orders for the better administration of building groups.

26. Extend the housing extension service in local authorities.

27. Initiate a clearing agency and advice bureau for sub-tenants.

28. Prepare a suitable subletting agreement and encourage the use of rent books.

29. Encourage the formation of building groups in upgrading areas.

30. Compile a list of material suppliers and merchants for every town.

31. Devote more attention and expertise to site selection for public projects and sites and services schemes.

STANDARDS:

32. Restrict revised byelaws to single storey dwellings.

33. Take into account the special circumstances of the largest towns when designing a new code.

34. Make provision for the mixing of functions and land uses in residential areas.

35. Keep densities reasonably low i.e. not exceeding 200 persons per ha. net or plot sizes not less than $150m^2$.

36. Reduce fire hazard by means of appropriate barriers as well as by reducing fire risk at source i.e. in the kitchen, where the majority of household fires originate.

37. Allow the use of a temporary habitable shelter on construction sites.

38. Legalise the issue of the phased occupation certificate.

39. Permit the use of second-hand materials.

40. Prepare a unified set of standards incorporating relevant sections from Grade I and II Byelaws and public health legislation.

41. Recognise various cost implications of changes in the planning and design standards when approving building plans.

42. Develop guidelines on land suitability for housing purposes.

43. Integrate building control with the land use zoning system.

44. Restrict the felling of trees on building sites.

45. Seek further reductions in roads and sewerage standards and costs.

46. Promote non-waterborne sanitation and mobilise support for its use in appropriate circumstances.

47. Devise appropriate infrastructure standards for upgrading areas.

RESOURCE:

48. Design suitable house types to satisfy progressive development, affordability and partial subletting criteria.

49. Amend specific Grade II Byelaws regarding the design standards for low-cost houses e.g. Byelaw 6, 8, 12 and 23.

50. Emphasize and promote the use of available local building materials and construction techniques for low-cost housing.

51. Design byelaws that will allow for pilot and innovative projects.

52. Encourage the use of appropriate technology in house construction.

53. Control energy consumption in building materials manufacture and in the domestic sector.

RESEARCH AND DOCUMENTATION:

54. Design and implement a housing statistics project to document and publish relevant economic financial and cost indicators; the HRDU is the logical institution for implementing this proposal.

55. Initiate research into alternative sources of energy, especially solar energy and biogas.

CHAPTER 1

# URBANIZATION IN KENYA

## INTRODUCTION:

Five hundred illegal dwellings are completed and occupied every week in urban Kenya. Three times as many come into being in the rural areas week by week. These numbers add to the vast "deficit" of 140 000 units and 500 000 units in urban and rural areas respectively needed if the existing obsolete or sub-standard stock were to be replaced. Replacement is obviously not even worth considering. It is impossible to even catch up with additional requirements at current acceptable standards. This means that our stock of sub-standard dwellings is increasing, fairly fast, and much faster in urban than rural areas.

Against this background one must then look at the towns' capacity to deal with this and associated problems. Meagre resources in the form of finance, manpower and access to the central Government ministries and key para-statals have constrained the capacity of local communities to help themselves.

## 1.2 URBANIZATION TRENDS:

1.2.1 Kenya when compared with other developing countries is urbanizing at a very high rate. Between 1969 and 1978 the annual urban population growth rate was 7.7% per annum of which 3.4% represented the natural growth rate and 3.3% the rural - urban migration rate. If this growth rate is sustained the total urban population will be four times the 1978 figure by the year 2000

1.2.2 In 1948 there were only 17 towns with a population of 2000 which represented only 5.1% of the total national population. However, in 1962, twelve years later the number of such towns had doubled. The latest 1969 census showed that there were 48 towns in Kenya. (see Table 1.1)

TABLE 1.1: THE NUMBER OF TOWNS BY SIZE AND URBAN POPULATION IN 1948, 1962 AND 1969

| Size of town | 1948 | 1962 | 1969 |
|---|---|---|---|
| Over 100,000 | 1 | 2 | 2 |
| 20,000-99,999 | 1 | 2 | 2 |
| 10,000-19,999 | 2 | 3 | 7 |
| 5,000-9,999 | 3 | 11 | 11 |
| 2,000-4,999 | 10 | 16 | 26 |
| Total | 17 | 34 | 48 |
| Total Urban Population ('000') | 276 | 671 | 1,082 |
| Percentage of total population | 5.1 | 7.8 | 9.9 |

Source: Human Settlement in Kenya 1978
Physical Planning Department

1.2.3 It is useful to note that during the three census years (1979 not yet out) about 70% of the total urban population (see Table 1.2) was located in Nairobi and Mombasa. The total urban share of the population is expected to rise from 9.9% in 1969 to 17.2% in 1983.

1.2.4 The existing level of service provision is inadequate. For example, the current urban housing shortfall stands at 290,000 units and an additional 30,000 units will be required annually during the current 1978 - 83 plan period. About 125,000 more units will be required annually for replacement due to obsolsence.

TABLE 1.2: RURAL AND URBAN POPULATIONS:

| | Population ('000') | | | Annual % Rates of Change | | Share of Total Population % | | |
|---|---|---|---|---|---|---|---|---|
| | Census 1969 | Estimated 1978 | Projected 1983 | 1969-78 | 1978-83 | 1969 | 1978 | 1983 |
| Total Population | 10943 | 14732 | 17470 | 3.4 | 3.5 | 100.0 | 100.0 | 100.0 |
| Rural " | 9860 | 12627 | 14470 | 2.8 | 2.8 | 90.1 | 85.1 | 82.8 |
| Urban " | 1083 | 2105 | 3000 | 7.7 | 7.3 | 9.9 | 14.3 | 17.2 |
| Nairobi | 509 | 959 | 1334 | 7.3 | 6.8 | 4.7 | 6.5 | 7.6 |
| Mombasa | 247 | 401 | 504 | 5.5 | 4.7 | 2.3 | 2.7 | 2.9 |
| Kisumu (urban) | 57 | 115 | 169 | 8.1 | 8.0 | 0.5 | 0.8 | 1.0 |
| Smaller Urban areas | 270 | 630 | 993 | 9.9 | 9.5 | 2.5 | 4.3 | 5.7 |
| No. of towns 2000 + | 48 | 68 | 108 | | | | | |

Source: National Development Plan 1979 - 83.

1.2.5 The problem is further complicated (see Table 1.3) by the fact that only 30% of Kenya's 440,000 urban households can afford the prescribed minimum conventional housing. This means that a solution must be found if the majority poor (representing 70% of the total urban households) are to be provided with shelter.

TABLE 1.3: NUMBER OF HOUSEHOLDS BY INCOME CATEGORIES, 1973 - 1978

| Household Income p.m.shs. | Additional Households 1973 - 1978 | % |
|---|---|---|
| A) Low income | | |
| Less than 300 | 63,000 | 47 |
| 300 - 700 | 44,000 | 33 |
| 700 - 1,200 | 12,500 | 9 |
| B) Medium income | | |
| 1,200 - 1,500 | 3,500 | 3 |
| C) High income | | |
| Over 1,500 | 11,000 | 8 |
| Total | 134,000 | 100 |

Source: Ministry of Housing

1.2.6 If the currently high urban population growth rate continues, coupled with the existing service shortfall, the consequences will pose a gigantic development problem.

Furthermore, the historical and unbalanced development of urbanization in Kenya has resulted in the dominance of Nairobi and Mombasa which have and will probably continue to experience most severely the acute problems of urbanization, such as inadequate and inappropriate housing, under and unemployment and the growth of uncontrolled settlements due to the continued adoption of high building and planning standards.

## 1.3 URBANIZATION STRATEGY:

1.3.1 The declared government urbanization strategy is aimed at:-

(a) The reduction of the national urban growth rate from 7.7% p.a. (1969-78) to 7.3% p.a by 1983, through preferential emphasis on integrated rural development and family planning programmes.

(b) The development of selected urban growth centres to control polarization towards Nairobi and Mombasa through provision of service infrastructure and more efficient utilization of existing urban services. Table 1.4 shows the distribution of designated service centres by province and the catchment population of each type of centre. The figures clearly portray the high population densities in Nyanza and Western province on the one hand and the high centre density in Central province.

TABLE 1.4: DISTRIBUTION OF DESIGNATED SERVICE CENTRES. 1/

| Province | Designated Urban Centres | Theoretical Population served by each centre 1969 | Designated Rural Centres | Theoretical Population served by each centre 1969 | Designated Market Centres | Theoretical Population served by each centre 1969 | Designated Local Centres | Theoretical Population served by each centre 1969 | Total Designated Centres |
|---|---|---|---|---|---|---|---|---|---|
| Central | 17 | 88,000 | 23 | 40,000 | 86 | 13,000 | 185 | 5,000 | 313 |
| Coast | 9 | 94,000 | 9 | 50,000 | 38 | 17,000 | 90 | 6,000 | 147 |
| Eastern | 17 | 100,000 | 29 | 40,000 | 93 | 14,000 | 173 | 6,000 | 314 |
| North-Eastern | 3 | 82,000 | 6 | 27,000 | 13 | 11,000 | 35 | 4,000 | 57 |
| Nyanza | 12 | 163,000 | 25 | 56,000 | 72 | 19,000 | 171 | 8,000 | 281 |
| Rift Valley | 18 | 105,000 | 37 | 38,000 | 74 | 17,000 | 263 | 6,000 | 395 |
| Western | 10 | 121,000 | 21 | 42,000 | 44 | 17,000 | 98 | 8,000 | 174 |
| Total | 86 | 113,000 | 150 | 38,000 | 420 | 16,000 | 1,015 | 6,000 | 1,681 |

1/ Desgnation is not solely based on present functions but also on an assessment of the future development potential and the level of service that should be provided in the urban hierarchical network of service centres.

Source: Human Settlements in Kenya.

(c) Greater emphasis will be given to the development of selected growth centres in Western Kenya, especially Kisumu, which have hitherto not fully tapped their vast agricultural and human resources potential.

1.3.2 Despite the above stated urbanization policy the high urbanization growth rate (over 7.0% p.a.) and the dominance of Nairobi and Mombasa is expected to continue even beyond the 1978 - 83 plan period. By the year 2000 the urban population is expected to increase to between 7.1 million and 9.7 million (Table 1.5). Therefore, the following problems will be compounded:

(a) Increasing demand for urban housing especially in low cost bracket;

(b) Increasing demand for urban land;

(c) Increasing demand for urban services and public utilities;

(d) Funds to provide for the above demands;

(e) Provision of more skilled and specially personnel.

(f) Mushrooming of unauthorized housing development

(g) Increasing under and unemployment and substandard physical socio-economic environment.

All these issues are addressed in some detail in three important Documents recently prepared or published by the Government. 1/ In all the three documents shelter programmes are seen as an essential part of a national urban development policy and particular attention is focused on the question of housing standards.

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1/ See Human Settlements in Kenya; Development Plan 1979-83; and Harry Richardson et al National Urban Development Strategy for Kenya.

TABLE 1.5: URBAN POPULATION IN KENYA DURING 1969-2000 (by province):

| | Low Projection | | | | High Projection | | |
|---|---|---|---|---|---|---|---|
| Province | 1969 | 1980 | 1990 | 2000 | 1980 | 1990 | 2000 |
| Central | 51.0 | 143.4 | 280.4 | 593.3 | 160.0 | 392.6 | 783.0 |
| Coast | 283.8 | 511.0 | 771.4 | 1,189.2 | 563.9 | 910.3 | 1,441.0 |
| Eastern | 37.9 | 103.0 | 212.2 | 490.2 | 116.3 | 304.6 | 640.0 |
| North-Eastern | - | 6.0 | 9.0 | 23.2 | 6.0 | 19.9 | 29.4 |
| Nyanza | 68.9 | 164.3 | 332.4 | 711.6 | 176.8 | 434.5 | 915.1 |
| Rift Valley | 151.0 | 296.0 | 522.7 | 955.9 | 341.7 | 690.4 | 1,282.8 |
| Western | 10.6 | 62.3 | 123.1 | 285.9 | 70.5 | 211.7 | 410.2 |
| Nairobi | 509.3 | 1,098.4 | 1,974.8 | 2,883.2 | 1,115.3 | 2,245.4 | 4,200.0 |
| Total Urban | 1,112.5 | 2,384.4 | 4,226.0 | 7,132.5 | 2.550.5 | 5,209.4 | 9,701.5 |

Source: National Urban Development Strategy for Kenya

CHAPTER 2

WHAT KENYANS CAN AFFORD

The National Development Plan 1979 - 83 estimates that of the existing 440 000 urban households only 30 per cent have sufficient income to afford minimum cost conventional housing. The plan pleads the case for sites and services:

> One proven method of reaching the majority of all urban families is through the development of site and service schemes. In these schemes the bulk of the construction work will be organised on an individual or collective self-help basis to keep the costs as low as possible.1/

1.1.1 A study has been commissioned by the Ministry of Housing and Social Services to evaluate the performance of the site and service programme. The results of the study will help the Ministry to initiate policy review in this sector. In the meantime the plan aims at the production of 74 000 dwellings during the plan period, excluding the traditional and informal sectors; of this figure the private sector will account for about a sixth and serviced plots 37 per cent. Whether this target will be achieved is another matter. In the 1970 - 74 plan period only 50% of the planned output of 25 000 units was achieved. In the subsequent plan period Only 9 000 units out of the planned 69 000 were produced, of which 3 000 were serviced plots.

1.1.2 The Ministry of Housing and Social Services has prepared a housing programme allocating £32 million during the period 1978 - 84 for low-cost housing in 38 urban centres, of which amount 45% is for the Second Urban Project in Nairobi, Mombasa and Kisumu. The target group is households earning shs. 300-1200 per month; those with incomes of less than shs. 300/= would be accommodated through subletting.

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1/ Kenya, Development Plan 1979 - 83 p.172

AFFORDABILITY AND 'LOW COST' HOUSING:

1.2.1 In being concerned about low-cost housing, Government is appropriately endeavouring to provide accommodation that the majority of households can pay for. Thus Government has to monitor not only housing costs throughout the country, but also what families are earning and how they spend their money. It also has to differentiate between builders, purchasers and renters. Unfortunately, in the effort to increase the housing stock, too much attention has been directed towards builders and new construction, and too little towards purchasers of existing houses or renters. The latter group is especially important. There are no up-to-date statistics on the number of renters in urban areas but it will not be irresponsible to assume that they out-number the owners. Therefore low-cost housing should also include housing meant to provide low-rent accommodation. Table 2.1 shows the various criteria that could be used to identify low-cost or low-income housing for policy making purposes. The criteria are:-

- initial development costs
- market value
- rent
- household income
- dwelling quality
- residual approach
- location
- building height

1.2.2 The relevance and paracticability of each of the above approaches depends on the desired policy output.

TABLE 2.1 : POLICY APPROACHES TOWARDS IDENTIFYING LOW-COST HOUSING

| APPROACH/ CRITERION | MAIN INDICATOR | ADVANTAGES | DISADVANTAGES | PROBLEMS OF DEFINITION | WORKING RANGE A FOCUS | B INNER LIMITS | C OUTER LIMITS | REMARKS |
|---|---|---|---|---|---|---|---|---|
| Low-cost | Land cost + servicing cost + building costs | Profuse data. Easy to estimate. Tangible | Rapid changes. Regional variations. | Public projects are subsidised | sh.20000 - 80000 | sh.5000 - 20000 sh.80000 - 120000 | over sh. 120000 | Ministry of Housing places emphasis on houses costing up to sh. 60 000/= |
| Low value | Market value | Precise indicator of what people can and will pay | Wide regional variations. Governed by liquidity and access to credit | Restrictions on the resale of S/S and T/P houses affects reported prices | sh.20000 - 120000 | shs.5000 - 20000 sh.120000 -160000 | | |
| Low rent | rents paid by households | Considers unit of accommodation occupied whether a room, several rooms or a whole house | Poor households pay more than they should. Rent restriction inhibits market operations | Whether rent is net of water, electricity and other services | sh.75 - 300 per room p.m in Nairobi sh.30-150 in other towns | below sh. 75 per room p.m | over sh. sh.300 per room | Rent control protects families paying up to sh.800/= p.m (unfurnished) |

TABLE 2.1:(Cont'd)

| APPROACH/ CRITERION | MAIN INDICATOR | ADVANTAGES | DISADVANTAGES | PROBLEMS OF DEFINITION | WORKING RANGE A FOCUS | B INNER LIMITS | C OUTER LIMITS | REMARKS |
|---|---|---|---|---|---|---|---|---|
| Low income | Household income | Indicates the capacity to pay i.e. a measure of housing demand | Inadequate statistics. Must be converted to capital costs using rule-of-thumb methods | Non.monetary income difficult to value. Seasonal and self employed workers | sh.500 - 1500 p.m 20-60th percentile | shs.1500 - 2500 p.m | over shs.2500 p.m | The Development Plan 1979-83 assumes a medium monthly income in urban areas of shs.900 p.m and 25% of income devoted to housing expenditure - Ministry of Housing target is households earning sh.0 - 1200 p.m |
| Quality | Indicators include space standards access to services sanitation and environmental criteria | Quality control | Difficult to specify | Many qualitative aspects are not measurable | Minimum quality | | | Government specifies a minimum of two habitable rooms for all new housing. |
| Residual approach | Cost or rent below a certain level i.e.non-high cost | Conforms with prevailing attitudes and institutional practices | Unrealistic. concentrate . attention and resources on the well-to-do. | What is a high income family? | | | | |
| Location | Location in a certain area or zone | Physical and visible | Social stigma | | Sites and services areas and upgrading areas. | | | |
| Height | Number of storeys | Single storey construction is the least expensive | Discriminates against multi-storey development | | Single storey buildings | | | Some countries e.g. Tanzania have a simplified code for single storey houses. |

HOUSEHOLD INCOMES:

2.3.1 The most widely used method is the income approach combined with rule-of-thumb techniques. For instance the Ministry of Housing approach of concentrating on households earning less than shs. 1200/= per month is well-considered since the upper limit is about the median income for Nairobi. Households earning below median income were also the target group in the USAID tenant - purchase schemes at Umoja in Nairobi and in thirteen other towns. In the estimates carried out by the USAID the income distribution in Nairobi (1976) was as follows:-

| | |
|---|---|
| 30% | Shs. 1047/= per month |
| 40% | Shs. 1508/= " " |
| 50% | shs. 1969/= " " |

2.3.2 In a survey subsequently carried out for USAID at Umoja the median income of allottee families was found to be shs. 1190/= per month; non-allottees showed much higher figures. It is worth comparing these figures with reported incomes at Dandora (MEDIS 7, Survey date July 1978) where 55.5% of households earn less than shs. 700/= per month. This figure is still fairly high compared to incomes from wage employment in Nairobi, where 55.9% of employees earned less than shs. 600/= per month in 1977 (Table 2.2).

2.3.3 In the Second Urban Project the figures of household income distribution used for Nairobi show that families in the 3rd quintile earn between shs. 1501/= and shs. 2000/= per month (Table 2.3). In such projects it is normal to direct efforts towards households falling within the second and third quintiles or to areas where the majority say 80% of households fall within that income range. This type of approach

TABLE 2.2: DISTRIBUTION (IN%) OF WAGE EMPLOYMENT BY MAJOR TOWNS AND INCOME GROUPS 1977

| | under sh.150 | shs.150 199 | shs.200 399 | shs.400 599 | shs.600 799 | shs.800 999 | shs.1000 1499 | shs.1500 1999 | shs.2000 2999 | shs.3000 5999 | shs.6000 &over | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nairobi | 0.8 | 1.8 | 13.9 | 25.7 | 13.7 | 9.1 | 12.7 | 6.4 | 6.7 | 6.7 | 2.5 | 100 |
| Central Province | 0.7 | 2.9 | 33.9 | 24.9 | 13.7 | 6.5 | 8.5 | 2.9 | 2.8 | 2.8 | 0.4 | 100 |
| Coast | 1.0 | 0.4 | 28.1 | 19.9 | 19.9 | 7.8 | 10.8 | 4.1 | 3.8 | 3.1 | 1.1 | 100 |
| Eastern | 1.1 | 4.8 | 19.0 | 20.9 | 23.3 | 9.8 | 10.0 | 4.7 | 4.2 | 2.3 | 0.2 | 100 |
| Nyanza | 1.1 | 0.9 | 28.5 | 22.2 | 16.3 | 8.9 | 10.4 | 4.2 | 4.1 | 3.1 | 0.4 | 100 |
| Rift Valley | 1.2 | 2.4 | 33.9 | 21.6 | 14.4 | 7.1 | 8.8 | 4.1 | 3.6 | 2.3 | 0.6 | 100 |
| Western | 4.2 | 0.7 | 27.3 | 21.0 | 12.7 | 7.1 | 11.0 | 6.0 | 5.3 | 4.1 | 0.5 | 100 |

Source: Statistical Abstract, 1978.

TABLE 2.3: NAIROBI HOUSEHOLD INCOME DISTRIBUTION,1977:

| | |
|---|---|
| 0 - 20% | Shs. 0 - 550 |
| 21 - 40% | 551 - 1050 |
| 41 - 60% | 1051 - 2000 |
| 61 - 80% | 2001 - 4000 |
| 81 - 100% | over 4000 |

Source: Second Urban Project Appraisal Report

is quite valid provided that adequate data on income distribution are collected and presented to housing planners on a regular basis. For the purpose of this study we feel that emphasis should be placed on dwellings and structures meant to accommodate households within the 10% - 60% income distribution range.

SHELTER COSTS AND GRAIN PRICES:

1.4.1 In an effort to find a more stable measure of shelter costs we collected and analysed data on 93 public housing projects built in various parts of the country between 1965 and 1976. The cost per person was calculated on the basis of 2.5 persons per room, and the resulting figure was then related to the producer price of maize at the time of project completion. Maize was selected as a yardstick because of its importance as the staple food for the majority of Kenya's population. The cost of housing one person in terms of grain equivalent i.e. the number of maize bags that will buy enough shelter for one person, was fairly stable at about 50 bags until the major price increases in 1972 when the figure shot up to 90 and has remained roughly at that level till now (Figure 2.1). It is interesting to note that the mean cost per room

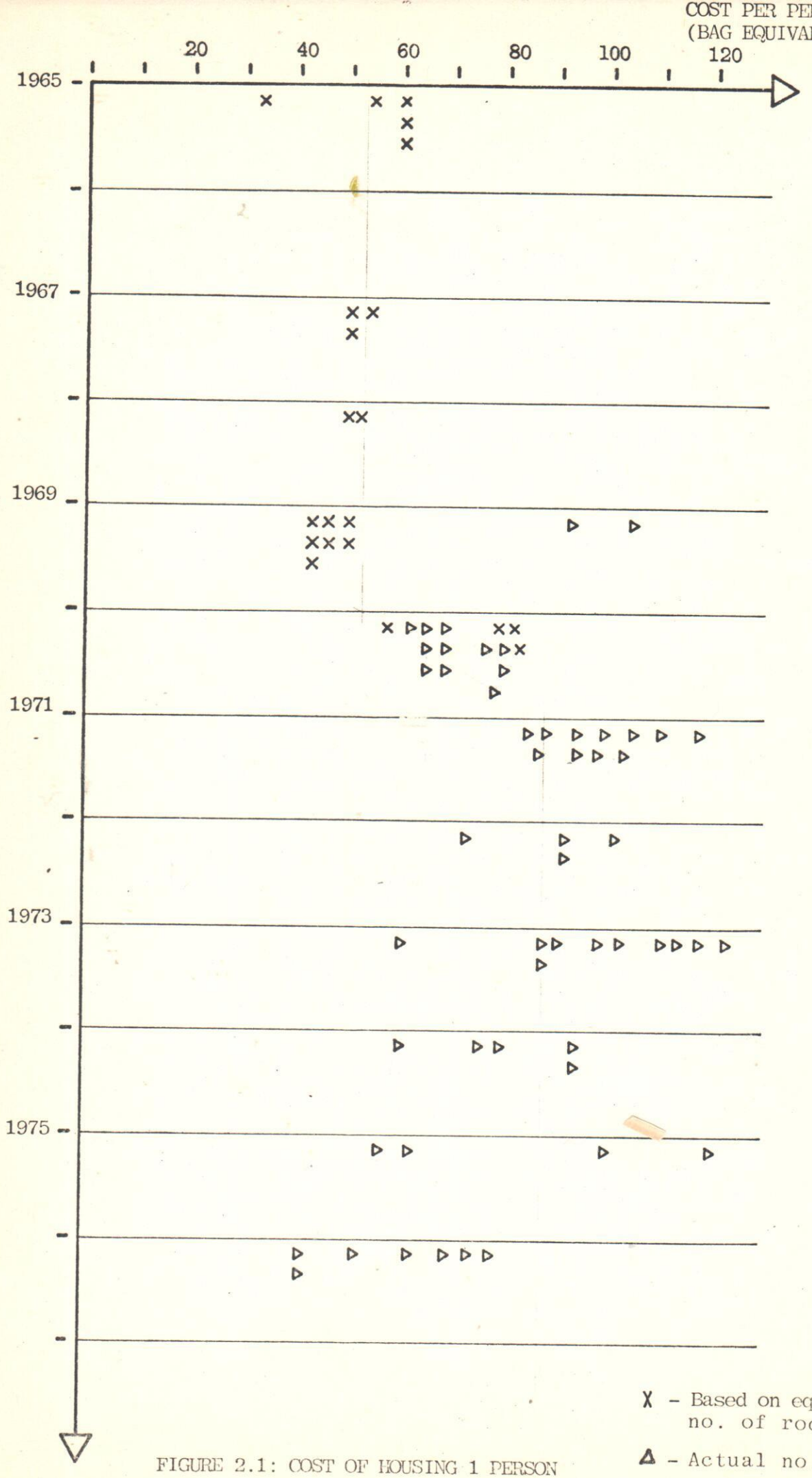


FIGURE 2.1: COST OF HOUSING 1 PERSON IN MAIZE BAG EQUIVALENT (MEE)

in public low-cost projects has risen from £100 in 1965 to £230 in 1976. 1/

1.4.2 The above method can supplement the rule-of-thumb techniques already in use e.g. the proportion of household income to be devoted to housing expenditure (25-33%) and the number of years' income that can build or buy a house (3-5).

CONCLUSIONS:

1.5.1 It is worth-while viewing the concept of affordability in a much broader and more dynamic context than hitherto. Relating housing programmes to cost limits, though useful in the short-term has its limitations, especially in an atmosphere of rapidly changing cost levels. In the long-term approaches based on household income distribution, and on the valuation of development costs in real terms, would seem to offer the least hazardous option. And whereas identifying the target group is fairly easy, ensuring the delivery of services to the intended group exclusively is impossible. It must be accepted that a proportion of the allottees or beneficiaries will come from wealthier sections of the community.

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1/ For lack of space the raw statistics and computations are not included in this paper but are available from the Consultants as a separate Annex.

CHAPTER 3

FIRE HAZARDS:

> . . On 3.11.78 at 2138 hours, a call was received from Mr.... to a house on fire at Kibera Drive - Olympic Village. On the arrival of the fire brigade it was found that a single mud room measuring approximately 12' x 12'was on fire. Two children were burnt to death; the third child had serious burns and was taken to Kenyatta Hospital in a 999 police car. The whole house was gutted. Fire loss approximately £800.
>
> On 4.9.78, at 1233 hours, a call was received from Mr... to shanties on fire at Mathare Valley. On the arrival of the fire brigade it was found that a range of shanties constructed with corrugated iron sheets, hardboard and some with paper cartons were on fire. About 35 shanties and their contents were destroyed by fire. Fire loss approximately £5250. 1/

3.1.2 Minimising fire hazard is one of the prime objectives of building control. The building code goes to great lengths to specify the minimum requirements. Byelaws 71-76 relate exclusively to fire resistance in small houses. In this chapter we shall examine the pattern in which fire has occured in urban areas in recent years and the extent to which additional measures may assist in fire prevention and control. Attention will be focused upon the large towns especially Nairobi, Mombasa and, to a limited extent, Thika, because of the availability of fire statistics. Fire services do exist in some small towns, but they all depend upon Nairobi for the training of firemen, except for Mombasa which has its own training programme. In fact a new Training School has been proposed by the City Fire Officer who is already training men from other African countries as well as fire officers from the private sector.

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1/ City Engineers Annual Report for 1978. Nairobi City Council, July 1979. p. 45

Fire Departments or Sections now exist in the following municipalities:-

- Nairobi
- Mombasa
- Thika
- Nakuru
- Eldoreti
- Kitale
- Nyeri
- Nanyuki (now covered by KAF)

3.2 FIRE CALLS:

3.2.1. An analysis has been carried out by the Study Team of all the reported fires in Nairobi for the three year period 1976 - 1978 for the purpose of ascertaining the location, cause and damage resulting from each fire. There is no consistent pattern from year to year as far the causes are concerned (Figure 3.1) but taking the three-year period as a whole the causes are unknown for about a third of the reported cases. The peak demand for fire services to residential buildings is in the dry hot season, that is December - February (Figure 3.2), although August does show a minor isolated peak possibly because of the more wide spread use of space heating during this cold month. The following list shows the rank order of recorded sources during the survey period:

1. Unknown/other
2. Doubtful - police to investigate
3. Electrical short-circuits in buildings
4. Paraffin, wax candle, lighted cigarette or electric motor in touch with clothes, cushions, bedding e.t.c
5. Hot charcoal burner
6. Escaping gas from gas cooker
7. Oil overflow in contact with a hot object
8. Family quarrel.

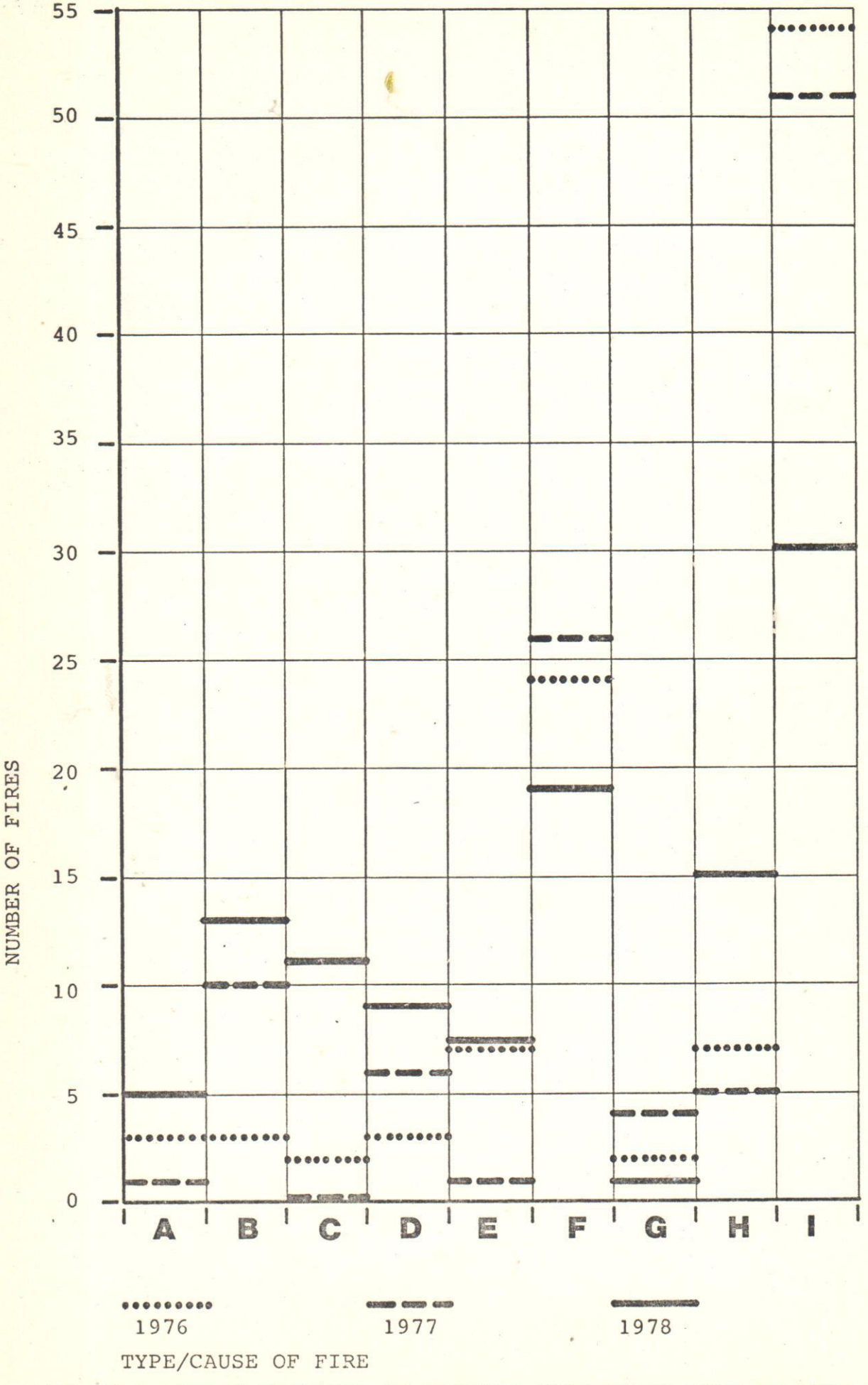


FIG. 3.1. FIRES REPORTED IN NAIROBI 1976-78 BY TYPE OF FIRE

KEY:

A. Oil overflow in contact with a hot object, getting ignited.

B. Short circuits in wiring in buildings.

C. Escaping gas from gas cooker

D. Lighted candle, cigarette or electric motor in touch with clothes/bedding/cushions.

E. Hot charcoal burner igniting a combustible material

F. Unknown

G. Family quarrel

H. Police investigation/doubtful

I. Other

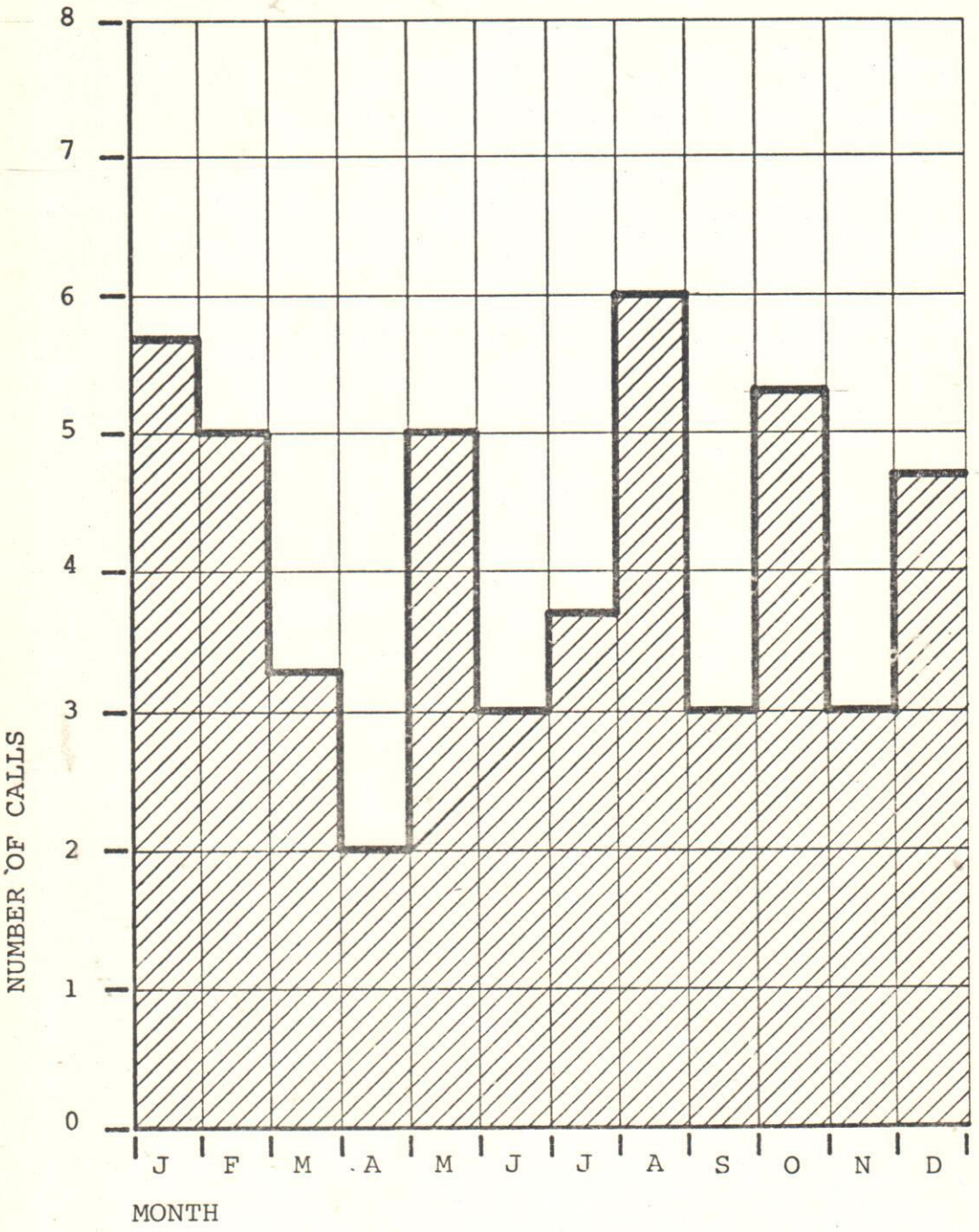


FIG. 3.2. REPORTED RESIDENTIAL FIRES IN NAIROBI 1976-78 (MONTHLY MEAN)

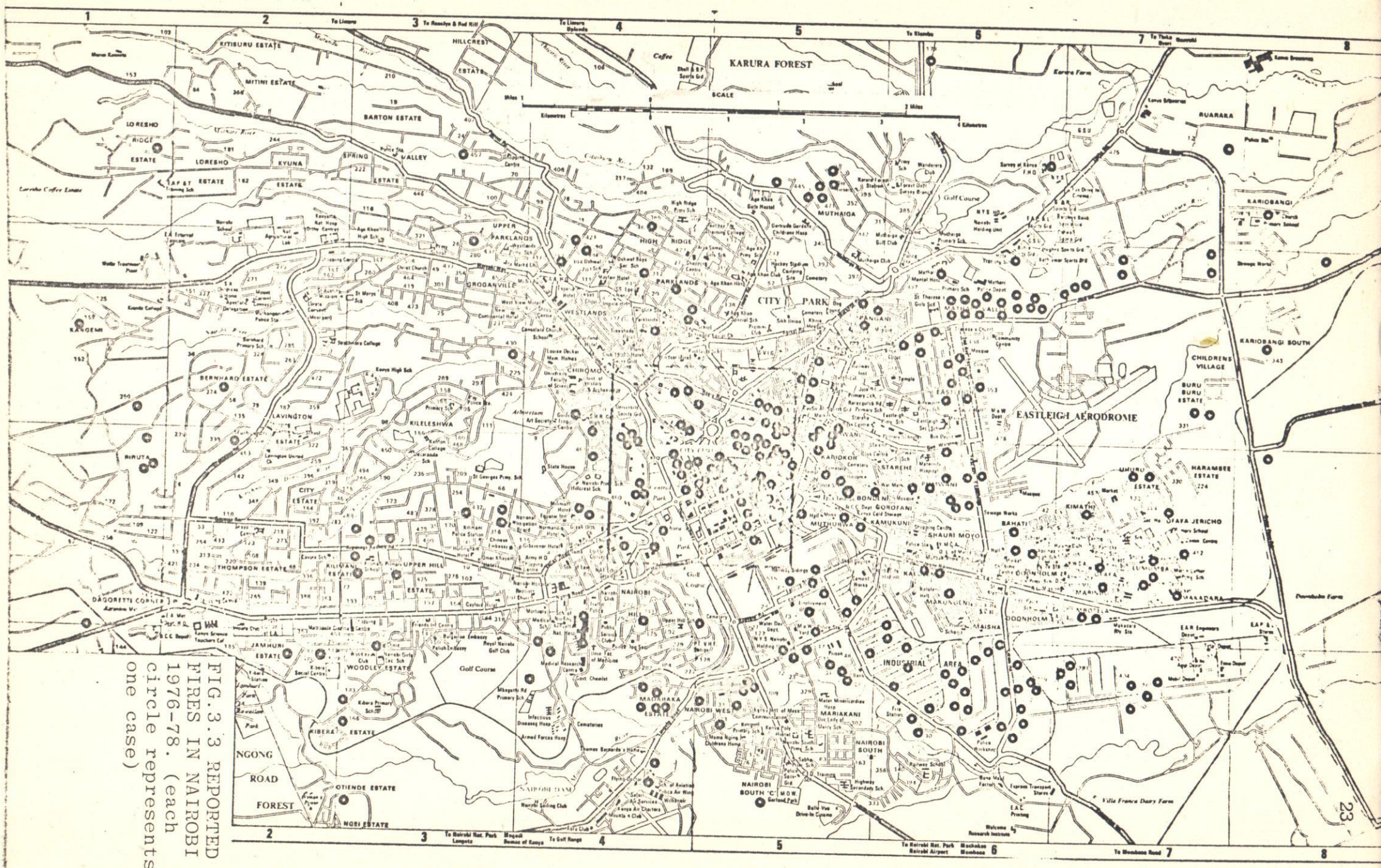


FIG. 3.3 REPORTED FIRES IN NAIROBI 1976-78. (each circle represents one case)

3.2.2. The above list catagorises the various causes, but in reality they vary extensively in their nature. Some are relatively innocuous, such as rubbish in a dustbin; some are minor but well known to be dangerous, such as a cigarette butt left in a lift in an office block in Tom Mboya Street in May 1978; many originate from industrial processes such as coffee roasting, spray painting, boilers, laboratories As an example let us examine the source of fires and the damage done in a single month, February 1977 (Table 3.1). The whole period makes interesting reading, but we cannot include the complete list report for lack of space.

3.2.3. The incidence of fires in Nairobi shows three areas of concentration, that is:-

- the City centre, mainly in the area between Moi Avenue and the Nairobi River, where there is a large concentration of fish and chips shops, inexpensive eating places and car repair workshops.
- Eastleigh and Mathare Valley, the latter being a squatter colony with a history of regular fire outbreaks.
- the Industrial Area; the importance of this area is reflected by the presence of a branch fire station, the only one in Nairobi.

3.2.4. The above pattern emerges clearly from Figure 3.3., which also shows a higher concentration of fires in the eastern part of the City than in the western. While this phenomenon might be purely coincidental, it could also be associated with higher densities, a larger concentration of industrial activities, inferior building specifications and drier climate in this part of the City.

TABLE 3.1

FIRES REPORTED IN NAIROBI IN FEBRUARY 1977

| Address | Type of Property | loss £ | Source |
|---|---|---|---|
| Luthuli Ave | Fish & Chips Shop | 750 | Kitchen |
| Utalii College | Hotel | - | Bedroom-discarded cigarette |
| Car & General | Commercial | - | Electrical fault-printer |
| Argwings Kodhek | Depot | - | Watchman's shanty |
| Kariobangi | Market | 74 | Stall |
| St.Austins Rd. | Dwelling house | - | Dry grass |
| | Office | 100 | Lift-motor room |
| Parklands | Temple | 50 | Candle - ignited curtains |
| Mathare Valley | Shanties | 400 | Open fire spread from one room to several |
| Naivasha Rd. | Dwelling | 50 | Cable |
| Kimathi St. | Clothes Shop | 1500 | Clothes, etc. |
| Tom Mboya | Hotel | 25 | Cooking oil; spread to roof. |

Source: Chief Fire Officer's Records.

3.2.5. In Mombasa the summary of calls received by the Fire and Ambulance Services from 1973 to 1978 is shown in Table 3.2. Again the peak demand is in December - March. Figure 3.4 shows the monthly average number of calls for 1976 - 1978. By far the greatest source during the dry season is burning vegatation and refuse, although the damage caused by these fires is quite small. The number of fire calls in Mombasa has been remarkably stable over the six-year period studied, even though the town's population will have increased by half as much as again.

3.2.6 Grass and vegatation are also the focus of the fire 'services' attention at Thika (Table 3.3) where household fires are surprisingly few. It must also be remembered that some of the calls are for fires occuring outside the township, since the town has to serve the surrounding rural areas. The Town Engineer reports that on 23rd March 1976 his men and sole fire tender spent six hours putting out a fire at a factory in Thika and on the same day two other calls were received, one from the Market and the other from Makuyu; a child was severely burnt at the Market and died later in hospital.2/

## 3.3. FIRE LOSSES

3.3.1 The loss of life and limb is immeasurable in economic terms. In 1978 there were 8 fatal casualities, 43 non-fatal casualties and 3 cases of injured firemen in Nairobi. The fire force rescued 109 persons from burning buildings and motor vehicles. The financial loss during the

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2/ Municipal Council of Thika Annual Report for the year 1976.

TABLE 3.2:

SUMMARY OF CALLS: MOMBASA FIRE AND AMBULANCE SERVICES 1973 - 1978

| | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 |
|---|---|---|---|---|---|---|
| Fire calls | 245 | 308 | 238 | 212 | 219 | 237 |
| Special Service | 184 | 192 | 210 | 239 | 232 | 280 |
| False Alarm | 31 | 49 | 51 | 39 | 36 | 45 |
| Ambulance | 10083 | 9353 | 9406 | 9176 | 8266 | 9717 |
| TOTAL | 10543 | 9902 | 9905 | 9666 | 8753 | 10279 |

TABLE 3.3

THIKA FIRE SERVICE: ANALYSIS OF CALLS 1970 - 1978

| Year | Factory & Household | Grass & Vegitation | Motor Vehicles | Electrical | Special | Total | Damage £ |
|---|---|---|---|---|---|---|---|
| 1970 | 1 | 19 | - | - | - | 20 | na |
| 1971 | 3 | 40 | 1 | - | - | 44 | na |
| 1972 | 3 | 19 | 3 | - | 21 | 46 | na |
| 1973 | 3 | 31 | 3 | - | 24 | 61 | 6000 |
| 1974 | 4 | 41 | 2 | - | 41 | 88 | 50330 |
| 1975 | 4 | 53 | 3 | 2 | 37 | 99 | 1125 |
| 1976 | 2 | 66 | 1 | 1 | 106 | 176 | 10020 |
| 1977 | 1 | 22 | 7 | 1 | 36 | 67 | 3090 |
| 1978 | 3 | 31 | - | - | 47 | 71 | 20000 |

year was £216000. In Mombasa the loss during the year was £189000. Both in Nairobi and Mombasa 1978 was a good year compared to 1977. Table 3.4 and Figure 3.5 show the monthly fire losses in Mombasa from 1974 to 1978. There does not seem to be any direct relationship between the figures of fire losses recorded by the two major fire departments and insurance claims. The latter figures are much higher (Table 3.5) since they include all fires, whether urban or rural, and also a large element of industrial and commercial fires where claims could include loss of production, rent of alternative premises and other contigencies.

## 3.4 RESIDENTIAL FIRES

3.4.1 Although domestic fires may account for a significant proportion of total calls in any particular town the amount of financial damage done is relatively small (Table 3.6). The amount of fire loss in Mombasa by type of asset during the period 1976 - 1978 is shown in Table 3.7; it seems that 1977 was a particularly bad year because of the fire at the oil refinery (Figure 3.6).

3.4.2 In residential premises the main source of fire is the cooking appliance. The City Fire Officer feels that designers and housing administrators should pay more attention to the design of safe cooking appliances and methods and to the education of the low-income households in the use of different types of stoves and fuels. 3/
The charcoal burner is not now as popular as it used to be because of the mess it causes; storage problems; the need to cook outside caused by the fumes, which is difficult when it rains; and the rising cost of charcoal. Nonetheless it is still widely used among the urban poor. Paraffin stoves are preferred because they are cleaner, with the wick-type being safer than the pressure stove but less efficient. The gas cooker is more common among the richer households. With all these methods there are hazards involved. The City Fire Officer

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3/ Personal interview

Table 3.4:

Fire Losses in (Kshs) 1974-1978 (MOMBASA)

| | 1974 | 1975 | 1976 | 1977 | 1978 |
|---|---|---|---|---|---|
| January | 392,320 | 709,280 | 9,530 | 3,950 | 145,705 |
| February | 15,500 | 14,465 | 26,000 | 107,425 | 59,783 |
| March | 17,990 | 36,877 | 68,551 | 106,300 | 2,886,580 |
| April | 16,490 | 12,850 | 14,200 | 108,950 | 418,125 |
| May | 123,500 | 21,300 | 6,050 | 51,550 | 20,065 |
| June | 1,256,555 | 36,800 | 45,700 | 19,615 | 8,390 |
| July | 2,020 | 570 | 1,170 | 10,544 | 20,800 |
| August | 56,420 | 31,695 | 96,620 | 42,050 | 83,660 |
| September | 92,015 | 17,045 | 27,850 | 7,839 | 17,834 |
| October | 42,520 | 31,290 | 9,000 | 110,286 | 64,650 |
| November | 12,765 | 34,250 | 10,385 | 132,980 | 37,178 |
| December | 217,500 | 4,223,839 | 99,005 | 5,324,280 | 24,500 |
| | 2,245,695 | 5,170,261 | 408,061 | 6,025,570 | 2,787,270 |

TABLE 3.5

FIRE CLAIMS IN KENYA 1972 - 1975 (K£'000)

| | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 |
|---|---|---|---|---|---|---|
| Gross Claims | 599 | 547 | 659 | 721 | 2956 | 1650 |
| Less Reinsurance | 160 | 145 | 164 | 154 | 855 | 466 |
| Net Claims | 439 | 402 | 495 | 567 | 2101 | 1184 |

Source: Statistical Abstract 1978, p. 197

TABLE 3.6

RESIDENTIAL FIRES AS PROPORTION OF TOTAL CALLS AND LOSSES IN MOMBASA 1976 - 1978*

| | Calls % | Loss % |
|---|---|---|
| 1976 | 39 | 18 |
| 1977 | 40 | 4 |
| 1978 | 35 | 3 |

* Excluding bush and rubbish fires

TABLE 3.7

BREAKDOWN OF FIRE LOSSES (K.SHS) FOR THE YEAR 1976, 1977, 1978

| Type of Premises | 1976 | 1977 | 1978 |
|---|---|---|---|
| Residential premises | 72,140 | 265,810 | 107,035 |
| Commercial premises | 112,411 | 231,940 | 40,660 |
| Workshops | 12,500 | 7,000 | 117,500 |
| Factories | 60,000 | 118,650 | 469,242 |
| Vehicles | 136,450 | 239,850 | 107,600 |
| Electrical appliances | 4,450 | 11,980 | |
| Refinery | 5,000 | 5,120,000 | |
| Locomotive engines | 2,530 | 5,294 | |
| Chemicals/Tar boiler | 1,200 | 39,836 | 1,653 |
| Fruit/Tea Kiosks | 500 | 2,200 | 2,400 |
| Warehouses & Godowns | | | 3,000,000 |
| Schools/Hotels | | | 116,805 |
| Others | 500 | 1,009 | 3,975 |
| TOTAL | 408,061 | 6,025,570 | 3,787,270 |

Source: Municipal Council of Mombasa Annual Report for the year 1978


FIG. 3.4 REPORTED BUILDING FIRES IN MOMBASA (1976-78 MONTHLY MEAN)

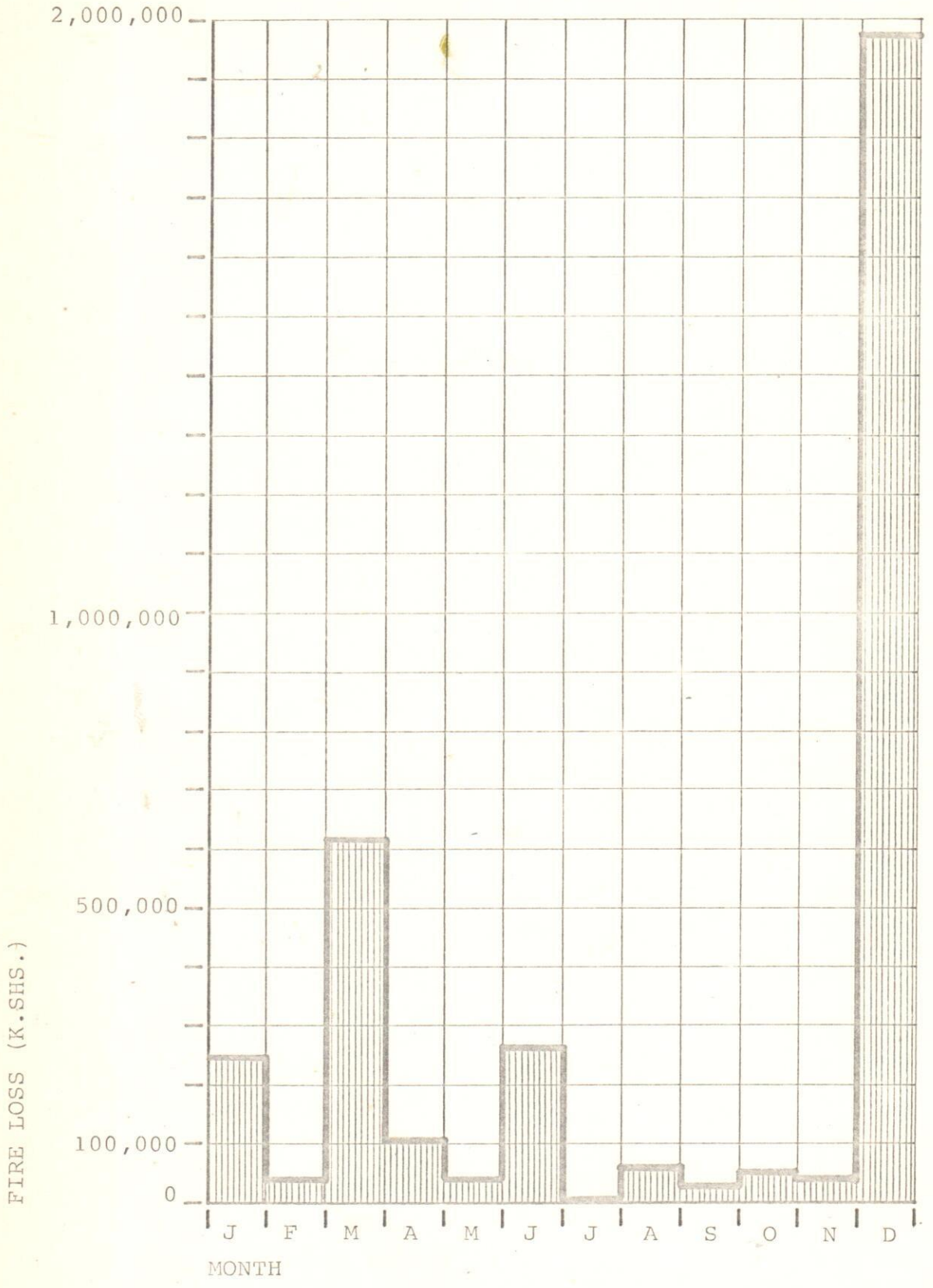


FIG. 3.5 MONTHLY FIRE LOSS IN MOMBASA, 1974-78

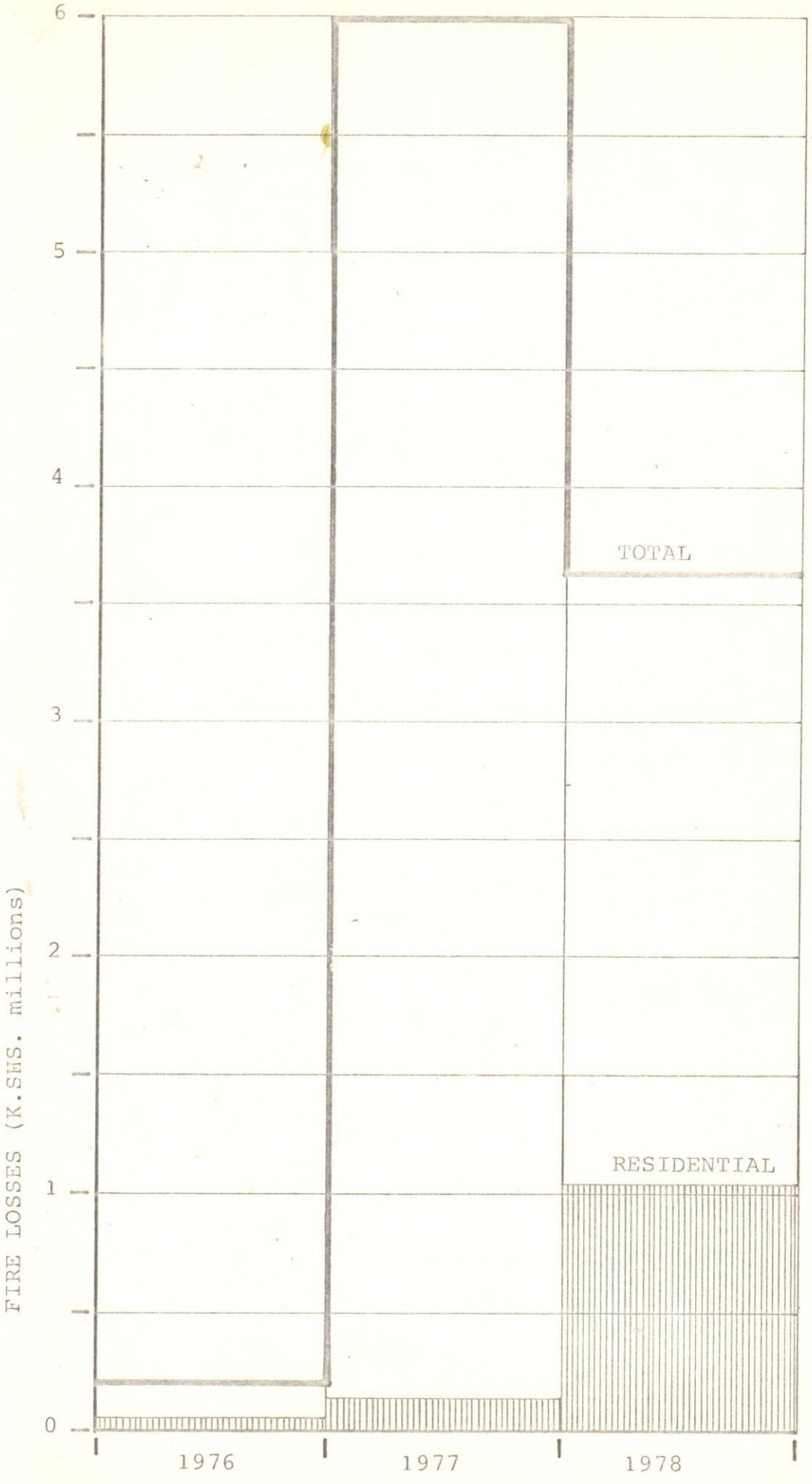


FIG. 3.6 RESIDENTIAL AND TOTAL FIRE LOSSES IN MOMBASA, 1976-78

notes the following common causes of domestic fires:-

- improper use of the kerosene pressure stove by putting in too much pressure or misusing the cleaning pin.
- "sufuria" (metal cooking pot) left to burn dry.
- undetected gas leaks causing explosions; people without the sense of smell should not use gas.
- burst gas cylinder: gas cylinders must be kept outside
- wood fire left to smoulder and not properly put out after use.
- inadequate electrical wiring.

3.4.3 Although electricians are licensed, many wiring jobs are undertaken by unqualified people. Moreover in low-cost housing, e.g. in the USAID tenant purchase schemes, it is normal to seek savings by allowing surface wiring (i.e. laying the wires on the wall surface) and to have the minimum number of outlets. It is also the custom in workers housing where the employer pays for electricity, to provide very few or no power outlets at all so as to minimise consumption. The dangers are obvious. When exposed wiring becomes loose the occupant may try to fix it with a nail. As incomes rise the household will consume more electricity for non-lighting purposes, resulting in serious overloading of the circuit and indiscriminate use of adaptors.

## 3.5 FIRE PREVENTION AND CONTROL

3.5.1 Although the byelaws pay a great deal of attention to minimising fire hazards, local fire brigades throughout the nation are generally understaffed, ill-equipped, and badly housed. Municipal Engineers' annual reports on the fire services are almost always a catalogue of complaints and

warnings of the consequences of neglect. It is worth while quoting the City Fire Officers' Report for 1978. 4/

> As it has been pointed out in every report of the previous years, the activities in the fire prevention are mainly coming to a halt so much that inspections in some areas of the city were not done adequately .....The City is yet to be fairly fire-covered until the proposed new fire substations in the areas for their construction is done. The issue of construction of new stations and staffing them in areas such as Outer Ring/Eastlands, Dagoreti/Karen; Westlands/Kabete and Roysambu is long overdue, and only when this will be done will the suffering of the people living in such suburbs, who fall in need of ourservices, be alleviated.

3.5.2 There are only two fire stations (excluding airports, military and private facilities), one in the city centre, the other in the Industrial Area. The eastern area of the city is not provided for, in spite of a large concentration of population at high densities and living in conditions that pose a relatively higher threat to life and property; the statistics show this. The City Fire Officer requested a site and funds for a fire station at Dandora. 5/ All he wanted was a shed for a fire tender. The response was not very encouraging. This is understandable in the context of budgetary restrictions. Nonetheless planners and designers must not only allocate land for fire stations but they must also endavour

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4/ Annual Report of the City Engineer 1978 Nairobi City Council July 1979 p. 39-48

5/ Personal interview.

to present a case for the necessary funding. Since the service does not reward decision makers and funding agencies with the same social and political benefits as say primary schools or markets, it will always end up low on the list of priorities. Even the provision of fire hydrants is sometimes a problem. Questions have been asked as to whether fire hydrants should be paid for, in the case of a large project such as Umoja or Dandora, from project funds or from the City Engineer's vote. This poor state of affairs is further illustrated by the situation at Thika.

> As reported in the previous years there is an urgent need of another Fire Vehicle and Ambulance, together with some modern Fire Fighting equipment. Our town is expanding industrially and so as to cope with the fire hazards in the industries modern equipment are essential.
>
> There is also a need of a fire-station as we do not have any. Currently the Fire Brigade and Ambulance are located in the depot where there are no facilities at all. For the maintenance of morale, discipline and above all training, the Fire Brigade and Ambulance require its own substation. 6/

3.5.3 Regular inspections of the following items need to be done, although this is normally not done because of lack of transport and men:-

- factories, hotels, public buildings, etc.; in Nairobi nearly 7000 buildings have to be inspected every year and 1200 full surveys made; in practice only 72 buildings were inspected and 28 full surveys made in 1978.
- fire hydrants
- occupation certificates
- inspections of godowns and factories at the request of the owner.

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6/ Annual Report for 1976 Municipality of Thika, March 1977 p. 10.

- renewal of night-club licenses
- petrol station inspections

3.5.4 Whilst being shocked at the inadequacy of the fire service in the largest eight towns, we must also remember that many towns have no regular fire service at all, and they have to make do with ad hoc arrangements.

## 3.6 CONCLUSION AND RECOMMENDATIONS

3.6.1 Extra attention needs to be paid to the protection of low-income households and their dwellings from fire. Building byelaws should therefore endavour to allow less expensive construction with the same or higher level of protection as that which now exists. The quality of the fire service also needs to be improved. We therefore RECOMMEND as follows:

- improve the design of cooking appliances and kitchens so as to minimise fire hazard
- educate low-income families in the use of gas, paraffin and other inflammable fuels.
- provide for the proper ventilation of kitchens
- design a suitable method of storing the gas cylinder outside the house without it being stolen
- review the system for financing the construction of new fire stations and hydrants.
- provide adequate cover in the low-income areas
- initiate, through the Ministry of Local Government, a nation-wide survey of local authority fire services with a view to developing proposals for improving facilities, especially equipment, transport, buildings, manpower and training.
- define the extent to which the armed forces can assist in fire control and prevention in urban areas.

CHAPTER 4

BUILDING CONTROLS AND CITY STRUCTURE

4.1 This chapter examines in greater detail the relationship between dwelling standards and the urban structure or form. We shall discuss how permitted and real building standards affect residential location and the extent to which the urban economy is reflected through contraventions of the building codes. These contraventions are important; not only because they have a significant impact upon the visual and sanitary environment, but also because they form a useful starting point from which to begin the preparation of preventative measures.

4.2 TYPES OF CONTRAVENTIONS

4.2.1 If, as it is assumed, the building codes are in large measure irrelevant to the needs of the urban poor (who constitute a large proportion of the urban population) in what way are the codes violated? Where and how do the infringements occur? Our analysis of the vast range of contraventions observed shows that one could conveniently divide them into three categories:

a) mass squatting and illegal construction
b) isolated building contraventions
c) non-building contraventions

Each type of contravention is discussed in detail below.

a) Mass squatting

4.2.2 This contravention is found in the familiar squatter colony or illegal settlement of the type seen in the larger towns, eg. Mathare Valley and Nairobi Dam in Nairobi; Nyalenda and Pandiperi in Kisumu and Chaani in Mombasa. The characteristics of these settlements have been analysed at great length in the reports for the Second Urban Project. They are situated on unclaimed land close to the employment centres, possibly outside the town boundaries. They constitute discrete communities in every sense of the word. Virtually all the structures in such a settlement are illegal.

b) Isolated building contraventions

4.2.3 Such a category includes one or more structures which do not conform to the building codes. Their main features are that they are isolated or in small groups and there is no homogeneity. The illegal structures are intermixed with authorised buildings, or the same building may be partly authorised and partly illegal. The constituents of this category are:

- isolated squatters, usually found at the periphery of an established residential area or in a discrete corner of a vacant plot in a built-up area. The occupant is normally employed on another plot close by or he serves as a caretaker of a property near his structure
- unauthorised kiosks whose owners trade in food, soft drinks, cigarettes, etc. These structures are found in the industrial area and the town centre where they serve the low-income workers. In the high-income residential areas the kiosks provide, for certain items, a more convenient and accessible alternative to the formal neighbourhood shopping centre. The kiosks need an unused piece of open space with a road frontage and, if possible, proximity to a bus stop.
- semi-rural or peri-urban squatters. These may be genuine squatters or land owners who have erected unauthorised structures to provide more accommodation for their families or for rental. Densities are low and the predominant land use is still agriculuture, although the majority of the occupants of such structures would commute to the town to work. Examples are found in Dagoretti in Nairobi, Likoni and Kisauni in Mombasa and outside the smaller towns such as Thika and Muranga.
- old buildings that were erected before the building controls were introduced and which could not be built in their present form under existing legislation. Such buildings are to be found in the older cities of Mombasa and Lamu and in areas, formerly outside the townships, but which are now within the the extended urban boundaries.

For example, in Nakuru one finds old stone-and-tile farmhouses which are now within the Municipal Boundary, but which in many ways deficient as urban dwellings. In addition national monuments and buildings of historic interest would also fall within this classification.

- approved structures with minor illegal ammendments. That is those mainly built in accordance with an approved plan, but modified during construction, or after, to suit the owners requirements; to economise on building materials or to gain extra space for rental purposes. For example, a room shown on the approved drawing as a 'store' or 'garage' may, with minor modifications, be subsequently used as a habitable room; or a smaller sceptic tank may be constructed; or a room partitioned to provide two smaller rooms.
- unauthorised extensions or conversions to existing buildings. These happen most frequently in the low/medium income areas where there is a great demand for rental accommodation by the room. As a result the addition of only additional room provides the property owner with a substantial and stable income. For example in Eastleigh in Nairobi the local authority is under considerable pressure to permit the construction of additional rooms in the courtyards of the houses and to vary the permitted ground coverage. A plot of $500m^2$ with a permitted ground coverage of 50% produces $250m^2$ of undeveloped land which the owner wishes to exploit. If he can quietly construct an extra room or two, without being discovered, he will gain an additional rent of shs. 300/- per month on an investment of shs. 10,000/-. This represents a gross return of 36%.
- temporary shelters on a building site. These are normally condoned on sites-and-services schemes on the basis that they enable the owner/builder to live on the site whilst he constructs his dwelling and, at the same time, provides him with safe storage of his building materials. On more expensive building sites such temporary shelters are used by watchmen. The role of the temporary shelter in the process of house consolidation in sites-and-services projects will be discussed in detail in Chapter 6.

c) Change of use

4.2.4 The regulation of land-use is controlled primarily by town planning legislation and the conditions incorporated in the ground lease, and only secondarily by the building code. However, these three methods of control supplement each other. Moreover a change of use(r) in a building is often accompanied by structural or internal alterations. Thus where a dwelling house is converted to a bar and lodging house alterations may be necessary to the toilet facilities, storage facilities, kitchen and car parking. In addition the approval of the public health inspector is also required. Such a change of use is very popular along the main thoroughfares in the lower and middle income residential areas. The drinking 'clubs' found in the smaller rural centres are also, in many cases, conversions. The concern of development control is not only to ensure public safety, but to protect the neighbours from nuissance and noise.

4.2.5 Changing the intensity of development is a constant desire, particularly in or close to the centres of towns where land values are higher. As a result houses are converted into flats, whether legally or otherwise. This form of contravention is relatively easy to do and difficult to detect.

Subdivisions

4.2.6 Illegal subdivisions usually occur in the crowded rural-urban fringe where the pressure of population growth has forced former large farms to accommodate a number of families - each demanding its own homestead or shamba. This phenomenom is common in the Rift Valley and especially around Nakuru Town.1/ A number of farms have been bought by companies and co-operatives with thousands of members. With so many families settling on a farm de facto subdivision is inevitable, although in law the farm is one unit and its

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1/C.S.Keriasek, TRENDS IN AGRICULTURAL LAND VALUES IN THE RIFT VALLEY PROVINCE. Unpublished M.A. Thesis, Dept. of Land Development, University of Nairobi, 1979

subdivision must be approved by the Land Control Board under the Land Control Act 1967. Nonetheless transactions do take place and individual sub-plots, or shares, change hands freely As a result agricultural prouctivity suffers. But this is more than just a rural problem since many of these areas will be future up-grading areas unless strict control is now exercised over the pace and pattern of settlement.

4.2.7 In the towns unauthorised subdivisions are fewer since the landowner is unable to sell or let undeveloped land which has not been properly surveyed and registered. Such subdivisions could only happen in the coastal towns (i.e. Mombasa and Lamu) where landowners have traditionally allowed Swahili houses to be built on the understanding that the builder will pay a monthly ground rent indefinitely whilst the land remains in its original ownership. This is a recognised system and is not strictly subdivision.

4.2.8 Overcrowding is a contravention that is almost impossible to control although it is embodied in the Public Health legislation. It is an integral part of the urban economy. Numerous studies have established the connection between low incomes, poor housing and high rates of room occupancy.2/ The vicious circle of low incomes, large households, poor dwelling conditions, high densities, lack of social facilities and deprived neighbourhoods is difficult to break and is beyond the scope of this study. Nonetheless, it is necessary to appreciate that, in so far as building control can contribute towards improving the overall quality of housing, it can be instrumental in breaking the vicious circle - especially in the context of sanitation and community health. In such conditions the application of the building codes is guided by political and moral values rather than by the law. Their contravention, however, is motivated largely, if not solely,

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2/ Waweru & Associates, Reports for the Second Urban Project especially REPORT NO.5: SOCIO-ECONOMIC ASPECTS, also CHEMILIL DEVELOPMENT PLAN, VOL.1 - Saad Yahya & Associates

by economics.

4.2.9 The range of contraventions previously discussed are shown schematically in Figure 4.1. The examples given are merely illustrative and no attempt has been made, because of practical limitations, to assemble quantative data although this could be done on the basis of the model shown. Such data would show not only a great deal of overlapping (as shown in the diagram), but also some transformation in the nature and size of the contraventions as the town expands.

## 4.3 THE RELEVANCE OF TOWN SIZE

4.3.1 Kenya towns vary in size as discussed in Chapter 1. They also vary in their capacity to perceive and tackle problems. For the purpose of building control town size - as measured mainly in terms of population but also in the context of physical size - is important for the following reasons:-

4.3.2 Standards need to be more complex in bigger towns. In large towns dwelling and environmental standards are not only more necessary or relevant but they also need to be more complex to match the wide diversity of physical and user circumstances. The sheer size and densities of the residential areas magnify the health hazards and the fire risk. Thus there is not merely the greater potential for catastrophies but also the heightened awareness of the authorities. A cholera epidemic in Nairobi is a much more serious affair than one in, say, Kakamega. However the capacity to enforce standards and avert disasters is not necessarily greater in the larger cities.

4.3.3 The capacity to enforce dwelling standards is highest in the medium sized cities: The arguement is illustrated in Figure 4.2. The small towns have neither the manpower nor the resources to enforce legal standards. It is quite common to find one building inspector or survey assistant in charge of building control for a whole district. The largest towns however like Nairobi, Mombasa and Kisumu, though relatively

KEY
1. Large squatter settlements (e.g. Mathare)
2. Peri-urban settlements
3. Agricultural subdivisions outside towns
4. Conversion of dwelling to bar/lodging house; erecting a kiosk
5. Change of dwelling to shop etc. without structural alterations
6. Extensions of dwelling or other building
7. Unauthorised outbuildings

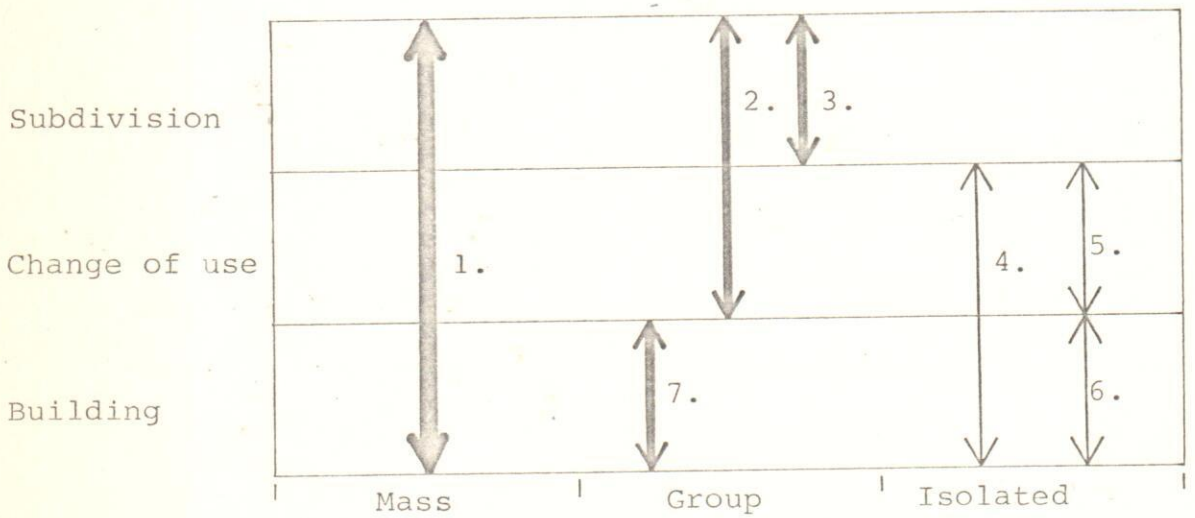


FIG. 4.1 VARIETIES OF CONTRAVENTIONS

well endowed in terms of manpower, lack the political muscle to demolish shanties and other unauthorised structures or to prosecute offenders.

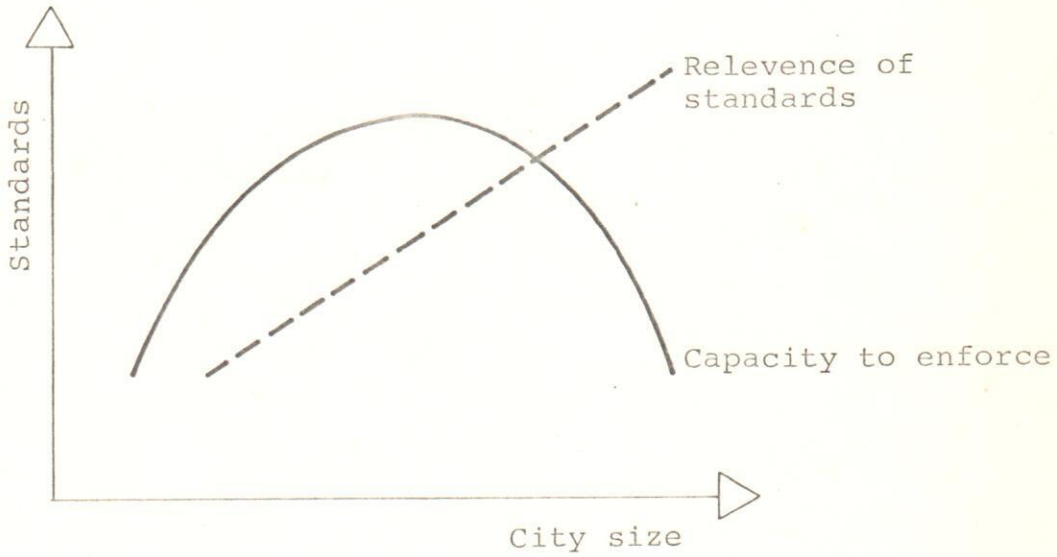


FIG. 4.2 CITY SIZE AND THE RELEVENCE AND ENFORCEMENT OF STANDARDS

4.3.4 The bigger the city, the more influential is the squatter lobby. The importance of Mathare Valley in city and national politics need not be stressed. In Mombasa the owners of 'temporary' houses on the Island and West Mainland have traditionally influenced any major urban development decisions. For instance the extension of Mombasa Airport in the early 1970's met a great deal of local opposition, while repeated efforts by a succession of Mayors to redevelop Majengo have met with little success.

4.3.5 Illegal settlements in the larger towns are more visible than in smaller. We are talking here not of visual impact but of consipicuousness among experts and officials. Substandard structures and conditions in the larger towns enjoy thorough scientific enquiry and better documentation. A case in point is the Urban Projects Series in Kenya which started with Nairobi and is now moving down the scale to the smaller settlements. Physical, economic and social

conditions in Nairobi have been better documented than those in the smaller towns.

4.3.6 The smaller the town the more difficult it is to assess the effective housing demand hence the desirable quality package. Housing designers and official suppliers are more likely to make mistakes and misread market preferences in the small towns than in the large. The market is not only limited in size, but it has unique local characteristics that are difficult to identify without a thorough pre-investment study and market analysis at the local level. There are numerous examples of well - intentioned tenant purchase and mortgage schemes built in the smaller centres which had to stay vacant for a long time because there were no eligible applicants. For instance the NHC houses at Mukueni remained vacant for over two years while the USAID/NHC scheme at Malindi failed to attract applicants and the houses had to be turned into a rental estate. Local people could find more spacious houses elsewhere in the town at the same price or even less.

4.3.7 Fire fighting services in the smaller towns are poor or non-existent. Only the four or five biggest towns in Kenya have a proper fire department. Therefore the capacity of the other local authorities to cope with a major fire is very limited and the standard infrastructure design practices regarding fire hydrants and access for the fire tender are irrelevant for most of the country. Infact standpipes and sand buckets may be more relevant in some situations.

4.3.8 It is easier for the bigger towns to attract finance and technical expertise for squatter upgrading. This point is related to what we have already written about visibility. Because of their manpower deficiencies, budgetary deficits, remoteness from core decision-making areas, low status in the local government heirarchy and lack of skills in project preparation, the smaller towns are immensely disadvantaged. This situation ought to be viewed in the context of the fact that upgrading projects are much more difficult to execute

than sites and services. It is natural that such towns should rely on the Ministry of Housing and the NHC for policy guidance and technical assistance, which raises other questions in the institutions area.

4.3.9 Intra-city variations in dwelling standards are more accentuated in the larger towns than in the smaller. Not only do standards vary, but the degree of variation is related to town size. The most expensive houses costing well over shs. 2 million each are built for occupation by top business executives, professionals and diplomats. The majority of these people are found in Nairobi and, to a limited extent, in Mombasa. At the lower end of the scale the most abject dwellings are erected in conditions of acute scarcity of land, materials and water. These too are conditions more likely to be found in Nairobi. Therefore, the minimum acceptable standards for the rest of the country may well be too high for Nairobi! Special standards may be needed for Nairobi (Figure 4.3) or certain parts thereof. In fact the city has traditionally used its own byelaws, which are legally different from the national building code but in substance more or less the same. These differences in housing standards or quality also apply to infrastructure where it is found that certain parts of Nairobi, Mombasa and Kisumu exhibit the worst kind of sanitation problems. The concept of special areas does not violate the overall principle of a uniform code.

4.3.10 What is the relevance of the above propositions? If anything they show that whereas a nationwide code may be administratively desirable and expedient, the performance and impacts may vary according to town size and there may even be cases where local circumstances warrant a local variation to the code. Some of these issues will come out more clearly in the discussion paper on political and administrative aspects.

KEY
1. Existing legal standards
2. Revised national standards
3. Exceptions

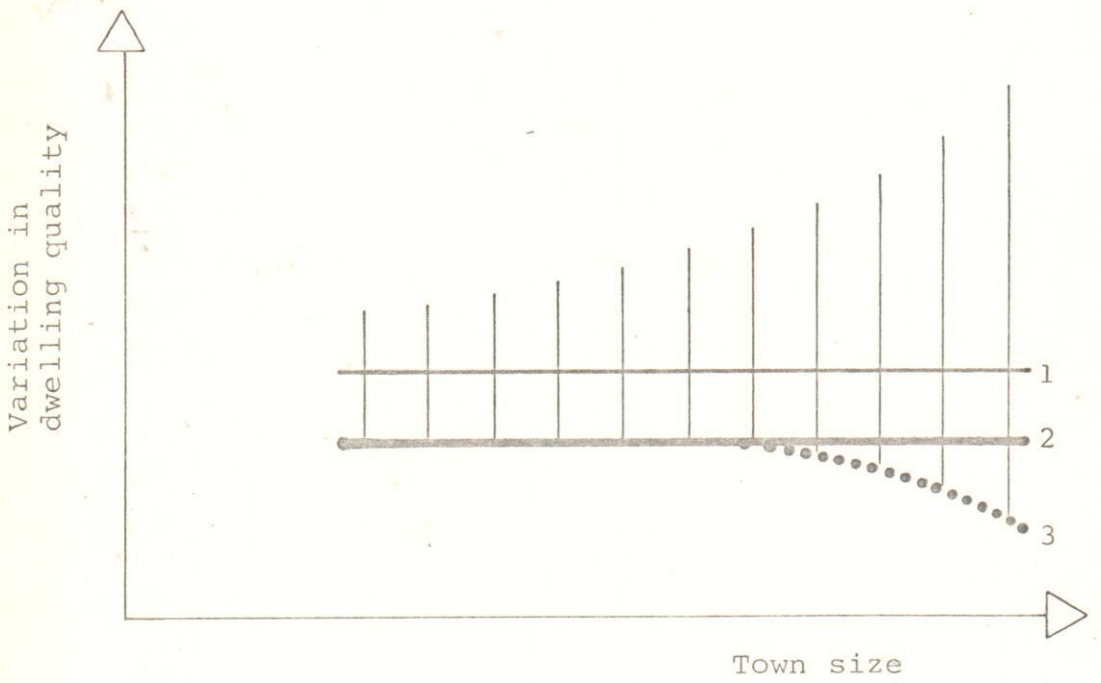


FIG. 4.3 TOWN SIZE AND VARIATIONS IN DWELLING QUALITY

## 4.4. BUILDING CONTROL AND LAND USE PATTERNS

4.4.1 The control of land use in urban areas is essentially a town planning matter. It is also a land management issue in that the Commissioner of Lands as ground lessor is empowered to regulate land use. This clear demarcation of regulatory domains has militated against a more liberal mixing of land uses in residential areas. An intermixing of functions would have several economic advantages, including:-

- creating new employment opportunities in the residential areas at minimal cost per job. A recent survey of small businesses in Dandora has shown a large incidence of small business enterprises. 3/
- reducing the demand for travel to and from distant centres of employment. Urban public transport services are already over-stretched while roads are congested at peak periods.
- bringing some essential services to residents, which would otherwise have to be surplus in other parts of the town. A doctor's surgery, lawyer's office or private nursery school will all be more economical to run if they are among the houses rather than in a separate neighbourhood centre.
- making fresh vegetables, fruits, eggs, and other necessities available through kiosks, street vendors and corner shops.
- making residential areas more heterogeneous, active and lively, the increased outdoor activity helping to improve neighbourhood security, especially in the evenings.
- creating a richer environment for children to grow up in especially in the context of being exposed to a wider range of experiences.

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3/See MEDIS Report No. 7.

4.4.2 There are, of course, are qualifications to be made. We are discussing here low income residential areas. So the traditional argument about adversely affecting the value of adjoining properties does not apply. A shop front enhances rather than depreciates the value of a house. What must be avoided are the obvious nuisances and noisy activities e.g. a manufacturing plant in the middle of a residential area. Thus, far from advocating unplanned development, we are pleading the case for a more flexible approach towards land use planning and land use segregation. There is a strong case for extending the building control machinery to overlap with land use control since the central criterion is the use to which the building is put within the context of an overall general land use.

## 4.5. CONCLUSIONS

4.5.1 This Chapter has been more analytical than prescriptive. It has shown that the motives for contravening the byelaws or rather the reasons for non-compliance with them, are mainly economic. Various types of contraventions tend to appear in different parts of the town and a better understanding of this process can assist the authorities to take the necessary preventive measures.

4.5.2 The capacity of local authorities to administer and enforce building control is largely influenced by the size of the town, with the larger towns showing strong advantages over the smaller, although size does have its own peculiar handicap. In designing a national code, it is important that allowance is made for a wide variation in township size.

4.5.3 Finally the natural tendency towards land use mixing should not be resisted in appropriate circumstances. Small business enterprises in low income residential areas have a great potential for promoting employment, raising household incomes and enhancing community life.

# CHAPTER 5

## DWELLING STANDARDS AND HOUSING FINANCE

5.1 Two kinds of changes in the building control system are relevant to the manner in which dwellings are financed. The first is connected with changes in the technical specifications mainly for the building but also for the infrastructure. The other is the efficiency and speed with which development applications are processed and approved. In both cases minor changes would have important economic implications.

5.2 Where there is a cost-saving change in the specification of a building e.g. in wall thicknesses or in the quality of finishes, the reaction of the lender will be to re-examine the durability and marketability of the asset being offered as security for the loan. The more ephemeral the asset the greater the risk he has to bear. The mortgagee has traditionally been largely influenced by the following considerations in deciding whether and on what terms he should lend.

5.2.1 Permanence in all its aspects i.e the structural durability of the building itself; a reasonable long and stable title to the land; immunity from compulsory acquisition for slum clearance or some other public purpose; resistance to fire.

5.2.2 Legality, not only of the tenure but also of the building itself; thus the right document and the stamp of official approval are more important than the circumstances behind the granting of the title or approval; official documents and expert opinion are seldom questioned by the lender.

5.2.3 Marketability and value maintenance; that is specification changes are tolerable as long as they do not affect the saleability of property. There is thus more scope for "invisible" cost-saving devices than for those that affect the appearance of the property hence its attractiveness to potential purchasers. For example economies in the drainage system, floor thicknesses or timber framing in the roof would be more acceptable than reductions in say room sizes or plot sizes. The maintenance or enhancement of value on a long-term basis is also important.

5.2.4 The income-producing capacity of the borrower (mortgagor) as well as of the subject property. As far as the borrower is concerned changes in standards in the forms of a lower specification will bring into the mortgage market a new type of borrower who is interested in borrowing fairly small amounts, has a low salaried or business income and is most probably less educated than other borrowers; the result is an increasing degree of risk and higher administrative costs for the lender. However, the income producing capacity of the property itself is not likely to be adversely affected by a marginal drop or variation on specification since in the local property market the percentage return is higher for a poor building than for a quality one. That is, given the same location and space standards, rents are fairly inelastic in relation to construction standards. Nonetheless a lender who operates on the low income market has to bear the additional risk imposed by rent control which applies to all private dwellings let at not more than Shs.800/= per month or Shs.1,100/= if furnished.

5.3 It is obvious therefore that the lending institutions as presently constituted place a high value on permanence, stability, predictability and capital growth. Any innovation that threatens to upset these conditions will be unwelcome, unless sufficient guarantees and assurances are given by either the borrower or the Government, or both. We will see later how that could be done.

5.4 The second type of change in the building control system i.e. the improvement in the approval machinery will be welcomed by financiers because it will facilitate the development process and improve the turnover of funds. Development finance will be more efficiently used and the developer will lose less money through idle funds - even if invested on short-term deposit - as well as rent and taxes on idle land. We have received complaints that approval of development schemes takes too long, especially for large estates of low and middle income housing. In theory it should not take longer than a month for plans to be approved, since that is the normal frequency of the appropriate committee meetings in most local authorities. The usual time taken however is much longer, since quite apart from the local council, the "planning authority" involves several other agencies e.g. the Commissioner of Lands, the Director of Physical Planning, the Director of Surveys and the utility corporations. It is only in Nairobi that there is a Town Planning Liaison Committee to deal speedly and efficiently with abnormal cases.

TABLE 5.1 : MATTERS TAKEN INTO ACCOUNT BY THE VALUER WHILE PREPARING A MORTGAGE VALUATION

1. Property identification
2. Ownership/tenure
3. Use
4. Neighbourhood features and appeal
5. Location/accessibility
6. Site characteristics
7. Accommodation i.e. number of rooms, etc.
8. Size/floor area
9. Construction
10. Quality/condition
11. Age and life expectancy
12. On-site services
13. Community facilities
14. Zoning and town planning
15. Land rent
16. Rates and other outgoings
17. Lettings, rents and rental values
18. Interest rates
19. Special market conditions

5.5 The cost of delay is not only the difference between the loss rent (or loss of occupation benefits) and the interest accrueable from money on short call; it is also the increase in construction cost due to inflation. While the developer is supposed to allow for escalation the unpredictability of the length of the approval and certification process makes it difficult for him to estimate an appropriate price escalation rate. As a result many developers in the medium-income market have resorted to the practice of selling houses at a provisional price and collecting substantial deposits even before the foundation trenches are dug. They may also downgrade the specification so as to accommodate price increases.

5.6 Even after construction has commenced expensive delays can occur through no fault of the developer. We have been informed of recent and current schemes which have had to stop midway because it has been discovered that the contractor has built on say the road reserve or sewer easement. Such delays are not only costly but also cause unnecessary hardship to the prospective allottees.

5.7 Another source of delay and frustration is the insistence in some cases by the local authority that the developer or sub-divider should surrender unreasonably large quantities of land for public purposes, or that he should build the trunk infrastructure from the existing main sewer or road to his estate at this own expense, even though the intervening land is public land. One lending institution has contended that these stipulations are not only costly but also unfair. They may even be illegal. Above all they add to the final cost to the allottee of the dwelling or site.

## 5.8 VALUATION AND LENDING TECHNIQUES

Changing standards and new legislation will affect the methods used by the lender to control his risk. These methods or control devices are centred around.

- valuation
- gearing (loan to value ratio)
- interest rate
- repayment period
- insurances for the building as well as the borrower's life
- employer's undertaking to deduct repayments from salary

5.8.1 VALUATION : A mortgage valuation has traditionally leaned on the cautious side. This is because both the valuer and the lending institution wish to cover themselves in case the property should have to be sold because of default. The amount obtained on forced sale at an auction may well be much less than the full market value. Where legal standards have varied downwards and the house is built to a more economical specification, the valuer is likely to be even more cautious. Although he will be influenced by both the construction cost and the investment value of the property, his main preoccupation will be the longeavity of the building. In preparing his valuation he will consider a variety of parameters as shown in Table 5.1. In the case of an estate the developer will have submitted a detailed application for a financial commitment, giving all the details about the project and its implementation.

5.8.2 GEARING : The loan-to-value ratio has as a matter of policy, always been relatively high for low-income housing. The common figure is 90% for new dwellings and 75-80% for old. For instance these are the proportions used by the two state-controlled building societies in Kenya i.e. Housing Finance Co. of Kenya and Savings and Loan Kenya Ltd. The ratio could easily go up to 95% without a significant increase in risk.

A minor change in construction standards would not affect the prevailing ratios unless the durability of the building over the loan period is doubtful, since adjustments can be made elsewhere i.e. in the interest rate, repayment period and insurance premia.

5.8.3 INTEREST RATES : The prevailing rates as at the time of writing are 10-12% depending on whether the house is bought for owner occupation or for letting. In order to encourage owner-occupation lower interest rates are levied. These are already quite high for owner-occupied low income housing. For instance the monthly repayment on a Shs.50,000/= loan over 15 years @ 10% is shs. 546/=. At 7% over the same period the repayment would be shs. 458/=. Thus although lowering interest rates to more concessionary or compassionate rates would have a strong social appeal, it cannot be done unless cheap funds are available. However as soon as the houses are partly or fully let the picture changes completely. Evidence from various low cost schemes in Kenya shows that the income from subletting produces returns of 20% or more. If therefore subletting is acceptable as a matter of policy, an increase in interest rates resulting from a revision of the building code downwards would be quite tolerable. Such an increase in interest could be argued by lenders on the basis of the greater risk and administrative expenses incurred through handling a large number of small accounts held by poor and largely unsophisticated customers. Subsequently interest could be lowered as an incentive to improve the house.

5.8.4 REPAYMENT PERIOD : The normal periods favoured by lending authorities in Kenya are 10, 15 and 20 years.

Again lengthening the period would be more beneficial for the low income borrower; but it is characteristic of low cost housing that the tenure is normally short-term while the durability of the construction is suspect. Therefore a reduction in standards would have to be counterbalanced by a lengthening of the tenure. That is a mud and wattle house built to a high specification on a freehold or 99-year leasehold site should not have less mortgage appeal than a minimum grade concrete block structure built on a site held on a 35-year lease.

5.8.5 INSURANCES : In the private sector the mortgage agreement always insists that the property be insured against damage by fire, floods and other hazards. In the public sector the risk is normally carried by the government or the relevant local authority. Bye-laws or codes that increase fire risk will naturally result in higher premia assuming that the insurance companies will want to insure. The current rate for durable approved construction is from Shs.5/= to Shs.8/= per £100. One can foresee these rates going up as a result of the use of more timber, thatch, thinner walls and higher densities. These would be the insurance industry's reaction to the change, not necessarily logical. The experience in Mombasa, where there are extensive areas with thatched mud houses is that the incidence of fire is not any higher than in the high-grade neighbourhoods. What is important is not so much the materials used as the way they are used, the type of cooking facilities, dwelling densities, and proper servicing with access roads and fire hydrants. Thus fire risk, hence insurance premia, could be controlled through throughtful design both inside and outside the dwelling.

5.8.6 Middle-aged borrowers are normally required to insure their lives so that should they die the proceeds will go towards redeeming the loan. This small addition to the monthly costs seems to be quite justified. For instance the Housing Finance Company of Kenya requires the applicant for a loan to produce his birth certificate and the loan conditions stipulate:

- The security document will provide for the life of the Mortgagor to be insured by the company for a sum assured equivalent to the outstanding loan. The sum assured will be used to liquidate the outstanding loan should the Mortgagor die 1/

5.8.7 There is no direct relevance of this condition to the revision of dwelling standards especially as no relationship has to our knowledge been established between housing conditions and mortality among heads of households. If such a condition were applied rigorously the life business of insurance companies would certainly grow and more funds would be generated for investment in housing or other sectors. The alternative would be to have a mortgage guarantee or insurance scheme underwritten by the government or a parastatal organisation.

HOUSING FINANCE INSTITUTIONS

5.9.1 The lending methods and attitudes discussed above are applicable mainly to private lending institutions consisting of:-

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1/HFCK Loan Conditions, 1978 Editon

- Bulding societies and similar organisations, such as the Housing Finance Company of Kenya, East African Building Society, Savings and Loan Kenya Limited and Pioneer Building Society, which has very recently been formed; the Housing Finance Company of Kenya will be discussed in greater detail later in this chapter.

- Commercial banks which lend money for the purchase and construction of houses when liquidity is high. Lending policies vary from bank to bank but the terms are normally less favourable than those obtainable from building societies, with the repayment period rarely exceeding ten years.

- Insurance companies have contributed to housing development financing in two ways.Firstly by financing large scale estate development for the middle and high income market, and secondly by giving loans to their clients for house purchase.

5.9.2 Private institutions will also include the private individual who manages to raise money either through his own savings, or through relatives and friends, for purchasing or building a house. Such private sources normally cover the difference between the total cost and what the household can raise in the market by way of mortgages. In sites and services schemes, where loan facilities are limited, the owner/ builder has to rely mainly on his own resources. Here are the findings of one researcher:-

- Several women admitted having resorted to chang'aa (illegal liquor) brewing and selling to increase their regular income. Having completed their houses, they stopped the chang'aa business. One person

> turned to black market trading as a sideline. Yet another person obtained small 'loan' from people promising each of them the same room as soon as it was ready. By receiving many deposits in this way the house owner could complete the house. He later returned some of the deposits ..... That is, the illegal means made it possible to build a house, which later provided the house-owner with a legal income from sub-letting.2/

5.9.3 Financial stress and the desire to complete the dwelling forces plot owners into the informal and semi-formal credit market. At Dandora it has been found that about a third of all allottees borrowed money for construction in addition to the official materials loan, the sources being friends, relatives, co-operative society and employer in that order. The mean amount borrowed was Shs.3,500/=, having doubled in less than a year (December, 1977 - July, 1978) while the number of borrowers had almost tripled during the same period.3/ The HRDU sites and services evaluation study shows that a quarter of all allottees have borrowed from private sources.

5.9.4 Co-operative savings associations and building groups play an important role but there is very little documentation on these sources of housing finance. The building groups operating at Dandora are discussed in Chapter 6. Housing co-operatives are the subject of intensive discussions and new policy making in the Government at the moment and we understand that a Co-operative Housing Bank is in formation.

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2/ M.S. Muller "House Building in some sites and services schemes: Some observations", HRDU June, 1977, p 12.

3/ Senga Ndeti & Associates, MEDIS 7, March, 1979

5.9.5 Public funds for low cost housing are mainly chanelled into:-

(a) development finance for mortgage schemes
(b) rental schemes
(c) tenant purchase schemes
(d) development of plots for sites and service projects
(e) materials loans for sites and services allottees.

The agencies involved are NHC and local authorities, with the central government not being directly involved.

5.9.6 In the case of rental schemes standards are usually high because of the liberal financing arrangements, the desire of the local authority to project a favourable development-oriented image, and the ability of such schemes to yield revenue surpluses. Our discussions with local authority officials have shown that rental schemes are very popular largely because of the revenues they yield, the enhancement of the council's assets, and the political benefits. Grade II Bye-laws have rarely, if ever, been used in rental schemes.

5.9.7 Tenant purchase is a variation of the mortgage arrangement, with the local authority acting as the developer and mortgage lender at the same time. The tenant is in fact a borrower. Nairobi City Council has successfully used this model for a long time. A well known example is Kimathi Estate in Nairobi. This was the first USAID project in Kenya, consisting of 343 three-room and four-room units built to a high specification. The money, approximately $2 million, was given to NCC through USAID by an insurance company in the United States at 7.75% for a maximum period of 20 years. The loan was guaranteed by both the Kenya Government and USAID. Allottees had to pay a 5% deposit and the remainder over a 10, 15 or 20 years period at 8½%.

5.9.8 The success of Kimathi enabled the USAID to arrange two further loans for low cost housing under its Housing Guaranty Programme. Ten million dollars were allocated to NCC for Umoja Estate and five million to NHC for tenant purchase schemes in twelve smaller towns. The financing terms were generally similar to Kimathi except that the interest had risen to 9.2%. Allottees had to pay 10%, the difference being NCC and NHC's administration fee. In these schemes Grade II Bye-Laws were used. Apart from Umoja Estate this series of tenant purchase schemes includes estates of varying sizes in the cost range £1800 -£3500 per unit at Eldoret, Embu, Kericho, Kisumu, Kitale, Malindi (subsequently converted to a rental scheme) Meru, Mombasa (two sites), Nakuru, Nanyuki and Thika. The schemes are now in various stages of construction, with many of them completed.

5.9.9 Finance of sites and services projects is administered by the National Housing Corporation and, for the World Bank series of projects, by the Nairobi, Mombasa and Kisumu municipalities. In the 1974 - 78 Development Plan period the NHC executed either on its own or with the help of consultants, 37 sites services schemes listing a total of £9.7 million. The NHC lends the money to local councils at about 6½% for a maximum of 20 years, and the councils onlend to the allottees, the maximum available to each plot-holder being Shs.14000/- of which 50 % is for infrastructure and services and 50%, i.e. Shs. 7000/-, is in the form of a materials loan.

The scheme is outlined in the NHC's Sites and Services Guidelines, which also specifies infrastructure standards and materials which may be used for building the house. For instance sawn timber, offcuts, mud and wattle and bamboo are allowed. Nonetheless many local authorities have been reluctant to allow the use of such materials. 4/

The operation of the materials loan concept is also illustrated in Chapter 6 in connection with the Dandora project. In the same chapter the First Urban Project is described. The Second Project involves sites and services and upgrading sites in Nairobi, Mombasa and Kisumu plus the normal peripherals like housing loans, community facilities and technical assistance. 5/ The project is expected to cost about K.£29 million of which a third is to be provided by Kenya Government and the remainder through an IBRD/IDA credit.

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4/ As one Town Clerk has remarked, "we approve of Grade II Bye-Laws and the NHC Guidelines, but we are not going to create slums in our town.

5/ See Appraisal Report, Second Urban Project

Another donor agency that is involved in financing low cost housing is the European Development Fund which has identified three project sites in Nairobi, for which a sum of K£2 million has been committed.

5.9.10 The reason for mentioning these three funding agencies is that they have played, and will continue to play, a very important role in the formulation of appropriate housing standards. Because of the influence and expertise that they command the major donor agencies are in a position to initiate and execute changes that would be very difficult for the Government to initiate internally.

5.9.11 Although the private lending institutions mentioned earlier have been financially very successful there are reasons for concern and complaint as far as low cost housing are concerned. None of them has been actively involved in low cost housing although there is nothing in law or in principle that prevents them from doing so. For instance HFCK is empowered to give loans of as little as Shs.22500/=. The resistance has arisen out of traditional attitudes towards what is an acceptable security. Traditional rules have tended to favour the well-endowed in terms of initial capital, personal income, regular employment, secure tenure, and favourable locations. At the same time the role of the African as a serious and responsible borrower has only crystallised over the last decade or so. This emergence of a new type of client has not been matched by innovative concepts and routines to suit his social and financial needs, in spite of numerous exhortations by government that lending institutions should be more flexible.

5.9.12 It is apparent therefore that major policy initiatives are called for on the part of government. These should focus an extending and liberalising the activities of either or both of the two state-owned building societies i.e. HFCK and SLK so that they:-

- adopt a more liberal approach to low cost housing and sites and services schemes.
- simplify the formalities that a borrower has to go through.
- lend to owners in the upgrading areas.
- establish branches in the smaller towns, expecially those to be covered by the Third Urban Project.

5.9.13 A more detailed look at the operations of the HFCK may now be useful.

THE HOUSING FINANCE COMPANY OF KENYA LTD

5.10.1 The Estate (Buru Buru) continues to live to its reputation as an outstanding example of co-ordinated urban development and the largest single Mortgage Housing Project in East Africa. Constructed and finished to very high standards, the selling prices have been competitive to meet the needs of the lower and medium income groups, for which the estate was designed.

5.10.2 The above is an extract from the Annual Report and Accounts for 1976 of the Housing Finance Company of Kenya Ltd. Buru Buru is one of the more successful estates they have handled recently. There are others e.g.

- Kericho Mortgage Scheme (NHC)
- United Housing Co., Ngong Road (private)
- Section 58 Mortgage Scheme Nakuru (NHC)
- Tom Mboya Mortgage Scheme Kisumu (NHC)
- Ngei Estate (NHC)
- Old Race Course Road (Ministry of Housing)

5.10.3 All the above are schemes meant for the middle and higher income groups within the Shs.70-240000/= price range. Nonetheless we have singled out HFCK for a more detailed discussion because of the potential it offers in the financing of low cost housing.

5.10.4 HFCK is owned jointly, in more or less equal shares, by the Commonwealth Development Corporation and Kenya Government. Both the Ministry of Housing and the Ministry of Finance are represented on the Board of Directors. It was incorporated in 1965 with the main objective of promoting house ownership among Kenyans. Founded on the principles of a building society it acts as a savings bank for the small investor as well as lending money for house building or purchase. Interest rates offered to investors are competitive. The financial record has been good, with pretax profits of Shs.3.7 million and Shs.5.4 million in 1975 and 1976 respectively. The subsequent year which saw a pretax profit of Shs.4.8 million, was described by the Chairman in his annual statement as " a year of difficult economic climate ..... a year of consolidation and planning for the future...." 6/ The total mortgage assets during 1977 were Shs.317 million in 4342 accounts while advances during the year amounted to Shs.19 million. In the same the maximum lending limit was doubled to Shs.400,000.

Inspite of this traditional interest in the more expensive sector of the housing market, our discussions with HFCK officials have revealed an encouraging and flexible interest in low cost housing if the right commercial atmosphere prevailed. After all being a state-owned company it is prepared to honour government policy within its overall objective of making a profit and at the same time safeguarding depositors' money.

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6/ HFCK Anual Report and Accounts 1977

As mentioned earlier the lower lending limit is Shs.22,500/=, fixed about ten years ago. Thus a house built for say Shs.30,000/=, provided it is in permanent materials and the plans have been approved by the local authority, could be considered for financing. Within the general considerations discussed earlier, there are no specific guidelines or rules as to what constitutes as acceptable standard. For instance a mud and wattle house finished to a high standard i.e. with plastered walls, ceilings, running water, WC and tarmac access road could be seriously considered. The question of approval does not arise since no such application has yet been made. We have for instance been assured that the type of houses now being built at Dandora are "very mortgageable", assuming that these neighbourhoods are permanent in the long term and will not be subject to slum clearance. In such a case then the problems would seem to arise from the tenure, since in site and services schemes the allottees are not given title deeds. The HFCK insists on 30 years of unexpired title after repayment.

5.10.6 A 90 % loan of Shs.22,500/= means a house costing Shs.25,000/=, which at 10% over 20 years (the maximum repayment period) ca be purchased on monthly repayments of Shs.220/= excluding land rent and other charges. A household earning 660/= per month could purchase such a house. The HFCK rule that the loanable amount should not exceed three times the annual income means that the minimum loan is available to a household earning Shs.625/= per month. This income group is well within the recognised low-income category however one would like to define it. In fact the early HFCK schemes were within this category e.g. Buru Buru Phase I (Shs.36,000/= loan) and Kibera (Shs.27,000/=). Subsequent rises in construction costs have unfortunately pushed HFCK well outside this cost bracket.

5.10.7 We are also informed by HFCK representatives that mixed land uses would be acceptable provided they were preplanned and were not noxious such as butchers or garages mixed with houses.

The Loan Conditions of HFCK include the following:-

- payment of deposit at the time of making an application for a loan.
- approved plans and specifications together with building contract to be deposited with the Company.
- construction must be supervised by an architect.
- stage payments on certification by the architect as well as the company valuer.
- inspection by the company of excavations and steel work.
- insurance of the building being constructed.
- concessionary rates of interest to owner occupiers.
- payment of legal fees, stamp duty and registration fees by the borrower.
- prior approval by HFCK of any leasing or renting of the premises.
- prior approval by HFCK of a second charge.
- insurance of the property and the life of the borrower.
- redemption of the loan on the expiry of three months' written notice.
- valuation of the property by the company valuer, whose report is confidential to HFCK.
- irrevocable authority to the borrower's employer to deduct the instalments from salary.
- preference is given to Kenya citizens.
- production of a birth certificate by the borrower.

The above are only some of the conditions. There is indeed scope for streamlining the procedures used by lending companies as well as by local authorities, especially if the low income groups are to benefit.

5.10.8 The 1978 lending record (estate development only) of HFCK is illustrated by Table 5.2 and 5.3 which show that the bulk of the beneficiaries are in the £3500-£5000 income range and repayments have averaged well over Shs.2000/= per month.

It is quite evident that HFCK is not paying as much attention as it should to the lower end of the market. There are plans however to extend its services to the smaller towns and to obtain more permanent funds from local sources:

- Conclusive discussions with the Treasury and Central Bank, on the future availability of relatively permanent funds, have placed the Company's future lending position on very positive grounds. The Company now aims at establishing the needs of the country as a whole and then attempting to raise the required finance to meet these needs. 7/

The opportunity has therefore presented itself for involving HFCK in the IBRD Urban Project Series. The possibility of channeling some of the funds through a special sites and services unit within HFCK should be explored. In fact HFCK has built up a considerable amount of expertise over the years and that is why the USAID used the company to administer the loans for the first phase of Umoja.

## CONCLUSIONS AND RECOMMENDATIONS

5.11.1 Extending the scope of legalised construction will open up new possibilities for the lending institutions and insurance companies, possibilities that could be both profitable as well as consistent with long term social goals. However certain assurances and incentives will be needed before established commercial concerns can be expected to assume radical attitudes and methods, especially government support in the form of adequate legislation, an efficient administration of Town Hall, sensible and understandable urban planning, and possibly cheap funds from the Treasury.

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7/ HFCK Annual Report and Accounts 1977

To summarise then the following steps are RECOMMENDED with a view to achieving more economical dwelling standards.

- cut down on invisible frills i.e. those building components that are at the same time inessential.
- introduce innovations in the following areas, which are the most likely ones to succeed:-

(a) fragile permanence i.e. durable construction that is not necessarily permanent. There is great scope for marrying the traditional with modern.

(b) style i.e. customer appeal, rather than content. The appearance of the dwelling is most important to the financier; which means that good 'packaging' should receive more attention.

(c) long term tenure, probably something midway between 35 and 99 years, if the latter is considered too long. Has the use of freehold tenure in sites and services been considered? The disadvantages may not be as strong as they are believed to be.

- Keep densities low wherever possible. Although economy and visual effect depend in large measure on site planning, we find that very high densities i.e. those exceeding 200 persons per ha. net or plot sizes smaller than $200m^2$ need an extra planning effort and tend to be more difficult for the financier to accept.

- Reduce fire hazard by means of appropriate barriers as well as by reducing the risk of fire at source i.e. in the kitchen; the majority of household fires are caused by cooking appliances.

- Provide adequate fire hydrants and access road for the fire tender.

- Get the National Assurance Corporation, a state-owned company, to expand their fire business into the low cost housing sector. At the moment the major housing insurer is the Insurance Company of East African Ltd. Premiums, even if competitive, may well be proportionately higher than for the more expensive dwellings, but in absolute terms the figures will be quite tolerable. Even at the rate of Shs.7/50 per £100, which is 50% higher than normal rates, the annual premium on a house with a replacement value of Shs.50,000/= is Shs.187/50. In fact a more direct involvement in housing development by the insurance companies has been called for by the Minister of Finance. 8/

- Make things easier for developers and subdividers e.g. through speedy approval of plans, and less stringent conditions on infrastructure and excising of land.

- Involve HFCK in lending for low cost housing.

- Involve HFCK in the design of low cost housing schemes.

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8/ Hon. Mwai Kibaki addressing a luncheon hosted by the Kenya National Assurance Co. reported in The Standard, June 30th, 1979. He had raised the same point in his Budget Speech.

# CHAPTER 6

# STANDARDS AND SELFHELP

## 6.1 BACKGROUND

6.1.1 Within the broad framework of self-help and mutual aid housing, one can utilize a number of sub-themes. Attention could focus on the nature and extent of the administration assistance required to make such projects a success. Similarly the question of psychological assistance could be another sub-theme, as could the policy that sponsoring agencies adopt in relation to site development.

6.1.2 One of such sub-themes is the influence of self-help upon housing standards. This issue is particularly relevant in such housing policies as the sites-and-services approach. Here the concept of self-help is adopted implicity in a physical setting where such standards often do not match the resources of the owner-builders. A sites-and-services policy presupposes a certain income group - the low-income earner say (500/- to 1,200/- per month) - which is expected to apply its own resources to erect dwellings that are often further subsidized by some form of aid. For example, the sponsoring agency provides serviced land, and some cash to purchase building materials. The purpose of such aid is to assist the owner-builder to-wards house construction. However, in practice, the housing standards prescribed for the kind of development tend to defeat the very purpose of applying the concept of self-help.

6.1.3 This chapter examines some of the influences that self-help efforts have on the housing standards prescribed in a sites-and-services project. Housing standards in this context are restricted to technical aspects of the sites-and-services project. This

chapter therefore describes the different forms of self-help practiced, and their influences and limitations on the housing standards.

6.1.4 The following topics will be dealt with:-

(a) The background of a site and services project, including the kind of housing standards adopted.

(b) The meaning of self-help in sites and services projects, including the kind of housing standards adopted.

(c) Different forms of self-help, their characteristics and examples.

(d) Comparative evaluation of the different forms of self-help.

## 6.2 METHODOLOGY FOR EVALUATION OF THE INFLUENCE OF, SELF-HELP ON HOUSING STANDARDS.

6.2.1 A sites and services project. The Dandora Community Development Project is examined as a case study; it will be briefly described from project identification to implementation. Reference to housing standards is made during the process of the project planning in order to highlight the adoption of a given set of housing standards.

6.2.2 From this sites-and-services project several allottee families were carefully selected in order to derive a cross-sectional representation of self-help practices. The criterias applied in selection of the sample were as follows:-

- The accessibility to interview
- Typical forms of self-help
- Different socio-economic and attitudinal characteristics
- Plot types and level of completion.

6.2.3 Based on these criteria nine allottee families were identified for interviewing. The interviews were treated as open-ended indepth discussions. The interviews portray the life patterns of the owner-builders and unfolds the actual process of their house construction; problems faced by them, identification of resources for the purposes of house construction and general options on self-help methods as a result of adopting a given set of housing standards.

6.2.4 Main Criteria for Evaluation of self-help in connection with housing Standards in Sites and Services Projects.

For our purpose the following criteria are seen as relevant in evaluating the role of standards in the adoption of self-help in the site and services approach:-

1. The extent to which the owner-builder is left to mobilise and decide the application of his own resources.
2. The autonomy of decision making in housing planning and construction; its decentralisation and incremental progression.
3. The extent to which official standards facilitate or hinder self-build methods.
4. The degree of improvement in socio-economic status of the allottees after joining the housing estate.

## 6.3 THE DANDORA COMMUNITY DEVELOPMENT PROJECT (DCDP)

6.3.1 The Dandora Community Development Project evolved in four different but overlapping stages:

- Project Definition (November 1970 - December 1974)
- Project Preparation (January 1973 - May 1974)
- Project Appraisal (June 1974 - May 1975)
- Project Implementation (May 1975 - to date)

It is not necessary to discuss each of the first three stages in detail, attention will be focused on project implementation since it is at this stage that self-help is most important.

6.3.2 The project was defined or identified by Nairobi City Council with the assistance of IBRD early in the current decade. Both the Nairobi Metropolitan Growth Strategy and the Interior Urbanisation Project prepared by the City Engineer were instrumental in laying the foundation and defining the basic concepts on which the Project was later to be formulated. A Housing Task Force (HTF) was then formed by the Town Clerk. In October 1973 it produced a Draft Project Report for discussion with IBRD. The two-volume report defined the following principles:-

> The authority demarcates plots and provides basic services including water, drainage, sanitation, paths, roads, electricity, and telephone at a standard compatible with the ability of the plot occupants to pay ..... responsibility for the provision of housing rests with the occupants under the supervision of the authority..... minimum dwellings (consisting of WC, store, cooking space and two habitable rooms) are to be built to the requirements of the authority within 18 to 24 months of allocation.

6.3.3. The Draft Report contained proposals for the necessary institutional and legal arrangements a preliminary financial plan and preliminary house designs and plot layouts. The site chosen was Dandora, about 11 km north-west of the City centre.

6.3.4 During the project preparation stage two issues concerning physical standards posed a conflict within the NCC which led to an important debate over the relevance of site and services as a housing strategy in the Kenya context. The first one was the extent to which Dandora should cater for private car ownership and the second was the desire for a water borne sewerage system which provided individual connections to each plot at a cost affordable to the participant income group. The two issues are of interest because of the different light each sheds on the question of standards.
The problem of waterborne sewerage was of concern primarily to the technical specialists. The battle lines were drawn between the engineers in the HTF who were designing the system and those in the City Council's Water and Sewerage Department who would have to operate it. It is significant to note that at this point the opinion of the City Medical Officer of Health was not sought. His evaluation of the proposal came only after the first 100 plots had been prepared.

6.3.5 The question - perceived purely in technical terms - was how much could the design of the system deviate from standard Council practice in an effort to save money without creating additional maintenance problems. It was seen as a trade-off between lower development costs and higher maintenance costs.
The designers proposed locating main sewer lines in way-leaves on private property. They urgued that this solution would result in significant cost savings of K.Shs.1700/= per plot over the conventional approach which positioned mains under the streets and used long branch mains to connect the individual core units to the main. A similar proposal for on-plot water distribution was advance, with concomitant cost savings of K.shs.320 (22). The disadvantage of the proposal was that the short branch connecting the core units furthest from the main had to pass under the core units adjacent to the main.

See Figure 6.1. The Water and Sewerage Department also argued that the proposed sewerage layout, resulting in manholes and inspection chambers deep inside private property, did not allow easy maintenance of the system. In the rush to finalize the project design before June 1974, the designer's proposal was adopted with the support of the Town Clerk. Further debate was still to come, however, when the Ministry of Health reviewed the design some two years later.

6.3.6 As regards accommodating car ownership the NUSG had recommended a car ownership rate of 3.6% for the target income group that is about 110 cars per 1000 plots. However, the politicians were calling for a much larger allocation. In the rush to finalize the project layout, the principle of one car per plot was accepted.

6.3.7 The IBRD sent a mission to Nairobi, to appraise the Projec The appraised form of the DCDP consisted of the following components:-

(a) New Residential Plots: The project was to provide about 6000 plots with individual water and sewer connections and related basic services and infrastructure, including roads, security lighting, and refuse collection. The 6000 lots included about 1800 of 100 $m^2$, 2100 of 120 $m^2$, 1800 of 140 $m^2$ and 300 of 160 $m^2$ each. The people to whom residential plots were to be allocated were to have leasehold tenure for a period of 50 years. Title deeds to each plot would be issued after allottees had constructed a dwelling approved by the Dandora Project Department (DPD), the implementing organ of the NCC. The gross density of the project was to be 32 plots per hectare (13 plots per acre). Plot occupancy rates were assumed to be 10 people per plot, giving gross residential population densities of 320 people per hectare. This compares

with densities of 310, 291 and 271 for Maringo, Makadara and Mbotela respectively, three of Nairobi's most densely populated residential areas. The results of a land use profile analysis of Phase 1 of the whole project are summarised in the table below. The land use 'conforms' to normal standards, with roads a little high at 24%.

| | Phase 1 1000 plots (ha) | Total 6000 plots (ha) | Average % |
|---|---|---|---|
| Gross Area | 46.5 | 218.2 | |
| Unusable Area (Quarries, excessive slope, etc) | 13.8 | 32.7 | |
| Area available for development | 32.7 | 185.5 | 100% |
| Residential | 15.0 | 89.8 | 48% |
| Circulation | 8.2 | 44.5 | 24% |
| Community Facilities | 9.5 | 51.2 | 28% |

(Source: World Bank, Appraisal of a S/S Project in Kenya IBRD; Report 607 KE Annex 4. Page 5)

(b) Core Units: Each plot to be provided with basic services consisting of water connections to wc, shower and basin, sewerage and stormwater drains in a contractor built superstructure --- "Wet Core". In order to accommodate different income levels within the low income sector, three options of "Wet Core" and shelter units were to be provided:

Option A: (65%) 3900 lots, including 30 reserved for demonstration units in three different sizes - 100, 120 and 140 $m^2$. Each was to have the basic plot services to the wet cores and participants would be offered a construction materials loan (K.shs. 4800) for developing their shelter. Owners were expected to develop the shelter through

self-help or hired labour. Total plot development costs, inclusive of the materials loan and physical contingencies, were estimated at between shs. 1100 and shs. 12000 per plot depending upon the size. About 30 of the 3900 plots were to be developed with different materials and room layouts by the Project Department for demonstration purposes at a per unit cost of about shs. 14700.

Option B: (30%) 1800 plots in three different sizes - 100, 120 and 140 $m^2$. In addition to the "Wet Core" outlined in Option A above each would have one contractor- built room (Kitchen) and a store. Plot owners were to be offered a construction materials loan (shs.2400) for further development of the shelter to suit personal requirements using either self-help or subcontracting. Total development costs including materials loans ranged between shs. 12000 and shs. 13000.

Option C: (5%) 330 plots, all 160 $m^2$ in area, will have a contractor -built dwelling consisting of two rooms. No material loan would be offered to plot owners. The development cost of Option C plots was estimated to about shs. 16500.

(c) Material Loan Fund and Repayment: Material loans would be made available to project participants for self help extensions to supplement other sources of funds, including personal savings and borrowings. Participants would contract and extend their own dwellings on the basis of approved designs. The DPD, through it's Financial Division was to operate the material loan scheme. Loans would be made in cash for the value of the materials in that portion of the house already constructed. The rate of interest was 8.5%. For Option A the loans repayable for "Plot Loan" was 30 years, and for Option B 20 years.

Material Loan repayment period for Option A was 30 years (with five years grace to principal only) and for Option B 20 years.

At the time of the Appraisal period, the maximum loan for Option A allottees was K.shs. 4800, sufficient to build two rooms and K.shs.2400 for Option B allottees, sufficient to build one room. However, since the occupation of the plots in Phase 1, the loans were increased to K.shs. 5760 respectively, an increase of about 16.5%. This was mainly due to price increases since the project actually started. All the loans are repayable in equal monthly instalments.

Repayment of material loans would commence 18 months (during which period the construction of the plot will have been completed) after the date thefirst instalment of the plot loan was due to be paid. The interest accrued during the construction period of 18 months on any material loans borrowed will be capitalised and the total amount of principal and interest will be repayable by Option B allottee over 18½ years - this period will coincide with the remaining plot loan repayment period at the time. Similarly Option A allottees, who have a five years grace period for principal only, will pay after 18 months, interest only for 3½ years on any material loans borrowed and accrued interest during the 18 months. After 3½ years their grace period would have expired and then they would commence not only paying interest but also repaying principal for the next 25 years.

(d) Community Facilities: The project was to construct primary schools, health centres, multi-purpose community centres incorporating day care facilities, sports facilities and markets. Primary schools, accounting for about 60% of the investment in community facilities, would provide about 5600 student places - allowing the project area the

same level of provision as the rest of Nairobi.

(e) Trunk Infrastructure: The trunk sewers would comprise of two branch sewers from the project area to the proposed main city trunk; 14.5 km of main trunk sewer running alongside the Nairobi river to a sewerage treatment works, a temporary stabilisation pond to serve the first 1000 housing plots by mid 1976, and a sewage treatment works to serve the equivalent of 230000 people.

(f) Other Components: Those consisted of technical assistance in the form of finance for detailed design and various studies; studies on municipal finances and NCC housing operations and preparation of subsequent projects; monitoring and evaluation of the project; and a nutrition component.

6.3.8 Infrastructure Standards. The following Infrastructure standards were adopted:-

(a)Roads and Surface Water Drainage: The site would have a circulation network providing a primary order framework around which the layout is developed. The site is linked to the city network from Komo Rock Road. A main through street running along the ridge which also forms the spine containing the community facilities. This main street is linked to a network of secondary roads and footpaths running transversely within the residential zones on either side of the spine. Standards and specifications adopted were as follows:-

1. Main Roads: serving as collector roads carrying bus traffic were to be constructed to bus route standards with an overall reservation of about 20 m. The carriageway was to be paved and would have foot paths. The footpath construction comprises of 150 mm murrum paving on compacted formation. The surface water drainage comprises of concrete invert block channels with 50 mm concrete slabs.

2. Secondary Roads: Would provide vehicular and pedestrian accesses to the residential plots. These roads were to have an overall reservation of about 12 m with a murrum carriageway and footpaths on both sides with a surface water drainage ditch on each side of the footpaths. The footpath construction comprises of 100 mm murrum paving and the surface water drainage ditch was to be the same as described for main roads.
3. Parking Areas: Were to be provided along the secondary roads at convenient locations and would consist of 150 mm murrum paving on graded and compacted formation. Connecting footpaths and surface water drainage was to be provided.

(b) Water Supply: Individual metered connections would be provided to each plot to serve a water closet, a shower, an outside tap with provision for installing a water tap and sink in the kitchen at a later date.

(c) Sewerage: Individual wet core units with water borne sewerage facilities. The sewerage system is designed to conform to NCC water and sewerage department specifications.

(d) Electricity: A system of street lighting and security lighting at communal areas would be installed. Individual metered electric connections would be available from the East Africa Power and Lighting Co., on application by a stated number of households.

(e) Refuse Collection: Approximately 120 concrete hardstandings would be provided for the whole area. NCC would provide the necessary bins collection services and charge plot holders accordingly.

6.3.9 Total project costs were estimated at K.shs. 211 million at January 1975 base prices. Physical contingencies of 15% on site preparation and infrastructure and 5% on community facilities and core units were included. Price escalation was calculated at 15% in 1975 and 12% annually for the period 1976 through 1979. Foreign exchange costs were estimated at about 26%.

6.3.10 The implementing organs were to consist of the Water and Sewerage Department of NCC and the Dandora Project Department, an implementing unit to be located on site.

6.3.11 The Project Department was especially created to implement the sites and services component. It would consist of 13 professional staff in three divisions: Technical, Financial, and Community Development.

6.3.12 The Technical Division was to be responsible for supervising detailed engineering and preparation of tender documents for site infrastructure, wet cores community facilities and for ensuring proper supervision of construction. The Financial Division was to be responsible for keeping all project accounts involving expenditure related to the project. The Division was to develop an accounting and financial management system acceptable to the Bank. The Community Development Division was to publicize the project, solicit and process applications, orient and train allottees prior to the occupation of plots, work with families during the construction phase and assist residents to develop the institutions and programmes which will enable them to create a genuine community.

## 6.4. PROJECT IMPLEMENTATION

6.4.1 A project Committee was established in December 1974, consisting of various Government representatives. It was given plenary powers in approval of budgets as well as detailed plans of layout and houses and to oversee allocation procedure based on random sampling by computer. The Director of the Dandora Community Development Department, formed early in 1975, was to report to the Project Committee.

6.4.2 The Tender documents were prepared by the Technical Section of the Department for Phase 1 of the Project, consisting of 1018 plots. Tenders were invited in third week of May 1975. On September 3, 1975 results of the tenders were brought to the Committee which approved the lowest tender for the general contracting of K.shs. 12.7 million, an increase of some 40% over the estimated tender cost. Another firm was appointed as building subcontractor. A departure from the tender specifications was the use of 100 mm block walls for the contractor-built wet cores. According to building subcontractor such a wall would not sustain rough useage and they came up with a system of precast panels which were eventually accepted by the Committee. However, the precast panels ('Checolite') would cost 40% more per $m^2$ than concrete blocks. Three demonstration units were erected to illustrate the construction components. There were separate contractors for civil works and for street lighting. The overall supervision of the works was done by the Technical Section. The contractor part was finished on November 1976 and the keys were handed to the plot allottees for Types A and B on November 20, 1976. Fifty four Type C plots were sold at a market value, the return on which was applied for subsidizing the costs of Type A and B plots.

6.4.3 Approval of Building Plans: An important issue regarding standards was raised during the construction of Phase 1. In May 1976 comments on the overall layout plans of Phase 1 were received by the DCDP Department. According to comments of the Medical Officer of Health the plans could not be approved. This led to a long controversy over the approval of building plans. The plans were prepared in accordance with the design standards and cost estimates outlined in the Appraisal Report. Moreover the Works and Town Planning Committee on January 15, 1975 had on recommendations for the City Engineer approved the structure plan for the Dandora Project and designated the project area as a 'Grade II' byelaw zone to which special density provisions would be applicable. The Medical Officer would not approve the plans since the design standards did not conform to the Building Code and the Public Health Act. After about six months of discussions and meetings the plans were accepted by the joint meeting of the Works and Town Planning Committee and the Project Committee held on January 20, 1977. The delay caused by the above controversy resulted in delays in the issuing of type plans to the plot allottees and delays in the construction of demonstration houses. Furthermore, the impact of such a controversial issue was to cause an extra K.£1.3 million for the modifications of Phase II of development when the technical section had to review the design, incorporating the standards which the Medical Officer had specified.

6.4.4 Plot Allocations: Application forms were sold in March 1975 at 20/-each. Out of 16018 application forms which were received 6710 were not qualified. The other 9308 were balloted upon by use of computer on September 24, 1976. Applicants had to meet the following conditions:

(a) The total income at the time of application of the allottee and such members of his family as will

live with him on the plot to be between K.shs. 280 and K.shs.500 per month for Option A and K.shs.450 and K.shs.650 per month for Option B plots.

(b) The prospective allottee had lived in Nairobi for at least two years immediately prior to his application for a plot and did not own any residential property in Nairobi.

(c) The allottee family (spouse, if any, or children) did at the time of application, and would, upon allocation of a plot reside with the allottee

6.4.5 Once the allocation was completed it was felt necessary to have public meetings with people who had been successful in getting plots. The purpose of the meetings was to explain clearly to the allottees about the project, their personal participation in the project, the Department's role, their responsibility to the project, etc. The meetings went on from October 18 to November 1. Allottees of Phase 1 plots were informed from October 7th that they pay and take possession of the plots within 6 weeks. By December 1st, all plots except 55 had been paid for. The 55 were then re-offered to the next successful applicants on the allocation list. Keys to the plots were issued to applicants who had paid their deposits as from November 20, 1976.

6.4.6 The letter of Offer required the allottee to:

(a) undertake to erect his own dwelling according to minimum standards, either with his own materials, if these be deemed adequate or with materials obtained under the materials loan scheme, within 18 months of signing of the lease. He can use help in construction but other than technical assistance available on the site, he must bear all costs of such outside assistance.

pay all charges promptly and in general conform to all lease conditions.

(c) sublet rooms only on conditions specified by the Project Administration and make the identity of the tenant known to it prior to subletting.

(d) Notify the administration of intention to leave the project and conform to the project rules and regulations regarding the transfer.

Soon after occupying the plots the allottee is faced with one of the first major decisions. How to commence construction of the dwelling in accordance with the prescribed forms of construction and conform with the general planning and building standards. Given the individuals background and resources the task of construction forms the initial challenge.

6.4.7 Participant observation with the allottee families has revealed several characteristics of their situations which determine the forms of self help methods for planning and construction of the dwelling. In principle these are:-

1 Ability to apply one-self in:
   1. Techniques of actual construction
   2. Supervision of construction and financial management,
   3. Organising a construction team which may consist of hired labour (skilled or semi-skilled), relatives and or friends.

11 Constraints and stresses of the plotholder including:-
   1. Financial limitations
   2. Size of the family and responsibilities towards the youngand the old.

3. Commitments to one's job and ensuring a regular income.
4. Availability of time to apply personal labour (skilled or semi skilled) to supervise and to manage the construction.

111 Attitudes of the allottee towards:-
1. Savings on labour and materials.
2. Rate of construction
3. Satisfaction in building one's home with one's own hands.

IV Impact of official rules and regulations on the allottee's resources and their effect on:-
1. Phasing of construction and eligibility for the material loans.
2. The role of the temporary shelter
3. Enforcement of the standards during the construction phase.

## 6.5 FORMS OF SELF-HELP

6.5.1 There is a basic distinction between the type A plot holder and type B plot holder. Generally the former builds a temporary structure first which is used for several purposes:

(a) providing accommodation during the construction of the permanent dwelling, thus saving on the rent for the previous residence,
(b) providing storage space for some of the construction materials and
(c) forming a natural surveillance point over the construction team.

The type B plotholder does not build a temporary structure; the kitchen is used for the same purposes as the temporary shelter in the case of type A.

6.5.2 The decision to adopt a particular form of self-help is largely based on a number of factors, chief among which is the hope to save in every stage of the construction process and in doing this there is no exclusive form of self help, rather a combination of several types. For analytical purposes we have identified two predominant forms that is:-

(I) self help by the allotte
(II) self help through subcontracting and
(III) self help through a building group.

In practice both forms coexist. The latter form of self help is a combination of the allottee-build, sub-contracting form and mutual assistance forms of self help. For discussion purposes this form of self help is treated differently since the essence of this form lies in the organisation of the allottees in the first instance, primarily to pool together their financial resources. It is then followed by the sub contract form of self help.

## 6.6 SELF HELP BY THE ALLOTTEE

6.6.1 This is the true of pure form of self help and self reliance by the owner-builder in planning, constructing and managing the whole process of building. The decision making process is a reflection of the owner builder's attitude towards maximising savings on labour and utilisation of the least expensive materials. The ability of the allottee to apply his energies in construction, supervision and purchasing materials is demonstrated and tested in the whole sequence of building. The organisation of all activities are finely tuned with the allottee's available time. Although the owner-builder is responsible for all the operation, he may seek

extra help. This sort of help is often 'free', meaning not paid for in cash. The help is either skilled or semi-skilled. The owner-builder returns the favour in an equivalent manner.

6.6.2 The case studies reveal that although allottee built is a true form of self help it is conducted through such pressures and constraints as lack of finance at the start, commitment towards one's job or sometimes the sheer size of the family.

6.6.3 Financial stresses turn out to be by and large the most pressing issue for the allottee and perhaps one of the major reasons for applying one's own labour. As a result, the owner builder works on the project when ever possible; seeks cheap materials, often reused one's, transportation is on foot or by hand cart, and/does he spend money on fares for public/rarely transport.

6.6.4 In this form of self help the other major restrictive factor is the rules set by the projects agency and the housing standards set by the local authority. Often the self-built house does not conform to the legal housing standards. For instance, the quality of construction, useage of building materials, and types of finishes tend to require higher forms of construction skills than what the owner builder possesses. In fact the process of organising the construction in a manner which would conform to the recognised housing standards is simply beyond the capacity of the average owner-builder

An Example of allottee built form of self help

6.6.5 The best known example of self help by the allottee is seen during the erection of the temporary shelter.

6.6.6 Building Materials used for the temporary shelter are those which are easy to find, cheap to buy and easy to handle in construction.

The most frequently used materials are mud and wattle, corrugated iron sheets and timber. Generally the roof is built in gci laid on timber purlins. Mud and wattle construction is common for walls. For an entry to the dwelling either a used door in timber or gci on a timber frame or even a curtain hung in the doorway is used. There are no finshes, the floor is left in murrum, sometimes compacted to/an even the surface. Table (6.1) gives a breakdown of various building materials used in the construction of the temporary shelter, the sources from which they were obtained and approximate costs.

6.6.7 General Standards of the temporary shelter: are 'crude'; the construction is rough, often the walls are not alligned properly, the door is crudely fixed, and there is no adequate natural lighting or enough air circulation. Generally an average of 12 $m^2$ floor area is built. The temporary shelter is located in a corner of the plot, generally on the entrance side of the plot. Figure 6.1 shows two examples of the temporary shelter.

6.6.8 The process of building the temporary shelter could be broken down into the following stages:

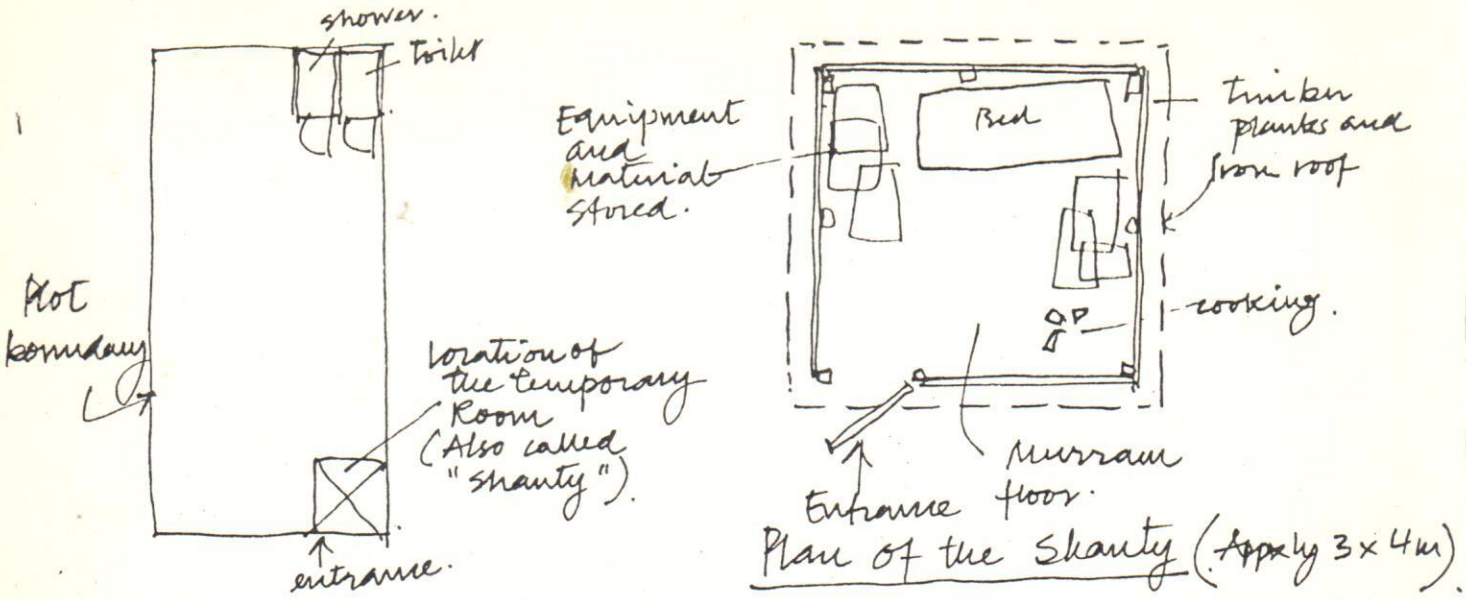
Stage 1: A rough marking is done to locate the position of the walls of the shelter. It is located in one of the corners of the plot so that during the construction of the permanent shelter the remaining space may be used.

Stage 2: Building materials are bought by the allottee. The quantities bought is determine according to the amount affordable by the allottee and the necessity of the materials during a particular stage of operation. For instance, during the erection of the walls just enough iron sheets would be brought in together with the timber for the frames. The frame is erected which takes about half a day and iron sheets nailed or screwed to the frame.

TABLE 6.1

Temporary Shelter - Materials, Prices, Places Purchased From and Approximate Transportation Costs

| Material | Typical Places Purchased | Price (Kshs) | Transport Cost |
|---|---|---|---|
| Mud | Within Estate, Ruiru, Njiru | Free | By foot |
| Wattle | Njiru, Ruiru, Estate, Eastleigh | 3/- per piece (about 5 feet long) | 3/- bus fare, two ways |
| Corrugated iron sheet | Ruiru, Njiru Estate | 45/- per piece, 26 gauge. Reused one about half this price | 2/- bus fare, two way |
| Nails | Eastleigh | 6/-per kg. | 2/- bus fare, two way |
| String | Eastleigh, Ruiru | 10/- a ball | 2/- bus fare, two way |
| Cement | Ruiru, Njiru Estate | 28/- per bag | 2/- bus fare, two way |
| Sisal cutting | Kayole Village | Free | By foot |
| Reused timber pieces | City centre, Industrial area, Eastleigh | 120/- for material used for a temporary dwelling, appx'ly $12m^2$ in area. | 4/- bus fare, two way |



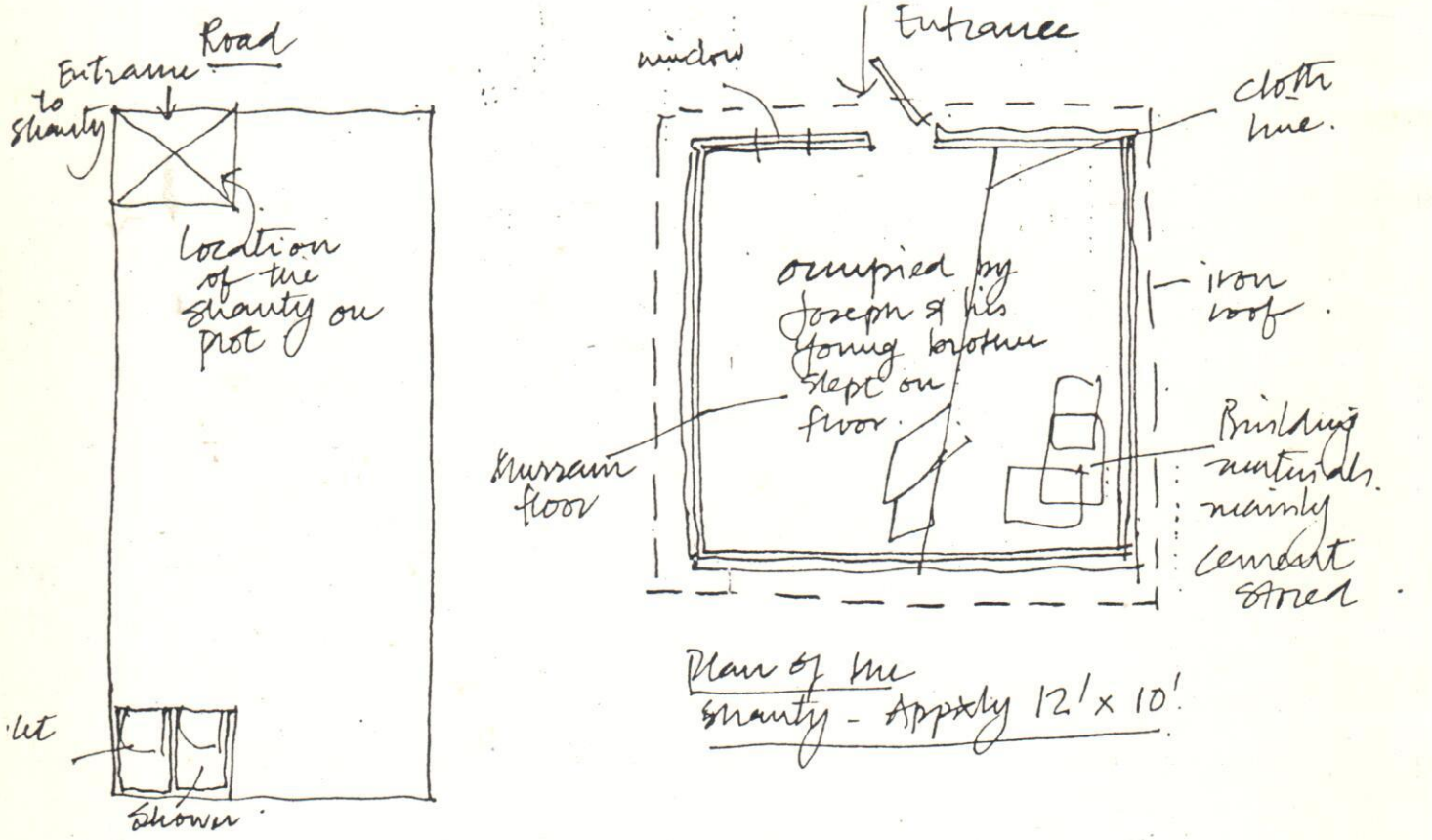




FIG.6.1 TWO TYPICAL LAYOUTS OF TEMPORARY DWELLINGS
Plans show a) location of the temporary dwelling on the plot
b) plan of the dwelling

6.6.9 There are no specific ways in which the quantities are decided, rather they are bought according to convenience of transportation and the funds available. Similarly, in the case of a shelter where mud and wattle is used for walls materials are bought in stages. For instance Joseph reports:

> Since I had no money I went around to collect whatever material which could be used to construct the temporary room with. I went to a nearby village (the Kayole Village) to cut some sisal plants which I used to build the walls of the shanty. The material was brought by myself on foot over some two miles distance. I would make two trips everyday to gather enough for the walls. The actual process of gathering the materials was started in December 1976 and completed by the end of February 1977. The entire shanty was built by me without any assistance from anyone. For buying the roof I borrowed shs. 100/- from a friend and bought eight used iron sheets. It took about one day to put the roof. After building the roof I applied wet murrum soil to the sisal material and the frame. By early March the shanty was ready for occupation. 1/

6.6.10 This is a typical case of self help by the allottee where incremental development is a dominant way of building.

## 6.7 SELF HELP THROUGH SUBCONTRACTING

6.7.1 Operationally, this form of self-help entails contracting out such activities as are not feasible within the means and resources of the allottee. Skilled and manual labour is recruited at various points in the construction of the dwelling. Basically, there are two sets of actors -- the allottee and the fundi (fundi is a local term used for a skilled artisan or contractor). Together with the fundi there are generally some semi-skilled helpers, locally known

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1/ Personal interview with an allottee

as kibarua (plural is vibarua). The decision-making process is more complex in this form of self-help.

6.7.2 Most of the technical decisions are made by the fundi.These generally deal with building materials; types, quantities and stages of purchasing; equipment for construction and organisation of the construction team. The latter involves such tasks as delegating responsibilities and tasks to the 'kibarua'. As the technical inputs consume most of the cost of the construction the decisions made by the fundi results in the allottee following them, often without questioning. The allottee's role is to endorse the decisions made by the fundi during all the stages of the construction, supervise the construction team and oversee financial matters.

6.7.3 Since the entire programming of the construction is arranged by the fundi it leaves little room for the allottee to adjust any of the tasks or activities. As a consequence the allottee is more of an 'outsider' than a full member of the construction team. The role of the allottee is dominant at the start of the organisation of the construction team, while agreeing on remuneration, the general tasks of the fundi and the period of engagement.

6.7.4 The allottee is occupied with his usual routines, for instance at his job or business and therefore cannot find sufficient time to attend to actually work on the construction site. The constraints are the lack of enough money to begin sub contracting, lack of a formal contractual agreement with the fundi and sheer family responsibilities. The allottee family is often large enough to enable potential application of members labour but most of them would be earning a living through a formal job or business.

6.7.5 This form of self-help is further characterized by a lack of organisational expertise in the allottee at the commencement of the job; towards the end of the construction he acquires some understanding of the construction process, techniques of construction, labour requirements, material quantities and source of materials. The educational value which the allottee acquires at the end of the construction and the mental picture of the 'critical path' of the construction enhance the allottee's ability to organize the next phase of construction.

6.7.6 Generally, at the start of the construction the attitude of the allottee is to sub contract the 'minimum' phase of the construction in order to test his own abilities and learn from the process of sub contracting. The other objective is to save on cost, sublet the 'minimum' completed dwelling and earn an income and to find adequate time to complete the next phase of the construction.

6.7.7 The relative success of self help through subcontracting depends on the ability to manage the construction team, financial availability, and the enforcing of contractual agreements. This form of self help has been successful in the construction of the permanent dwelling.

6.7.8 Building Materials: The 'permanent dwelling is characterised by the types of building materials used. Generally, they are prescribed by Project Agency. The common ones are concrete blocks and stones for the walls and foundation. Stone is popularly used for the foundation walls. Concrete blocks are used for both external and internal walls.

6.7.9 The common material used for the roof is 24 gauge corrugated iron sheets,. There are some instances where both asbestos and clay tiles have been used for the roof. Timber is generally used for the framing.

6.7.10 For the windows metal frame and glass are popularly used while timber flush doors and batten doors are common.

6.7.11 There is a variation in finishes. Either there are no finishes, that is the walls and floor are left in natural material or walls are simply plastered without paint. In some cases the walls are painted.

6.7.12 Reinforced concrete is limited to use in lintols, cast insitu over wall and door openings, and in strip foundations. Iron loops are used as reinforcement for the wall construction. A water proof membrane is laid in either bituminous felt or strips of plastic membrane at the foot of wall construction to prevent dampness from climbing into the walls.

6.7.13 Table 6.2 gives a breakdown of the common building materials used in the permanent dwelling. It lists the materials, equipment, transportation and labour costs.

Construction Process: The overall construction process of the permanent dwelling is not a 'one shot', smooth operation. It is distinguished by several stages of construction, each stage being characterised by several decisions and activities. These stages could be divided as follows:

Stage:I Identification of the sub contractor and organisation of the construction team. Verbal contractual agreements between the two sets of actors take place

Stage II: Setting out of the rooms.

Table 6.2

An Example of Costs for Building Materials, Equipment, Transportation and Labour in a permanent Dwelling

| Date | Materials, Equipment, Transportation and Labour | Cost (K.Shs.) |
|---|---|---|
| 1/4/77 | Wheel barrow | 210 |
| 1/4/77 | Two spades | 50 |
| 1/4/77 | 50 ft. water hose pipe | 100 |
| 6/4/77 | Sand, two lorries of stones each (including transportation cost) | 600 |
| 6/4/77 | Foundation stones, (9"x8), 1 lorry | 350 |
| 7/4/77 | Ballast or Kokoto, 1 lorry (including transportation cost) | 210 |
| 9/4/77 | Cement 15 bags, (including transportation cost) | 402 |
| 9/4/77 | Digging foundation trenches | 150 |
| 9/4/77 | Site measuring pegs wooden | 35 |
| 11/4/77 | Hardcore, 3 lorries (including transportation cost) | 220 |
| 11/4/77 | 1 bundle steel straps | 20 |
| 12/4/77 | 3 lorried of blocks, 9"x6", 750 blocks, (including transportation cost) | 1685 |
| 13/4/77 | Hardcore, 1 lorry (including transportation cost) | 120 |
| 13/4/77 | Foundation stone, 1 lorry, 9"x9", (including transportation cost) | 350 |
| 15/4/77 | Expenses in transport to get some materials which were not avilable | 50 |
| 16/4/77 | Cement, 10 bags | 293 |
| 19/4/77 | Paid fundi and helper | 45 |
| 20/4/77 | Paid Mr. Munene, another fundi | 200 |
| 20/4/77 | 5 bags of cement (including transportation cost) | 140 |
| 20/4/77 | 2 three-eight inch steel rod | 70 |
| 20/4/77 | Expenses for food and bus | 10 |
| 21/4/77 | Paid fundi | 200 |
| 21/4/77 | 10 bags of cement (including transportation cost) | 280 |

| | | |
|---|---|---|
| 21/4/77 | Personal expenses | 15 |
| 22/4/77 | Roofing wooden panels | 253 |
| 22/4/77 | 1 kg of nails | 5 |
| 22/4/77 | Personal expenses | 15 |
| 23/4/77 | Iron sheets, gauge 26, 24 sheets (including transportation cost) | 1604 |
| 23/4/77 | Roofing nails, 2 kg | 10 |
| 23/4/77 | Personal expenses | 15 |
| 23/4/77 | Paid fundi | 300 |
| 25/4/77 | Fitted 5 door frames @ 50/- each | 250 |
| 25/4/77 | Nails, 3 kg | 18 |
| 25/4/77 | Plumbing in the kitchen, paid for labour | 10 |
| 25/4/77 | Personal expenses | 10 |
| 26/4/77 | 2 iron sheets, gauge 28 | 58 |
| 26/4/77 | Fascia boards, 70 ft run | 77 |
| 26/4/77 | Personal expenses | 10 |
| 27/4/77 | 5 T&G Doors (including transportation cost) | 500 |
| 27/4/77 | 5 bags cement (including transportation cost) | 140 |
| 27/4/77 | Personal expenses | 10 |
| 28/4/77 | Window frames (including transportation cost) | 500 |
| 28/4/77 | Paint | 40 |
| 28/4/77 | Paid fundi | 305 |
| 28/4/77 | Personal expenses | 10 |
| 29/4/77 | 5 bags of cement (including transportation cost | 140 |
| 29/4/77 | Red oxide, 5 kg | 36 |
| 29/4/77 | Paid fundi | 60 |
| 30/4/77 | Personal expenses | 10 |
| 30/4/77 | 5 mortice locks, each @ 85/- | 425 |
| 30/4/77 | Window locks | 66 |
| 30/4/77 | Personal expenses | 10 |
| 3/5/77 | Paid fundi | 200 |
| 3/5/77 | Nails, 2 kg | 10 |
| 3/5/77 | 5 bags cement (including transportation cost) | 140 |
| 4/5/77 | paid fundi | 60 |
| 4/5/77 | Cigarettes for the helpers | 5 |

| | | |
|---|---|---|
| 4/5/77 | 2 iron bolts | 45 |
| 4/5/77 | Hedges | 30 |
| 4/5/77 | Personal expenses | 7 |
| 6/5/77 | 1 lorry sand, 7 tons | 350 |
| 7/5/77 | Paid fundi | 300 |
| 10/5/77 | 5 bags of cement | 140 |
| 12/5/77 | 11 ft of fascia board | 17 |
| 13/5/77 | paid fundi | 100 |
| 14/5/77 | Ventilation block | 5 |
| 14/5/77 | Assigned a mason and a helper | 40 |
| 17/5/77 | Kitchen plastering | 56 |
| 17/5/77 | 2 bags cement | 56 |
| 18/5/77 | Red oxide | 27 |
| 22/5/77 | paid fundi | 20 |
| 22/5/77 | Kitchen water fittings | 330 |
| 22/5/77 | Paid for carrying unwanted soil | 50 |
| 23/5/77 | Yellow oxide for spraying | 100 |
| 25/5/77 | Spraying charges | 55 |
| 26/5/77 | Glasses for window fittings | 110 |
| 26/5/77 | Labour for fitting window glasses | 40 |
| 30/5/77 | Outside pavement preparation | 30 |
| 30/5/77 | Completing store | 30 |
| 30/5/77 | Completing pavement | 60 |
| 31/5/77 | Paint | 300 |
| 31/5/77 | Labour for painting | 100 |
| 2/6/77 | Construction of the chimney, labour & material | 250 |

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(A) Building material and labour costs during April and May 1977.

(B) Prices for Two Rooms and a kitchen store

Source: Extract from the personal diary of holder of Plot No.....

Stage III: First Phase of the Construction -- Foundation trenches, construction of the foundation and the ground floor slab

Stage IV: Construction of the walls, external and internal

Stage V: Construction of the roof

Stage VI Second Phase of the Construction -- Repeat from stage I to stage VI.

6.7.14 Stage I Identification of the sub contractor and organisation of the construction team: Allottees arrived to occupy their plots at different times. Those who arrived much earlier were faced with more severe problems of looking for a fundi than those who came later. Allottees who arrived later had the advantages of observing self help activities on their neighbour's plots. By then there were already several fundis operating at the estate. This made the task of engaging a fundi relatively easier.

6.7.15 The identification of a fundi is informal; the allottee collects information from various sources, such as friends, contractors within the estate and even the project agency. For instance,

> Although Mwangi is illiterate he was observant about others performance and approach. He went around the plots on which neighbours had started to dig trenches erect walls, buying materials and also saw fundis working. Mwangi was perceptive about this. Carefully he assessed his need through observations and worked out his approach.
>
> First, Mwangi felt, he lacked the knowledge of construction with permanent building materials. Secondly, he did not know where to obtain the materials. Thirdly, he did not know how to set up the walls and lastly, Mwangi was suspicious of people around him since he felt perhaps someone may even cheat him with his money.

6.7.16 Allottee finds it difficult to assess all the needs for every stage of the construction. He lacks an overview of the construction process. Rather, the allottee leaves it to incremental stages to decide; he decides from situation to situation. As a result of this there is rarely any case where just one fundi is employed to construct the entire room or house; the allottee changes the fundi from stage to stage of construction. Continuing with the case of Mwangi:

> Mwangi befriended a fundi who was working at one of the plots nearby. Mwangi asked the fundi about the places where he could buy building materials. One day the fundi took Mwangi to Njiru, a nearby trade centre to show some of the materials. The purpose was to gain some information on type of materials and prices.

6.7.17 Together with the identification of the fundi the allottee also begins to inquire about the building materials, their prices, sources and types. There is also an attempt to cross check the information which the allottee gathers with other sources:

> Next day, Mwangi went to Project Agency for some more advice. Once again, he was inquiring about the materials and their prices. At the office he was advised to use concrete blocks, iron sheets and so forth. All these materials could be purchased from the city centre, was the advice given to Mwangi.

6.7.18 Based on this comparision the allottee begins to decide about the choice of fundi and materials. The role of the fundi is to lead the construction of the dwelling. Generally, he organises his own construction team which has an average of two to three Vibarua. The number of vibarua varies from task to task. Vibarua help the fundi on all technical matters and are expected to follow his instructions.

6.7.19 Negotiations and verbal contract: Negotiations with the fundi deals with the tasks and the general responsibilities which the fund is expected to assume. They also deal with the daily rates or the amount to be paid on a lump sum basis. The negotiations are informal and there is no written contract. Two cases are quoted here to illustrate the procedure of negotiations:

> Mwangi's brother-in-law resided in Kariobangi. He knew of a fundi whose mother resided in Dandora. This fundi would be able to do the work at a special price. Mwangi negotiated with this fundi at a rate of 600/- per room. This was the price of labour agreed. It was up to the fundi then to bring whatever extra men required.

6.7.20 Similarly in the case of another plot holder:

> Lucy negotiated with the fundi about the rate and days during which he would work and any additional sources of labour required. The fundi was paid 40/- per day and since he was a full time employee in the construction company he would work only during Saturday afternoon and whole of Sundays. The fundi also got two more fundis. Both of these were paid 35/- per day, Both of them would work during the same days and hours as the main fundi. The two fundis were however, paid half the rate during the Saturdays since they worked half days.

6.7.21 Such verbal negotiations form the basic agreements between the allottee and the fundi about the rate and the method of payment. Agreements do not stipulate the definite tasks, only the specific stages of construction Defaults, delays and time schedules as is the case in the formal contractual agreements are rarely discussed. As will be seen later in this chapter the deficiences in such verbal and informal contracts often lead to loss of time, materials and labour to the allottee. Furthermore there is no mechanism for enforcing the agreements.

6.7.22 Stage II: Setting out of the Rooms: Figure 6.2 shows the typical house plans used by the allottees in the Dandora Project. These house plans are prepared by the Technical Division of the Project Agency and sold to individual allottees at 20/- for a set of drawings. A set of drawings consists of a house layout, location of the drains in relation to individual's plots and details of the 'wet core' facilities. Allottees are expected to conform to the specifications shown on the drawings.

6.7.23 The individual plots are demarcated by the project agency and the 'wet core' forms a point of reference for setting out the rooms. Generally, the setting out is done by fundi although in some cases it is done by the plot owner and a building foreman from the Project Agency. The whole house is marked, including thicknesses of the walls and partitions. The location and the thicknesses are indicated by strings.

6.7.24 Where the setting out is carried out by the fundi it costs about 50/- for the whole setting out and takes about two days. For such a task when a fundi is hired a lump sum amount is paid.

6.7.25 Stage III: The First Phase of the Construction: After the setting out is approved by the Project Agency the next stage is excavation of the foundation trenches and construction of the foundation walls for the 'minimum' number of rooms, generally two rooms in the case of type A plot and one room in type B. In the former case one of the rooms is a kitchen. This stage of the construction is referred to as the 'First Phase" since the allottee commences with the 'minimum' number of rooms.

6.7.26 Trenches are excavated according to the foundation details provided by the building specifications. Generally a depth of about three feet is excavated. There are some instances where the soil happens to be 'black cotton' (not suitable for load bearing) and as a result the foundation trenches dug much deeper till solid rock is reached. In such a particular case the Project Agency compensates the additional cost of the excavation and the construction of the foundation through an extra material loan.

6.7.27 Excavation is done either by sub contracting to a fundi or by the allottee. Sub contracting to a fundi is done because of the strenuous physical labour required for the excavation process. Generally the fundi is helped by two vibarua. The method of payment is based on a lump sum, at an average of about 100/- for excavation of foundation trenches for one room. The payment is made to the fundi who inturn has his own arrangement to pay vibarua.

6.7.28 Generally, the allottee prefers to get the trenches excavated for at least the minimum number of rooms required. There are also cases where the allottees have excavated the trenches for the entire house with a view to building the foundation walls for the entire house.

6.7.29 Where the allottee decides to excavate the trenches on his own he does so (a) to save on a task which involves purely physical labour and (b) to utilise the free time available such as in the case of a member of a building group. Excavation made by the allottee generally takes on an average of twice the time taken by the fundi.

6.7.30 Construction of the foundation walls starts after the excavation is made. The excavation is inspected and approved by the Project Agency. The construction of the foundation and the footing involves purchasing building materials, preparing concrete for the footing and laying the foundation. On the organisation side of the construction the

team has to be assembled since the previous fundi is not retained. Building materials used for this stage of the construction are either solid concrete blocks or stones, cement/sand mortar, and reinforced concrete.

6.7.31 On the organisation side of the construction a new team has to be assembled at this stage since the previous fundi often departs for the following reasons:

(a) after the trenches have been excavated there is a waiting period of often upto four weeks during which the allottee is organising the purchase of materials; the fundi therefore decides to find a job elsewhere or

(b) the allottee may have experienced problems with the previous fundi who did the excavation, for instance an unanticipated rise in his labour charges.

6.7.32 There are materials suppliers operating at the estate. Often the allottees patronize these suppliers, primarily because of the convenience in delivery a service provided by the suppliers. Furthermore, agents of the suppliers go round the estate to inquire personally about the needs of the allottees for any building materials. Generally the materials bought from suppliers at the estate tend to be 10% to 12% more expensive than material prices in Ruaraka and Njiru, each about 5 km away.

6.7.33 Generally the fundi has no say in material purchases. Allottees attempt to get favourable prices; bargaining is common and they tend to save on small items through bargaining.

6.7.34 Building materials are purchased in small quantities according to the situation defined by the sub contractor. Material is stored either on site, in the open (except for cement) or in the temporary shelter. Where mutual assistance is practiced between neighbours

material is often bought in large quantities. This results in savings on transportation costs, better prices for large quantities and fewer visits to the supplier. On the other hand the two disadvantages experienced in this particular case are:-

(a) lack of control over the useage of the materials and

(b) risk of theft of the materials while stored.

6.7.35 The fundi is generally assisted by two vibarua . In this part of the stage of construction a lump sum contract is not negotiated. The daily wage of the fundi is about 30/- while that of the kibarua is 15/-. Thus the cost of labour totals 60/- per day, each fundi having generally two vibarua.

6.7.36 During the construction of the foundation the allottee assumes the role of supervisor Often a relative or a friend of the allottee helps to supervise. The allottee's own presence at the site during the 'working hours' tends to be minimal, due to commitments at work. Generally, the 'working hours' of fundi and his assistants, are from seven in the morning till late in the evening, often till seven. There is a wide range of total time taken to complete the foundations, depending on the method of payment to the fundi. The team works only on such days as the allottee is expected to pay. On the days when the allottee is unable to pay the fundi the team does not work, while the allottee seeks to raise some money.

6.7.37 For a typical room the team manages to complete the foundation in about two working days. Then about four to five days are required for the concrete footing to set before erecting the foundation walls.

6.7.38 In case of a room being built by an allottee who is a member of a building group the entire labour cost is agreed upon by the organisation of the building group from the start. There are therefore no variations in the labour costs at either this stage of the construction or in the remaining stages. A lump sum is agreed upon to complete the construction of a room, from excavation to roofing and finishes.

6.7.39 Once the foundation walls are built, the hardcore filling is compacted by the construction team. A building supervisor comes to inspect the foundation in order to approve the construction upto this stage and also to approve the first stage of the material loan which the allottee is eligible for. This material loan is to help the next stage of construction.

6.7.40 At this stage of the construction those allottees who may have erected the foundation walls for more than the minimum number of required rooms are given material loans sufficient for only the two rooms in case of type A plot and one room in case of type B. That is why many houses are completed to plinth level only while the allottees are waiting for other finance to complete the rest of the rooms.

6.7.41 Stage IV: Construction of the Walls: The building materials used for the construction of the walls, both external and internal are: concrete blocks, stones (about nine inches in thickness for the external walls and about four and six inches for the internal walls), iron hoop for reinforcing the walls, cement/sand mortar and reinforced concrete for lintol.

A typical cost range of these materials is given below for three rooms (one of which is a kitchen):

| | |
|---|---|
| Sand | 2 lorries (7 tons each 350/- per lorry. This also includes cost of transportation. Supplier from Ruaraka. |
| Stones | 4 lorries. Each lorry carries about 350 ft. run of stones. Per foot run cost of the stone is -/80 cents |

| | |
|---|---|
| Cement | 15 bags @ 27/20 per bag. This also includes transportation cost. Supplier from the Dandora estate. |
| Reinforcement bars | 9 bars, three-eight inch in diameter, @ 1/30 per foot run. |
| Damp proof membrane | 150/- |

6.7.42 These materials are bought by the allottee in small quantities as defined by the fund and financial resources. There are some cases where through mutual assistance neighbouring allottees bought materials in bulk. This resulted in better prices, reduced transportation costs and fewer trips to purchase the materials.

6.7.43 In this stage of construction there are three variations in the organisation of the construction team.

(a) The previous team continues.

(b) A new team is formed by the allottee and

(c) having had some experience the allottee leads the construction team. That is, the allottee assumes the role of a fundi. In such a case, the fundi is still hired to ensure allottee's performance is adequate.

6.7.44 Where the previous team assumes the task of construction of the walls the allottee is already accustomed to the ways of working of the fundi. Observations suggest that the fundi and the vibarua continue to receive the same amount of renumeration as before, that is, 30/- per day to the fundi and 15/- per day to a kibarua.

6.7.45 When a new team has to be assembled there is a slight rise in the cost of labour, particularly for the fundi 35/- to 40/- per day is common. Kibarua receives the same amount as before. Besides, a new working relationship needs to be established between the allottee and the team. The fundi has to be oriented to the expectations of the allottee.

6.7.46 There are some instances where allottees have shown enthusiasm to learn the process of laying blocks. Although some of these allottees are full time employees they took some time off to participate with the construction team in the manual work of laying the blocks and building walls. However, in this case there are no appreciable savings since the fundi is still retained to ensure the allottee's participation is adequate in construction matters. Besides, allottees tend to participate during such time as when they are 'free'.

6.7.47 There is a wide range of total time taken to complete the walls up to wall plate level. Observations suggest that three weeks is an average time period for erection of the walls for three rooms. Rarely do the walls get built in one go.

6.7.48 Stage V: Construction of the Roof: Construction of the walls represented a major activity towards shaping the room formation. After this the allottees also obtained their material loans. Type A plot occupants get a maximum of 2400/- for completion of the walls for two rooms, one of which is a kitchen. Type B plot occupants get a maximum of 1200/- for completion of the walls for one room.

6.7.49 This amount of loan is generally channelled into purchasing building materials for the roof and paying for the labour costs. Almost the whole amount is spent in purchasing the materials for the roof, such as iron sheets and timber rafters and purlins. In many cases allottees have subsidized the costs of materials with their own income or loans from other sources. A typical range of material is given below for two rooms:

| | |
|---|---|
| Timber purlins and rafters | 400/- supplier at Ruaraka. |

| | |
|---|---|
| Corrugated iron sheets | 30 sheets, 24 gauge. 1600/=. Supplier on the estate. |
| Fascia board | 80/=. Supplier at Ruaraka |

6.7.50 Materials are bought by the allottees and transported either by public transport or on foot. Often allottees experience the need to travel on foot, over some two to three miles distance, carrying iron sheets on the head. This is in the hope of saving in transportation costs. Where mutual assistance is practiced between neighbouring allottees material is bought in bulk with obvious advantages. Also at this stage where the allottees practice mutual assistance a bond of trust develops to the extent of relying upon one of the allottees to go around and do the 'shopping' for the materials. In cases where the other allottees are full time employees such an arrangement is convenient and also saves in time and costs of transport and frequency of visists.

6.7.51 The organisation of the construction team also varies. In this stage of construction there is either the previous team continuing with the consent of the allottee or a new team is assembled. The latter is the case when the allottee has to wait and prepare for financing the stage of roof construction and the previous team decides to seek job opportunities elsewhere.

6.7.52 When a new team is organised the allottee tends to negotiate payments in lump sum. This is particularly because of financial stress. The lump sum is believed to help in saving when the time period of constructing the roof is not ascertained. Labour costs at this stage also begin to impose a financial strain more severely. Where the allottee decides to pay on a daily basis the previous rates apply. Some of the materials, especially roofing sheets, from the temporary shelter are reused.

6.7.53 The process of laying the roof starts with timber rafters. This forms the basic structure and grid for the roof on which iron sheets are then nailed. The underside of the roof is left as it is, without any ceiling.

## 6.8 THE BUILDING GROUP

6.8.1 The building group as a combination of the first two forms of self-help and mutual assistance is another form worth mentioning, particularly as the former is one of the most important forms of self-help.

6.8.2 The purpose of a building group is to organise the financial and managerial resources of plot holders, whose basic aim is to build at least one room. Allottees who form building groups are often those plot owners who are in real need of assistance; they are 'helpless' Once the building group has organised the financial component of construction and identified a construction team the rest of the building is undertaken as discussed earlier.

Allottees who are members of a building group are often those who have no regular jobs, are unable to find jobs, or are too old. The earning capacity of an allottee is minimal except for an occational casual job. Allottees who are in such a situation wish to utilise their time in generating income through self employment on such activities as building their own house. They value their own potential involvement. The building group is thus an organisation to facilitate such aspirations.

6.8.4 'Mutual financial assistance', the principle upon which the building group is based creates an organisation whereby the allottee can build at least one room through the financial support of the group members. Once such a room is completed the income produced by subletting is used to construct another room while the allottee continues to stay in either a temporary shelter or kitchen. The allottee starts repaying his share of the contribution towards the building group until such time as the other members of the group complete their rooms.

6.8.5 The building group as a form of self-help can be followed by the sub contract form for the actual construction. The combined form of self-help thus shows distinction between the organisation and planning stage where the building group assumes the responsibility and the sub contract which ensures the completion of the construction.

6.8.6 General Objectives of a Building Group: The basic objectives of a building group is to build at least one room for the members of the group. There are sometimes other objectives such as improvement of nutrition and assistance in growing food individually. Building groups also have other interests like promoting welfare of the community in cultural activities and so forth. However, construction of the rooms still remains one of the prime purposes of building groups.

6.8.7 Organisation of the Building Group: Building group is organised on the principle of financial rotation system. The system enables the members to contribute to a common fund and utilise the funds in the construction of the rooms. The individual members rely upon their material loans, as the source for their contributions.

6.8.8 There are a number of building groups at Dandora (Table 6.3). Each consists of about fifteen members. Generally, building groups have their own organisations and method of working, rules and schedules. A typical building group has office bearers who call meetings, keep accounts and delegate responsibilities to members. The office bearers also sub contract construction of the rooms on behalf of the members. Generally there is a chairperson, two secretaries and a treasurer. The chairperson is responsible for calling the group meetings. Meetings are held twice a month, at the beginning and middle of a month.

Table 6.3 BUILDING GROUPS AT DANDORA

| Group Name | Date contributions started | Total No. of Members | M | F | No. rms Planned | No. rms built October'78 | Monthly contributions K.shs. | How Contributions Used |
|---|---|---|---|---|---|---|---|---|
| Mwireri | March '77 | 12 | 7 | 5 | 18 | 12 | 100 for 2 rms | Labour only |
| Giikaro | | 11 | 2 | 9 | 11 | 11 | 550/rm built | Labour only |
| Komo Rock | | 16 | 8 | 8 | 16 | 16 | 50 for 1 rm | Labour only |
| Mwako | | 8 | 2 | 6 | 16 | 16 | 120 for 2 rms | Lb.& some materials |
| Baraka | | 13 | 7 | 6 | 13 | 13 | 100 for 1 rm | Lab.& some materials |
| Mwangaza | April 1977 | 6 | 1 | 5 | 12 | 12 | 100 for 2 rms | Lab.& some materials |
| Subira | | 13 | 2 | 11 | 26 | 24 | 100 for 2 rms | Lab.& some materials |
| Kugeria | | 10 | 6 | 4 | 19 | 16 | 2500 total for 2 rms | Lab.& some materials |
| Upendo | July 1977 | 10 | 0 | 10 | 20 | 14 | 150 for 2 rms | Lab.& some materials |
| Muungano | | 11 | 8 | 3 | 11 | 9 | 150 for 1 rm | Lab.& some materials |
| Bahati | August'77 | 10 | 4 | 6 | 20 | 12 | 150 for 2 rms | Lab. & some materials |
| Umeme | | 13 | 8 | 5 | 26 | 14 | 100 for 2 rms | Lab.&some materials |
| Mwenge | | 10 | 9 | 1 | 20 | 11 | 110 for 2 rms | Lab.& some materials |
| Rumwe | Sept. '77 | 7 | 2 | 5 | 14 | 8 | 100 for 2 rms | Lab.& some materials |
| St.John | Nov.1977 | 8 | 2 | 6 | 15 | 6 | 100 for 2 rms | Lab.& some materials |
| | TOTAL | 158 | 68 | 90 | 257 | 194 | | |

Source: Monitoring & Evaluation Study of the DCDP, March 1979

6.8.9 The secretary keeps all the records of those who contribute. Two secretaries are selected by the group to ensure the smooth functioning of the group. One of the secretaries assumes the task of looking for a fundi, negotiates the rates and the responsibilities of the fundi. Once again the contractural agreements between the fundi and the building group is verbal. Generally only one fundi is agreed upon to complete the construction of one room for each of the members of -the group An approximate time is also agreed upon for completion of one room. Generally when a building group employs a fundi he is paid on a lump sum basis for either a particular stage of the construction of the rooms or the entire construction of the room.

6.8.10 The chairperson is elected by the members of the group. His role is to call meetings regularly, ensure functioning of the committee members and attends to matters affecting the general interests of the group.

6.8.11 Frequently during regular meetings of the building group a representative from Project Agency attends to assist the group in technical, organisational and financial matters. Generally delinquent members are removed from the group. The process of removal is through unanimous decision of the members of the group.

6.8.12 Rules of the Building Group:

1. Since there are about fifteen members in a group a method needs to be devised for selecting a rota system for the members whose rooms would be built. Generally alternatives are discussed in meetings but the most common method is through balloting.

2. Each member of the group has to contribute a certain amount of money every month until every member's room is completed. For instance, in the 'Komo Rock' group, each member had to contribute 50/- every month. This money is paid to the fundi

for the cost of labour. During one month the contribution of the 'Komo Rock' group would total 800/-. The fundi is expected to complete the construction of the room within this period or its equivalent time period.

3. Whenever a room for any member of the group has to be started every member has to contribute a specific about of money. For instance, a nominal amount of 5/- in case of the 'Komo Rock' group. A total amount of 80/- is collected. This amount is paid for the labour cost of the fundi who is hired to excavate trenches for the foundation. This fundi is different from the one who is hired by the group. Generally the fundi who does the excavation is hired by the allottee rather than the group.

4. After formation of the group and organisation of the committee, the members of the group collect their first amount of material loan, 400/-. In the case of "komo Rock" group it totaled to 6400/-. Out of this sum the building group offers a lump sum amount to the first and second eligible allottees to commence the construction of their rooms.

5. As the construction of the room continues the allottee receives the material loan through various stages, in small increments. Table 6.4. All these loans have to be returned to the building group until the amount which the allottee had taken at the start of the construction of the room is completely repaid For those who do not pay their contribution regularly a small fine is imposed by the group. When a member fails to pay at all the committee may remove him from the group.

6.8.13 The Role of an Allottee: Members of the building group are expected to participate in group meetings. Through their participation the group hopes to increase the awareness of allottees in the organisation and management of the

construction of their rooms. Allottees discuss their problems during their group meetings. Such problems range from personal problems to technical matters. Once the group hires the fundi the role of the allottee is primarily similar to the one described in the case of self help through sub-contracting. It is also true in the case of the building group that the allottee's role as limited to purchasing building materials and general supervision of the sub contractor.

6.8.14 Some Advantages and Disadvantages of Building Group:

1. Advantages:

1. Most of the allottees have no money at all at the start of the construction. The building group's financial rotation system and facility to pay in lump sums for the construction of a room reduces the financial stress on the part of the allottees. With a lump sum the allottee is at least in a position to initiate the first stage of construction - setting out and excavation.

2. The building group also finds the sub contractors on behalf of the allottees of the group; a task which in itself requires identification and negotiations before a suitable fundi is found. The building group has often various skills and resources; identification and negotiation is carried out carefully by the committee members of the group.

3. Regular meetings of the group benefit the allottees. Allottees' experiences and situations are discussed and the group members attempt to find some solutions. For instance, how to approach the project Agency to seek some specific help, how to arrange for transport by using a friend's vehicle, what are the best times during which the performanceof the fundi should be judged, e.t.c.

4. The Project Agency has a sympathetic attitude towards assisting the groups and seeking ways to alleviate personal problems of the member. For instance, many allottees run into arrears. According to the regulations of the Project Agency allottees who run into arrears of three consecutive months are to be evicted fromthe project in order to recover the plot cost and the material loans through resale of the plot and whatever completed room (s). The group often prepares the individual's case on merit with a view to seeking an extension on behalf of the allottee member.

II. Disadvantages:

1. Although the spirit and activity of building group represents a true picture of self-help the members of the group often take undue advantage of the group. Building groups also a form political platform for some of the members. No records are kept regarding the contribution and payments. The accounting system is often poor. Some of the more knowledgeable members tend to take advantage of their colleagues. In Dandora project there are several building groups. Collectively, the group's overall output is relatively less than that of non members. Often this is viewed as a result of groups being grounds for wasteful meetings, lengthy discussions, gossiping and finding loopholes in the Projects system.

2. During the negotiations and verbal agreements between the building group and the fundi the discussion is limited to simple tasks expected to be performed by the fundi and the remuneration. There are no specific stipulations about defaults, defects and liabilities, as in the more formal contractural agreements between client and a

contractor or a sub contractor. Besides, the agreement often reached is between the committee member and the fundi. In practice when the fundi is working at one of the plots of a member, the fundi is in a better position to interpret the contractual terms with the allottee member; often to the fundi's advantage.

3. There are many delinquent members within a group. Often the members do not turn up for the meetings, or pay their contributions. In a building group there are both active and dormant members. It is difficult to remove a member.

4. With delays in contributions and decision-making during group meetings there arise frustrations among some members. Often members who had started in good spirit and joined the group decides to leave quite soon just because nothing seems to happen. There is also a rapid turnover amongst the committee members. Often slack performance/members loose heart. /makes

6.9 CONCLUSIONS:

6.9.1 Using the criteria determined in Section 6.2.4, it is possible to focus upon a comparative evaluation of the three forms of selfhelp. For this purpose four plans of "completed" dwellings are presented in the conclusion of this chapter in order to portray a visual comparison of the type of dwellings that are currently implemented. For analytical purposes, the four are described as 'good' 'average' and 'poor' dwellings. These qualities define the construction standards as well as the maintenance and usage standards.

6.9.2 A 'good' dwelling (Figure 6.3) is one where the owner has utilised the total permitted built-up space, the outdoor and indoor spaces are fully utilised for

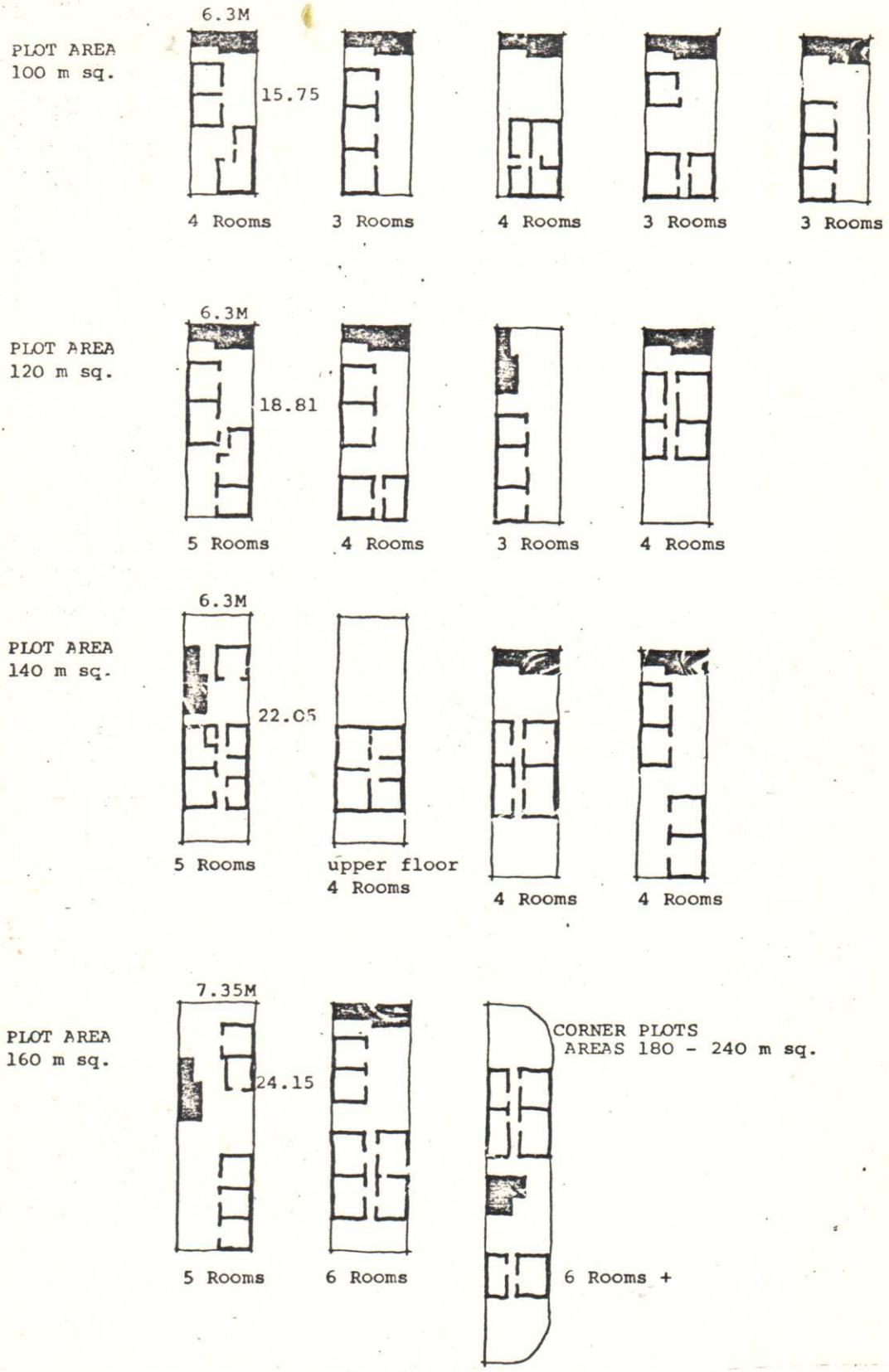


FIG. 6.2 TYPICAL HOUSE PLANS PREPARED BY THE TECHNICAL SECTION OF THE PROJECT AGENCY

Source: Monitoring and Evaluation Study of Dandora

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6

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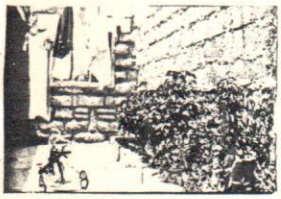

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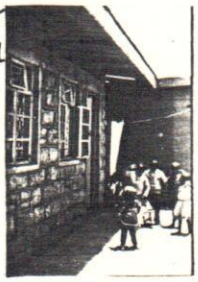


3

2

1

Kitchen occupied by the Domestic worker.

Bed

cup'd.

sink up shelves.

shelves store

SH.

Toilet

gas cylinder

Cooks

wall

cans

splash

Wall built by Mugo

door

window Removed

corner shelves for display of loudspeakers, radio & photographs.

Dressing Table

Higher wall of adjoining plot holders Room

cement floor smooth finish

table

sofa

2 Rooms occupied by Mugo's family totally 5 people.

Flower Box in concrete edges

door added

cupid

Bed.

Next door plot.

new window

Table

Cloth line

door not used

stool & bags on top.

clothes hanging.

cooking

chimney.

cooking

cupid

Bed for husband & wife.

Bed

window removed

cupid

cloth line.

clothes hanging.

cupid

seats

Tab.

seat

door added

seat.

stool & bags on top

bed

tab

seat

Clothes hanging

door not used

Bed

Bed

shamba.

Entrance (decorative)

Metal gate.

0 1 2 4 METER.

2 Rooms occupied by Cousins family. total 6 people.

Wall built by Mugo.

+ = Apply 1 meter difference.

− 

No electricity, but Mugo has started installing with a hired electricians.

FIG.6.3 HOUSE LAYOUT OF A 'GOOD' DWELLING
Source: Study Team field notes.

Plot # 272A
Res & dom. Mugo.
March 25th 1979.

household functions; the exterior is carefully finished and maintained, often some vegetables are grown and on the whole, the attitude of the owner towards the maintenance of the dwelling is geared towards improvement and better utilisation. Whilst the owner is often using such a dwelling for partial subletting (for income-generation), he also occupies it himself with his family. The plot is well defined by boundary walls often with a decorative gate and the concept of personal space is beginning to be achieved whilst the treatment of the physical aspects of the dwelling creates some kind of identity.

6.9.3 An "average" dwelling (Figure 6.4) is one where the minimum amount of construction has taken place; that is two rooms in the case of a type A plot and one room in the case of type B plot. Some attempt has been made to add more rooms, but, as yet, they are not completed. The outdoor space is not well treated, that is the ground is still undeveloped, the plot is not well defined and as a result the adjoining plot - owners share the same open spaces. The actual standards of construction and utilisation are more or less the same as the description of a 'good' dwelling.

6.9.4 A'poor' dwelling (Figure 6.5) is distinguished by the extent to which the owner has been able to complete the required amount of construction. This means, that the owner has either not been able to build two rooms (in the case of type A plot) and has not yet completed the finishes in the case of type B plot. For several reasons the construction may be very haphazard; even the standard of construction is generally poor compared to other dwellings. What is more obvious is the poor quality of the interior and exterior environment. The outdoor and indoor spaces are badly maintained. The wet core area is often unhygienic, water from the toilet or shower drains through the plot into an open area. The plot itself lacks any kind of distinction, lacks a physical boundary and the dwelling is partially sublet.

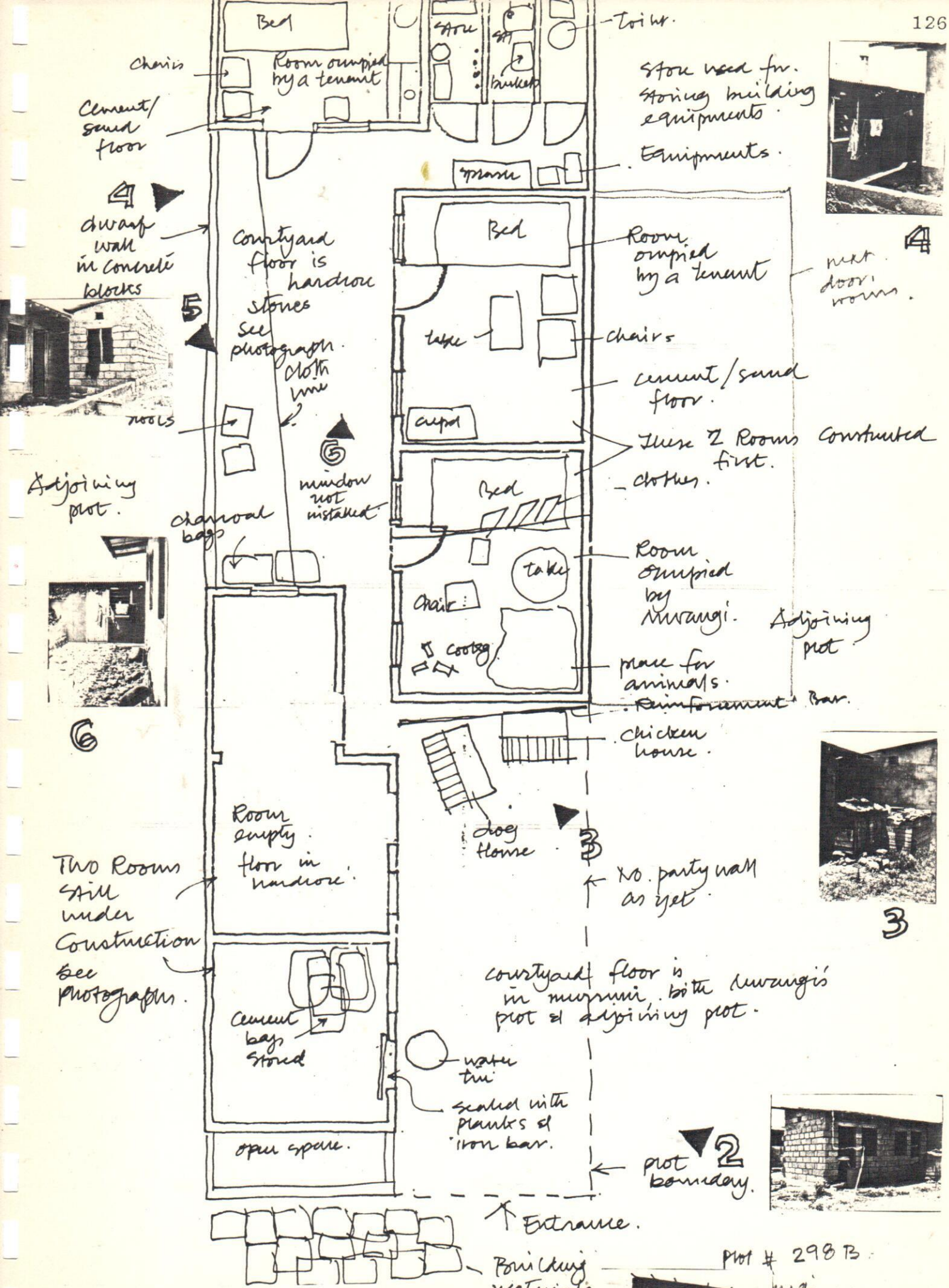



FIG.6.4 HOUSE LAYOUT OF AN 'AVERAGE' DWELLING
Source: Study Team field notes

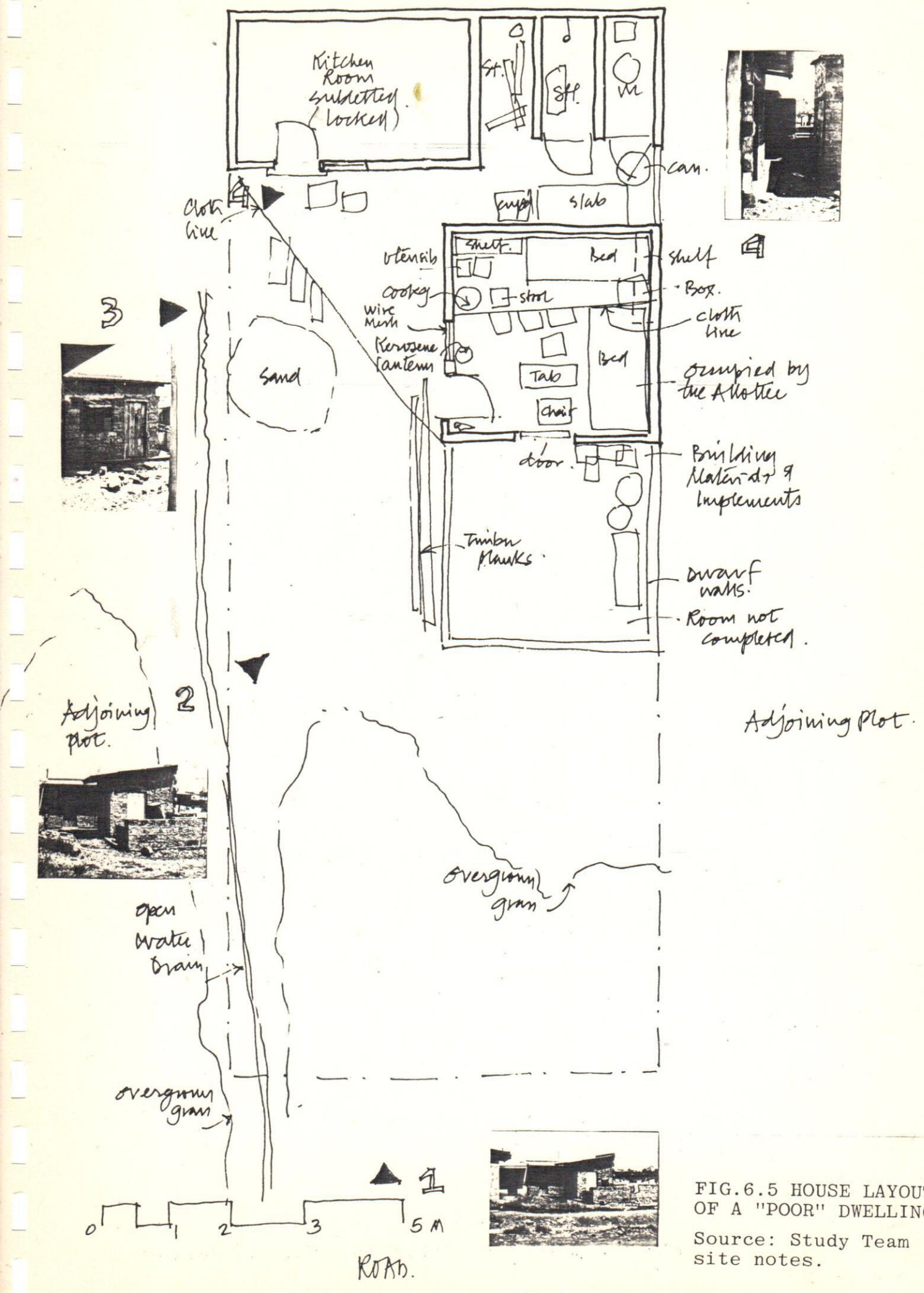



FIG.6.5 HOUSE LAYOUT OF A "POOR" DWELLING

Source: Study Team site notes.

6.9.5 Finally, there is another kind of a dwelling which can be distinguished as an 'average' dwelling but is partly constructed through the assistance of a building group (See Figure 6.6).

6.9.6 Criteria 1: THE OPPORTUNITIES FOR THE OWNER/ BUILDER TO MOBILISE HIS OWN RESOURCES: The owner-built example indicates that there is a wide choice of services that he may wish to use. This choice is, economic savings.

6.9.7 In the sub-contract type of self-help construction the choice is limited by the allottee's need to build to the required standards. However the need to re-inforce (or even completely replace) his own construction abilities reduces the choices available to the allottee. The necessity of collaboration is introduced which creates additional financial and social costs. For example, the lack of written agreements leads to difficulties in planning the construction and the purchase of materials. If the fundi is absent from the site for long periods of time or subsequently decides to raise his charges, the allottee has no way of enforcing agreements made when the fundi was first selected.

6.9.8 The building group as a form of selfhelp is a collective organisation of those allottees who are either too young, too old, unemployed or those who have no knowledge or experience of building construction. Through such an organisation it is hoped that an aducational process can be created to expose the members to the basic process of construction and budgeting. The "financial rotation method" enables members to finance the construction of at least one room. In this broader context of allottees' organisation,

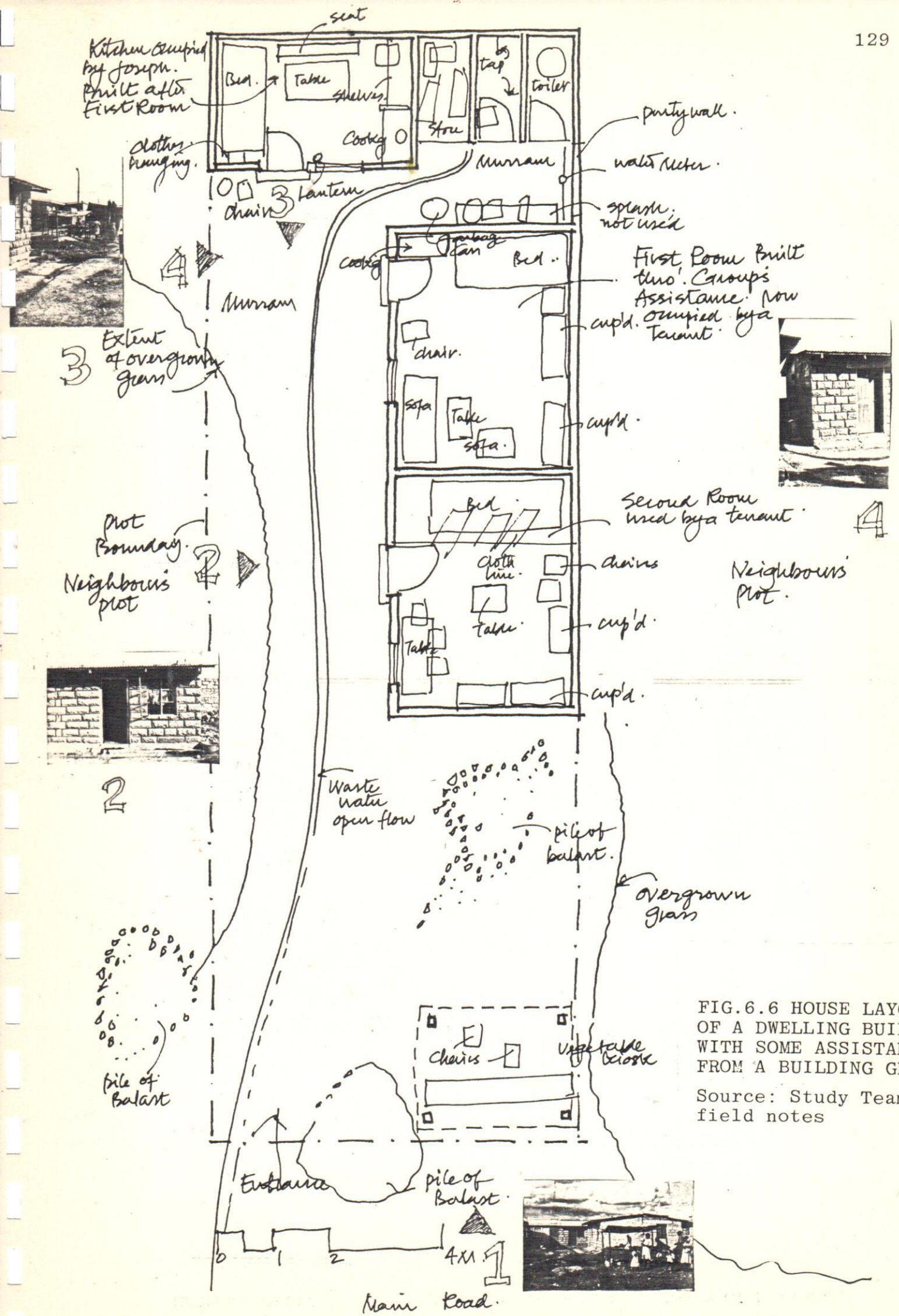



FIG.6.6 HOUSE LAYOUT OF A DWELLING BUILT WITH SOME ASSISTANCE FROM A BUILDING GROUP

Source: Study Team field notes

individuality and self-reliance take a secondary position. Nonetheless, it is clear that the mobilisation of resources through a group presupposes adequate and effective leadership.

6.9.9. Criteria 2: THE AUTONOMY OF THE DECISION MAKING PROCESS IN HOUSE PLANNING AND CONSTRUCTION, ITS DECENTRALISATION AND INCREMENTAL PROGRESSION:
Autonomy suggests the extent to which the owner builder manages to apply himself in planning and/or construction. Planning requires his skills in designing a house layout and making decisions. Incremental or step-by-step investment is necessary due to the limited resources of the owner/builder. In practice the stages of construction are sequential so as to achieve the best combination of benefits and economic savings. This view of self-help by the allottee reflects an 'ideal' situation, that is decision making in planning and construction is antonomous.

6.9.10 The subcontract form of self-help on the other hand has more than one actor, that is the owner/builder and the fundi(s). Each stage of the construction programme requires different fundi(s) either because the owner/builder is unable to afford continuously hired labour or all the skills necessary are not normally available in one fundi. The owner/builder is expected to adopt the fundi's decisions. As a result the owner's role is marginal; he is in fact an 'outsider'. The role of allottees generally is to purchase building materials, renumerate the fundis, seek finance and organise their team. However, in these tasks the allottee is not experienced. As a result the owner/builder has to seek advice from friends, neighbours and the Project Agency.

6.9.11 The construction of the permanent shelter also necessitates incremental stages of construction. Such incremental construction over a period of eighteen months (two rooms for type A plot and one room for type B plot)shows that there is one group of allottees which manages to construct the required number of rooms in time, while the remainder cannot or even find it difficult to commence. The commencement of construction is an important phase for the subsequent progress since whatever construction that is completed is utilised for some kind of economic benefit.

6.9.12 When the minimum number of rooms are completed the remaining plot is left vacant until such a time as the owner/builder has sufficient resources to continue with the construction. Observations suggest that allottees experience some kind of a limbo and stop after the minimum number of rooms are constructed. There are hurdles or thresholds to overcome at this point. The required standards of construction is one of them. Perhaps this is one of the reasons why so many plots are not yet utilised to the maximum, despite nearly three years of occupancy.

6.9.13 In the case of a building group the room(s) that have to be constructed, through the group's efforts, are done by subcontracting all the activities to a fundi. The fundi is employed on a lump sum basis, the contractual agreement is made by the group's representative with the fundi. This helps the owner/builder/member to overcome some of the difficulties experienced by non members when employing a fundi. In this case therefore it is clear that, in the actual decision making process of planning the tasks of construction, the groups collective effort is applied and an individual's direct participation reduced.

6.9.14 Criteria 3. THE EXTENT TO WHICH OFFICIAL STANDARDS FACILITATE OR HINDER SELF-BUILD METHODS: In self help by the allottee, a temporary shelter is first built. However, within the official rules and standards such a a shelter is considered "temporary" partly because of the materials used, the form of and construction but also because of the functions that the temporary shelter serves. Taking the official view this kind of shelter does not conform with any standards. On the contrary, it is not "acceptable" or "desirable" since this kind of shelter projects the image of a squatter and is therefore considered to be undesirable. As a result in the early stages of the Dandora Project, such temporary shelters were not permitted to be erected. It was only after realising that only by providing such temporary accommodation could the owners commence construction of the permanent dwelling that the official view changed.

6.9.15 The phenomena of the temporary shelter is an important element of the self-help effort; perhaps never conceived by the planners in their concepts of house construction. This phenomena demonstrated the extent of the owner's ability and limitations. It was only when the local authorities realised that this kind of a temporary shelter was a pre-condition to any further plot development did they relax their rules.

6.9.16 The official view extended the useage of such a structure until the permanent house is completed. Thereafter, the temporary structure must be removed. The sub-contract form of self-help is perhaps the only realistic way of constructing dwellings which would meet official standards. The process of construction necessitates an understanding of the type of materials

to be used, when and how. This knowledge is also lacking amongst the owner-builders.

6.9.17 As a consequence, it is necessary to sub-contract those tasks which are beyond the allottees' abilities. In an attempt to do this the owner-builder falls into other pitfalls due to the need for contractual negotiations, enforcement of verbal agreements, and financial management. All thse issues arise when the allottee hires and fires fundis.

6.9.18 To summarise therefore, it is clear that in an attempt to conform to the official standards the concept of self-help is grossly reduced. Only the construction of a temporary shelter is done fully on a self-help basis: thereafter the construction of a permanent dwelling is less and less a self-help process.

6.9.19 The official view of building groups advocates the idea of group participation, demonstration and even technical assistance, A building group however requires more management, record-keeping and equitable distribution of resources. Practice reveals that far more resources are required for a building group to function effectively. Once again the official standards can help but, at present, the pattern of standards hardly corelates with building groups as a resource.

6.9.20 Criteria 4: THE DEGREE OF IMPROVEMENT IN THE SOCIO-ECONOMIC STATUS OF THE ALLOTTEES AFTER JOINING THE HOUSING ESTATE: One of the broader objectives of the project was to alleviate the "housing problem" through the sites and services policy. This objective is conceived as the improvement of the socio-economic condition of the allottee and environmental quality of the dwelling. Observations suggest that most of the allottees were previously residents of squatter settlements, such as Mathare Valley, Pumwani, Embakazi and Dagoreti. The quality of these previous areas, whilst varying, could be considered, from the authorities view, as 'undesirable'

6.9.21 The present residents of the Dandora project can be broadly grouped under three categories in order to observe the degree of improvement in their socio-economic status after moving to the estate.

6.9.22 The first group, where there is an appreciable economic change. Incomes have risen suddenly due to the income from renting, either partly or fully, and from small business enterprises.

6.9.23 The second group of allottees experience no adverse effects on their income level, either due to better management of their finances or to partial subletting to meet some of the principal costs of house construction.

6.9.24 Thirdly, a large group of allottees have experienced an adverse impact upon their income level. For several reasons their income has fallen compared to that enjoyed before joining the estate. This is due to poor management of house utilisation, record keeping or the need to change their job due to change in residence.

6.9.25 On the social side there are both benefits and costs accrueing from the project. On the positive side there is the sense of security through tenureship of a property and investment which rapidly appreciates in the market and lastly, the educational experience derived out of participation in erecting a dwelling and in finding a foothold in the urban economy.

6.9.26 Social costs include the breaking up of the extended family. Often this is due to a lack of sufficient rooms in the estate, the need to partly sublet and earn extra income. Most importantly, the financial stress that the allottee now bears. The repayment period, for example, is about 30 years and this indeed is a long time for a person to shoulder the stress. The other social or personal

costs are temporary but noticeable during the course of house construction. These are the pressure of working alongside a fundi, seeking approvals from the authorities and raising enough finance to meet the cost; often the allottee has to partly sublet the dwelling at the cost of privacy and overuseage of the wetcore facilities.

6.10 RECOMMENDATIONS:

6.10.1 Having studied in some detail the operation of self-build methods at Dandora we wish to RECOMMEND as follows. These recommendations apply to low cost housing in general and not just to sites and services schemes:

- Allow the building of a temporary shelter on construction sites
- Prepare a list of approved fundis for use by house builders; for example in a sites and services project, the list would be prepared and kept up-to-date by the project agency's representative on site.
- Design a simple form of agreement for use between the developer and fundi.
- Prepare a self-help construction manual with simple easily understood specifications and details.
- Prepare guidelines, model constitution and standing orders for the better administration of building groups
- Expand the housing extension service in local authorities
- Legalize the issue of the phased occupation certificates
- Initiate a clearing agency and advice bureau for subtenants.
- Prepare a suitable subletting agreement and encourage the use of rent books.

- Review the amount of material loan from time to time to keep abreast of material prices.
- Permit the use of second-hand materials.
- Encourage the formation of building groups in the upgrading areas.
- Compile a list of materials suppliers and merchants for every town.

CHAPTER 7

INITIAL AND OPERATING COSTS

7.1 7.1.1. If there were no legal controls over the choice of materials, building techniques and space standards building practice would then be governed by non-legal parameters; the most important of which would be the market. However there are other principles that would also influence dwelling quality and cost. These are the traditional building practices; available materials, land tenure, personal preferences and the need to innovate and emulate; and social rules regarding location and nearness to community leaders. Each of these determinants will be discussed in turn:

7.1.2 If there were no building code, the market would still see to it that quality dwellings are built. As long as there is demand for spacious, well built and well equiped houses, owner builders and developers will supply those houses. That means that even if codes or byelaws are instituted, they need not cover every aspect of dwelling supply. They ought merely to cover those aspects aimed at public safety and safeguarding public health. Matters relating to comfort, convenience, and famoly life-style can best be left to market processes. The consumer of a house of certain price or rent catagory demands a particular standard of comfort and fittings and the developer or landlord knows that he must provides those facilities if he is to get a purchaser/tenant. For example whether the byelaws require it or not a three-bedroomed suburban house or maisonette costing £15,000 or more would have hot water, a bath-tub, fitted cupboards in the kitchen and bedrooms, hidden electric wiring, and servants' quarters. That is why the Commissioner of lands normally inserts a building covenant in the ground lease requireing the allottee to build a house or other building at minimum cost of so much. A cost 'floor' is a

convenient way of specifying building standards, subject to it equating with the inflation of building costs.

7.1.3 Building techniques learnt through apprenticeship and handed down from generation to generation to ensure that acceptable standards are achieve. Although the quality and sophistication of craftsmanship will vary from society to society, or from tribe to tribe, it is found that the more intricate designs and technologies are available in the more sedentary societies with a tradition of specialization and long apprenticeship for the "fundis", while the simplest are evident among the nomadic societies. In an urban situation with a relatively advanced building technology quality would be ensured, for the richer, by competition among 'fundis' to excell and to establish a reputation. For the poor, who cannot afford to pay for competent craftsmen, the quality of design and construction would be extremely low. This is in fact what happens even in a controlled situation for it has not been possible to couple building control as a legal instrument with economic measures that would ensure its compliance.

7.1.4 Residential location in the absence of building control would be partly determined by the land tenure system. The landowners or the chiefs would allocate the choice plots to relatives or community influentials, who because of competition amoung themselves and because of their desire to get noticed by the top leaders, could erect substantial dwellings. In such situations physical proximity to leaders and decision makers is an important consideration. That is standards are determined by who builds where. Certain people are expected by society to erect dwellings of a certain standard. Moreover, the importance of a site in terms of its owner, its potential occupant and its proximity to other sites dictates that a structure of a particular cost level (hence quality) should be built upon it.

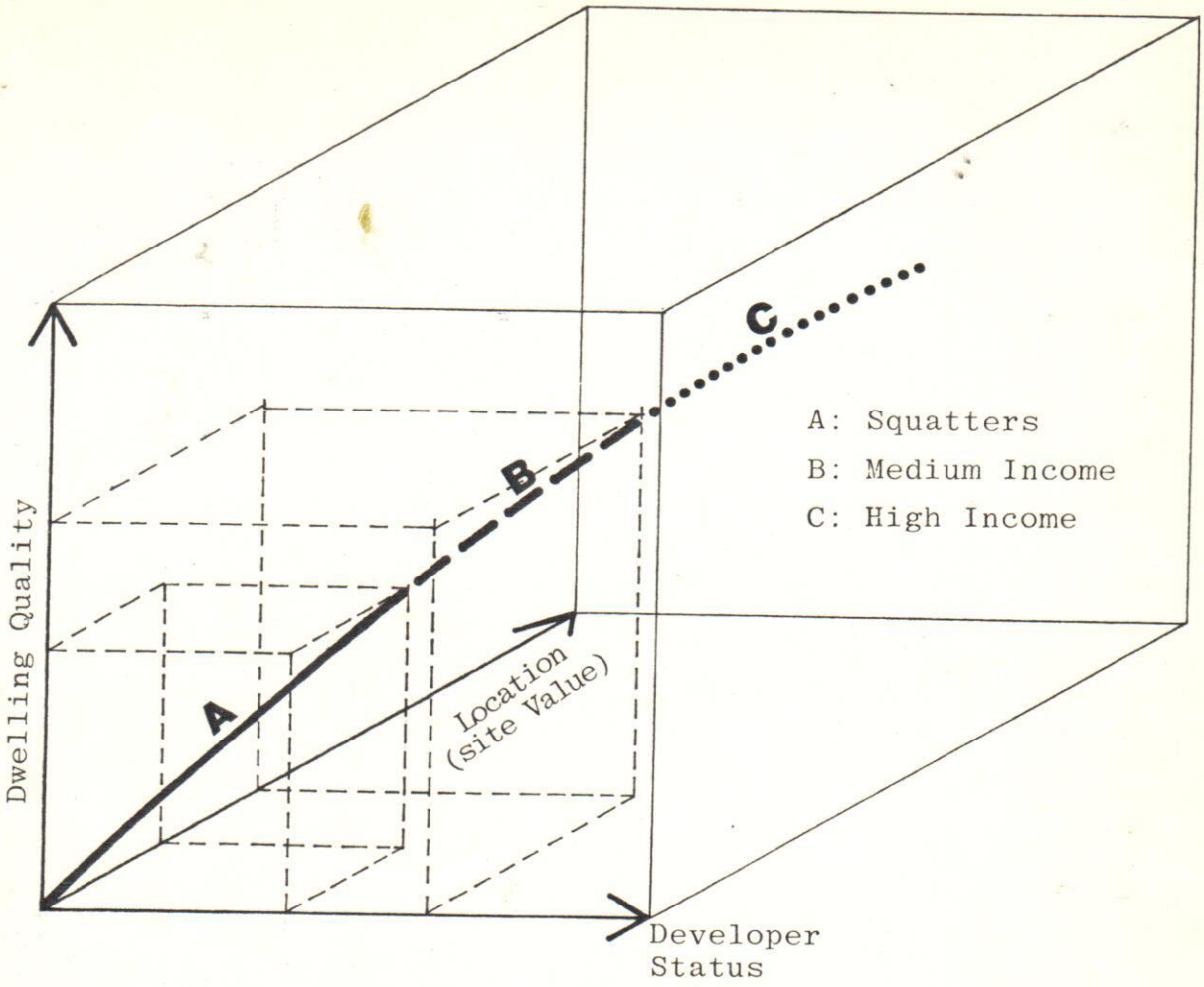



FIGURE 7.1: DEVELOPER STATUS, LOCATION AND STANDARDS ("WHO BUILDS WHAT WHERE")

The concept is illustrated in Figure 7.1

7.1.5 The social status of the developer and site location would also influence the materials used. In the absence of legal constrants the choice of useable materials is in theory unlimited. In practice however, the range of choices remains virtually the same since the well-to-do developer will want to avoid cheap, temporary and low-status materials while the poor would in any case use the cheapest local materials availabe-as they do now in spite of the legal restrictions.

7.1.6 If it is necessary to introduce legal and codified standards where none existed before, the logical starting pointing point is the standard of dwelling that is built by the poorest member of the community without endangering the health, safety and dignity of the occupants. Hopefully with increasing prosperity the minimum standards would be allowed to rise.

This does not happen at present. Legal standards are constrained yet the capacity to meet them declines with time while expectations are rising.

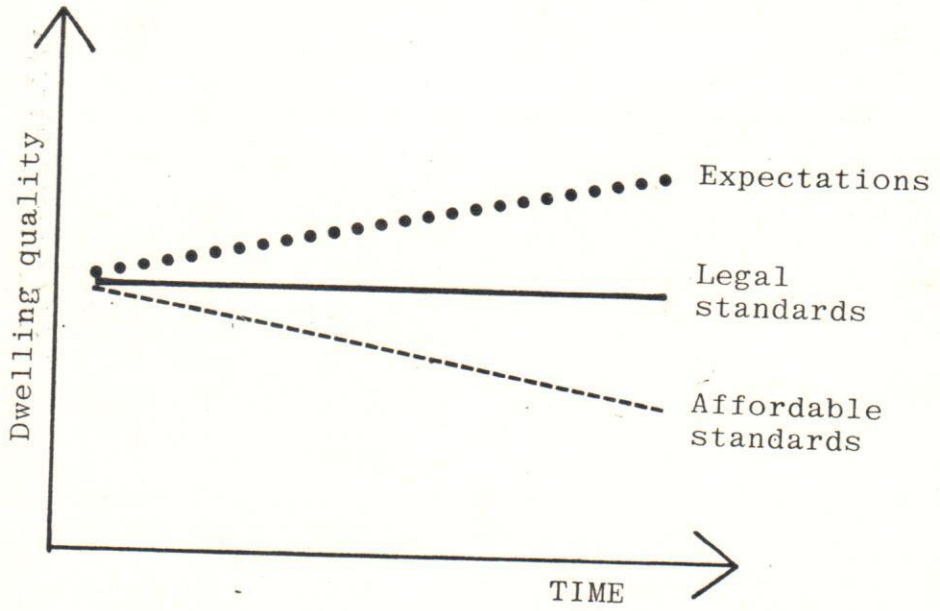



Fig. 7.2 CHANGING EXPECTATIONS OVER TIME

## 7.2 BUILDING CONTROL AND DEVELOPER BEHAVIOUR:

7.2.1 The influence of a building code on developer behaviour varies according to the market in which the developer operates. The builder of a high quality house is not likely to be bothered by the code. His standards are well above the legal minimum. It is in the middle and lower income sectors that meeting the legal standards creates a problem. In order to maximise his profit the developer will want to keep building costs as low as possible, since profit is the residual after deducting development and land costs from the sale value. A change in the building code downwards would thus assist the developer to maintain stable prices in the context of inflation, and also increase his profit. Only a portion of the cost reduction will be passed on to the purchaser.

7.2.2. Will the introduction of less expernsive standards result in more dwellings being built? Again the answer depends on who builds. The public sector will get more houses for their money, though not in the same proportion as the reduction in cost, since although public land is inexpensive the administrative overheads are much higher in public than in private development. On some NHC projects, administrative overheads have been quite substantial. Even if we assume that construction accounts for 60% of the total cost, a 10% reduction in building cost will result in 6.38% more housing. It is obvious that for maximum effect byelaws changes must be accompanied by reductions in other costs, especially land and administrative overheads.

7.2.3. In the private sector changes byelaw will make as we have already seen, individual houses slightly cheaper and more accessible to the lower income families, but a massive increase in the supply of housing is not likely since private developers operate as uncoordinated individuals and companies and are more interested in specific projects to satisfy specific demands. Thus unless effective demand for approved housing is increased as a result of byelaw changes the private sectore will not respond with an enhanced supply. In fact in this sector of the market the supply is more likely to be influenced by factors other then legal standards, e.g land availability and the possible financing arrangements. As far as dwelling quality is concerned the aim ought to be that a revised code should not adversely affect housing quality. The achievement of this objective is however not, an easy task. For example there is little scope for lowering the existing space standards without seriously affecting family welfare and comfort.

7.2.4 The scope for structural changes is limited by safety considerations, while sanitary requirements are tied to health considerations. So changes are not worth while unless the resulting cost reductions are large enough to justify increased risks. If one can define the risk level it will be easy to identify the cut off point as far as standards are concerned. This point is discussed in greater detail in the Discussion Paper DP 2 (Environmental Health) as well as in the other technical papers in this series. It is not possible to quantify the resulting trade-offs at this early stage.

## 7.3 INITIAL COSTS:

7.3.1 The cost of providing a new dwelling consists of the following:

- land
- Services/infrastructure

- construction cost i.e. materials, labour and contractors, overheads and profit if contractor built.
- landscaping
- professional fees
- survey fees
- interest on capital during construction
- developers administrative costs/or profit
- land taxes during construction
- marketing costs.

7.3.2 In addition the occupant will have to pay connection charges and deposit for the various services as well as legal costs and stamp duty. In the above list by far the largest and most important item is construction cost. If reductions were to be made here by a private developer building for speculative purposes who, let us suppose, is not constrained by a building code, where would he seek to effect reductions? He would first opt for the most economical design in terms of layout, both internal and external, and site conditions. He would then seek to effect economies as shown in Table 7.1.

7.3.3 New byelaws should attempt to accommodate the builder in his efforts to reduce costs. We have concentrated above on the areas in which byelaws could make a contribution. Thus the use of self-help methods or more efficient labour, though very pertinent as far as cost reduction is concerned, is not a legal requirement. Nonetheless byelaws must promote a more efficient use of labour by being simple, clear, and easily understood.

7.3.4 When a professional designer is involved, he will endeavour to utilise each cost-reducing tactic to the maximum while at the same time bearing in mind the possible secondary effects on other building elements.

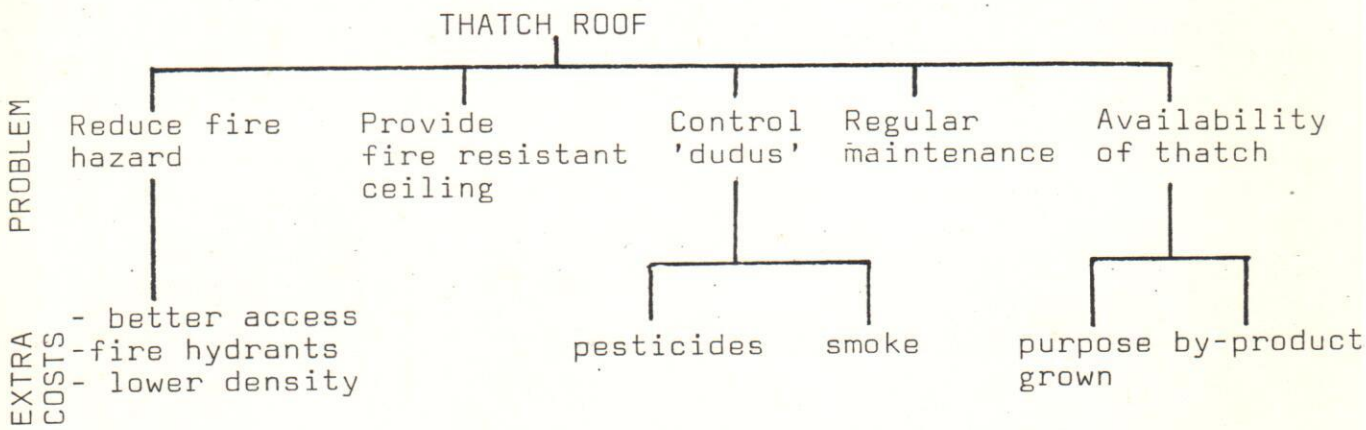
TABLE 7.1

HOW THE DEVELOPER ATTEMPTS TO REDUCE CONSTRUCTION COSTS

| COST-SAVING DEVICE | POTENTIAL FOR CHANGE IN BYELAW REVISION | EXAMPLE |
|---|---|---|
| Reduce dimensions | High | Thinner walls, floor and partitions; light weight roof trusses; small dia. rwp.; thinner plaster or screed |
| Reduce space requirements | Low | Smaller rooms; lower ceilings |
| Reduce plot dimensions, side yards, e.t.c. | Medium; $100m^2$ plots already in use | Small plots in sitse & services schemes; narrow frontages |
| Use inexpensive materials + recycled and secondhand materials | High | Local materials e.g. Walls: Mud/wattle coral & other locally available stones, soil-cement blocks, mud bricks, used concrete blocks, timber, sisal poles; roofs: g.c.i. sheets, makuti & thatch |

| COST-SAVING DEVICE | POTENTIAL IN BYELAW REVISION | EXAMPLE |
|---|---|---|
| Use labour-saving detailing & technology | High | Pre-manufactured elements and components; on-site machine for making blocks; mud bricks; efficient kilns |
| Cut down on finishes | High | No ceilings, plstering, skirtings, architraves, etc. |
| Use cheaper site | Medium ('cheap') sites are normally expensive to develop | Peri-urban sites on government land; land acquired at agricultural prices |
| Share elements and components | High | Shared water tanks, drains, manholes, road frontages; back-to-back houses; party walls; stand-pipe; shared septic tanks. |

Here is an example showing the possible effects of using a thatch (say makuti) roof.



## 7.4. OPERATING COSTS:

7.4.1 The effect of byelaw changes needs to be examined in the context of total dwelling costs, that is capital as well as recurrent costs. If the resulting total costs (i.e. operating costs) were higher the change would in theory not be worth-while. However in practice other considerations may be paramount, e.g. the fact that only a limited amount of money is available now to build a house and future maintenance and other expenses though relatively high, can be met from other sources as and when needed. Such irrational, but necessary, considerations make it almost unrealistic to argue in terms of operating costs. To a low-income household it is more important to get the house built than to worry aboutfuture maintenance costs, rates and so on. Moreover not only do all costs rise anyway through inflation, but rising maintenance costs can be met from additional income from subletting.

7.4.2 Operating costs in this context are seen as including:

- amortisation of the initial investment over the life of the building; for renters it would be the rent
- maintenance
- rates
- insurance
- management expenses
- water charges

Electricity consumption would be much less responsive to byelaw changes and does therefore not warrant discussion here. It is also convenient to exclude depreciation, since at the prevailing interest rates, if a building can last fifty or sixty years, it is as good as an ever-lasting asset.

7.4.3 Amortisation: This aspect can be approached from three directions. First there is the mortgage repayment, which is a real and tangible household expenditure. The amount would depend on the loan period and interest rates plus any additional fees like insurance charges. We have already disccussed the possible effects of any changes in the byelaws on mortgage repayments. The second way is to take the rent payable by either real or hypothetical tenants, although in this case the demand of land and location would be included. The rent value is almost higher than the mortgage repayments. Thirdly, an annual equivalent of the initial investment could be calculated on the basis of a suitable interest rate taking into account the opportunity cost of capital and risks involved. Whichever method is used the amortisation on lower quality dwelling - say mud and wattle as opposed to concrete block- would be proportionately higher than for a superior dwelling. This is because of the shorter working life and higher risks involved.

7.4.4 The rent for a house built of mud or wattle would be lower than for a concrete block house but not in the same proportion as the capital costs. For instance whereas a tenant of a room in a permanent low-cost house at Likoni, Mombasa, may pay shs.100/- per month, his colleague in a mud and wattle and mabati roofed house may well pay shs.75/- per month, although the cost of the latter house may be about half of the permanent one. That is owners will benefit more from byelaw changes than renters. Even in Nairobi one finds that the difference in rent between say Mathare Valley and Dandora are in no way related to differences in construction costs and residential quality.

7.4.5 Maintenance: There is very little available information on maintenance costs outside the public sector. Even in the public sector estimates and actual expenditures are usually rendered for the whole town by Government Department. Widely varying figures of maintenance expenditure should be expected since there are so many factors which

influence the amount of expenditure. These include:-

- type of construction
- design
- age
- occupancy and use
- climate
- site conditions
- changing family preferences
- management capabilities.

7.4.6 The relevant point is that standards that allow inferior materials will result in higher expenditure on maintenance. A study of investment in Swahili housing in Mombasa, carried out in 1970, showed that investment in repairs and improvements accounted for two-fifths of the total investment in "temporary" construction, with non-new work (i.e. repair work) being heavily concentrated in the older neighbour hoods. 1/ Another study of Nairobi City Council maintenance expenditure on three housing estates showed that 2.64%, 3.90% and 23.20% of rental income from Mariakani, Kariakor and Ziwani Estate respectively was spent on maintenance. The amazingly high figure for Ziwani is explained by the age of the estate and the very low rents charged, varying from shs. 26/- to 91/- per month.

7.4.7 That particular study recommends a figure of 7½% to 10½% of revenue as being an appropriate allocation for maintenance in local government housing. 2/ However, the HRDU reports that in 1974 Nairobi and Mombasa spent respectively 17.00% and 11.55% of rental collections on maintenance. 3/

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1/ S. Yahya Tradition and Modernity in Residential Investment. Dept. of Land Development, University of Nairobi, 1971.

2/ D.M. Mugaa "The Economics of Maintenance" KIPIMO Vol. 1 no. 1. March 1976

3/ Local Authority Housing in Kenya, HRDU, University of Nairobi, 1978

The HRDU report also gives the following average figures of maintenance and insurance expenditure for 1974 in five municipalities.

| | Maintenance | | Insurance | |
|---|---|---|---|---|
| | per unit shs. | % of revenue | per unit shs. | % of revenue |
| Kisumu | 73/50 | 3.02 | 30/10 | 1.25 |
| Nakuru | 48/70 | 6.50 | NA | - |
| Thika | 451/10 | 54.10 | 4/10 | 0.50 |
| Eldoret | 35/30 | 4.00 | 2/80 | 0.30 |
| Kitale | 77/70 | 5.65 | 13/20 | 1.00 |

7.4.8 The Ministry of Local Government recommends a figure of 1%% to 2% of capital value. A recent study of University of Nairobi maintenance costs shows that the University spends 0.06% of the valuation on maintenance, but this figure is for all buildings, not just housing. 4/

7.4.9 It must be noted that maintenance demand and expenditure occur in "lumps" with large investments at intervals for the purpose of renewals and renovations, and relatively low expenditure in the intervening years. This is especially the case where traditional materials, such as mud and wattle and makuti roofs, are used. A suitable financing plan has yet to be devised for this kind of expenditure.

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4/R.M. Njihia, Maintenance of University of Nairobi Estates Unpublished Student Project, Department of Land Development, University of Nairobi, 1979.

7.4.10 Rates: The rating system in Kenya is based upon the unimproved site value, i.e the market value of the undeveloped land. Revised byelaws that result in less expensive improvements will have the rather odd effect of raising rather than lowering rates. There are two reasons for this. First the reduction in construction costs will result in higher land values, not merely because there will be greater demand for legal building plots, but also because only a portion of the cost reduction will be reflected in the sale value of the house. The rest will be absorbed by the developer's profit and the site value. In practice however the person preparing the valuation roll will be influenced by the type of development on the land, although he is not supposed to be.

7.4.11 The other reason for a possible increase in rates is that the lower infrastructure specifications, for instance murram roads as opposed to tarmac, or unlined open drains as opposed to lined, will cost more to maintain and the local authority will have to recover the increased costs from ratepayers. In upgrading areas a special rate or surcharge may be levied to recover the cost of infrastructure. In any case land settled densely by the poor is more productive in terms of rates than land in the more expensive neighbourhoods since hectare for hectare the former is more valuable. For instance the current market value of hectare in Eastleigh is about £70,000 while a hectare in Lavington would cost a mere £30,000.

7.4.12 Insurance: This aspect has already been discussed in connection with housing finance (Chapter 5). Cheaper construction will not attract higher premiums unless the fire hazard is increased. The risks are graded by insurers as follows according to the type of construction:

Class 1 Construction - Brick, stone and other permanent materials.
Class 2 " - Wood and iron
Class 3 " - Basic types e.g. farm buildings.

Premiums range from shs. 5/- to shs. 8/- per £100 of replacement cost. Reductions are possible where owners get together and ensure a whole estate.

7.4.13 Management: This expense is only relevant where the owner has a number of houses which he lets out and has to employ a managing agent or incurs expenses in rent collection, voids (i.e. vacancies); advertising for tenants and preparing leases. In the context of low income housing the cost are minimal, apart from the mental and emotional stresses of living and dealing with subtenants. For owner-occupiers there is the inconvenience of attending to different types of official notices and requirements. For instance the difference between land rent and rates is not easy to recognise for the non-initiated, while landlords are not always aware of their rights and obligations under rent restriction legislation. Revised byelaws are not likely to affect management costs to any significant extent.

7.4.14 Water is paid for separately as a user charge and is an expenditure not directly affected by building standards.

## 7.5 CONCLUSION:

7.5.1 This chapter has endeavoured to identify those areas where byelaw changes would be most profitable. The actual initial cost reductions are fairly easy to calculate once the changes have been decided upon and proto-type designs developed. That is a purely technical function. The long-term effects are however more difficult to forecast because of uncertainties regarding obsolenscence, maintenance technology and costs in the future. Not only is there a dearth of essential data, but the relevant methodological tools are quite weak. It is difficult to answer the question often asked by the layman: are the

inexpensive dwellings we are trying to develop going to be the slums and shanties of the future? It is a question which designers should assist to solve in a positive manner.

7.5.2 It is essential that a Housing Statistics Project be designed and launched to monitor and publish all the relevant financial and economic indicators discussed in this and preceeding chapters on a regular basis.

CHAPTER 8

RESOURCE USE

8.1 This section of the discussion paper deals with the following aspects of building control:-

- Relevance of housing types, standards and technology;
- Materials, local and imported;
- Labour, i.e. manpower, skills and management
- Equipment and capital
- Energy.

8.2 HOUSING TYPES, STANDARDS AND TECHNOLOGY:

8.2.1 The efficient utilization of such resources as building materials, labour, equipment, capital and energy (amongst others) is directly related to the house type designs, standards and technology. These resources are basic to the production of housing for all types of income groups, i.e. low, middle and high income groups. The wasteful utilization of these resources for the production of housing units for the high income groups directly and indirectly effects the production of housing units for the other income groups, especially the low income groups in the urban areas, and vice versa. It is, therefore critical that the utilization of the resources for any type of housing development project be a matter of concern at the planning and building design stages.

8.2.2. Table 8.1 shows a comparative cost analysis of various public housing estates in Nairobi for the low, middle and high income groups. This brief comparative analysis shows that the site-and-services scheme in Dandora is very competitive in terms of public investment per dwelling, as compared to other publicly completed housing programmes in Nairobi. The cost of services per plot in Dandora is the lowest despite the fact that in all the cases there is a provision of water-borne sewerage, individual water - supply, roads and street lighting. The main difference, however, is that Dandora is a high density area using some of the

TABLE 8.1: COMPARATIVE COST ANALYSIS OF DANDORA & OTHER PUBLIC HOUSING ESTATES IN NAIROBI

| HOUSING AREAS | Plots per Ha | Plot Size $M^2$ | Covered Area $M^2$ | Cost of Building K.Shs | Cost of Services K.Shs | Sale Price K.Shs | Monthly Payment K.Shs | Affording Income K.Shs p.m |
|---|---|---|---|---|---|---|---|---|
| 1. DANDORA | 50 | 120 | 60 | 9,600 | 3,200 | 12,800 | 115 | 575 |
| 2. BIAFRA (PUMWANI) | 40 | 102 | 36 | 27,600 | 4,900 | 32,500 | 290 | 1,400 |
| 3. UMOJA | 45 | 126 | 42 | 28,000 | 5,000 | 33,500 | 290 | 1,400 |
| 4. HURUMA | 45 | 105 | 35 | 49,500 | 6,500 | 56,000 | 500 | 2,500 |
| 5. BURUBURU | 38 | 167 | 67 | 54,900 | 11,500 | 66,400 | 600 | 3,000 |
| 6. KIMATHI | 22 | 210 | 70 | 70,000 | 8,000 | 78,000 | 700 | 3,500 |
| 7. MADARAKA | N/A | N/A | 90 | 77,000 | 7,000 | 84,000 | 750 | 3,700 |
| 8. HARAMBEE | 26 | 270 | 70 | 80,000 | 6,400 | 86,400 | 760 | 3,800 |
| 9. KIBERA | 38 | 150 | 110 | 91,000 | 18,000 | 109,000 | 980 | 4,900 |
| 10. JAMHURI | 21 | 108 | 62 | 139,400 | 11,100 | 150,500 | 1,350 | 6,700 |
| 11. NGEI | 10 | 700 | 130 | 130,000 | 30,000 | 160,000 | 1,440 | 7,200 |
| 12. LORESHO | 36 | 2,500 | 200 | 219,000 | 23,000 | 242,000 | 2,100 | 10,500 |

Grade II Building byelaws and the others are medium and low density areas using Grade I byelaws. Table 8.1 also shows that the cost of services and buildings is directly related to the affordability of housing by the various income groups. The planned income group in Dandora (site-and-services scheme) is that earning upto K.shs.575 per month, while in the Ngei Estate (completed housing scheme) it is the higher income group earning upto about K.shs.7,200/- per month. Furthermore it shows that for the total cost of one housing unit in a high income, high cost housing project (e.g. Loresho at K.shs. 242,000/- each) almost 20 housing units in a low income/low cost housing project (e.g. Dandora at K.shs.12,800/- each) could be provided using public funds and resources.

## 8.3 HOUSING TYPES:

8.3.1 Within the low cost housing programmes implemented by the National Housing Corporation (NHC) or the Local Authorities (such as the First and Second Urban Projects implemented by the Housing Development Departments in Nairobi, Mombasa and Kisumu) house type plans with stipulated building standards and specifications have been provided in the past. These type plans have not always been followed by the plot holders in the site-and-services schemes nor have they always been enforced by the Local Authorities. According to the Housing Research and Development Unit (HRDU) study on the evaluation of the site and services programme in Kenya several examples of non-compliance with type plans were found in various schemes in the country. In most of these cases of non-compliance the plotholders built more rooms than was permitted, i.e. more than 50% of the plot coverage. Several houses were built on the plot boundary, leaving a space of less than two metres to the next house. In one case a house

was built partly over the sewer. In one of the project towns, the Town Engineer stated that type plans, and for that matter even byelaws, are difficult to enforce.

8.3.2 The HRDU study further points out that by and large the house type plans have improved in Kenya during the past 10 years since the first HRDU Site-and-Services (S&S) Analysis and Report prepared in 1970. Many of the recommendations made at that time are common knowledge. These include, interalia:

(i) The need for independant access to all habitable rooms in order to facilitate subletting;

(ii) The use of 4 - 6 rooms per service unit;

(iii) The need for room dimensions suitable to accommodate commonly used furnishings;

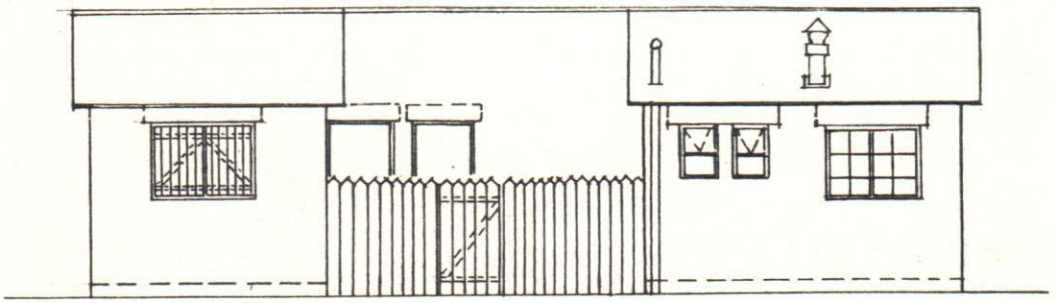
(iv) The need for simple construction methods which respond to the varying skills of local fundis' (craftsmen); and

(v) The principle of the Swahili house as a feasible low-income house-type based upon private outdoor space and security.

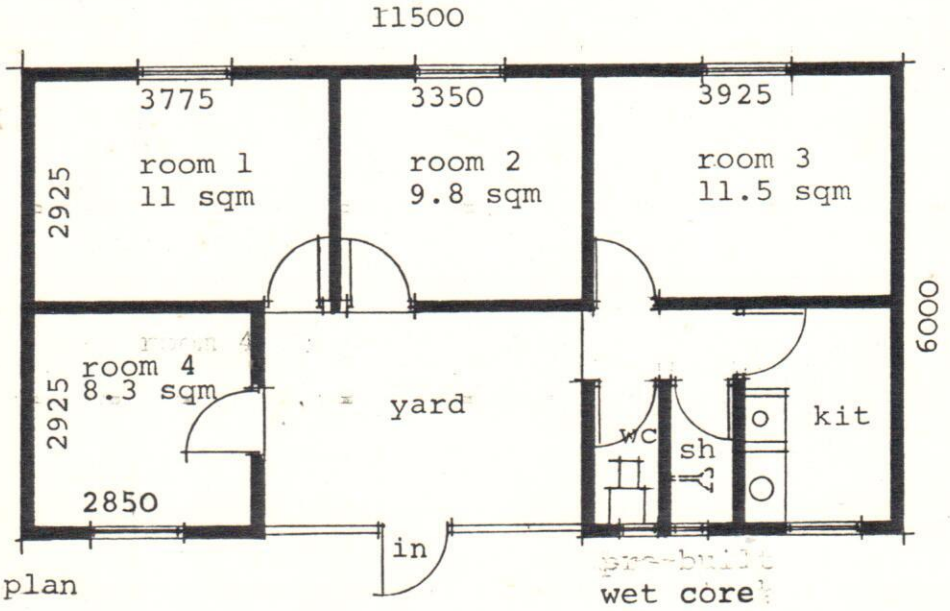
8.3.4 The NHC has adopted a range of housetypes based on the principle of the Swahili house and that of the conventional corridor house-types, which have been improved over time. However, a number of house type plans are not suitable for progressive development as mentioned in the HRDU S&S evaluation report.

8.3.5 Two examples from Webuye and Kakamega have been described in the report. (See Type Plan 8.1). This problem of one stage development as against progressive development is related to the detached house types being used presently. It is, therefore essential to control the use of type plans which cannot be developed in a progressive manner with relation to the income of the household and thus affordability. The detached houses built in one stage have often resulted in

TYPE PLAN 8.1 AN EXAMPLE OF AN NHC TYPE PLAN
(Webuye Town Council: Site & Service 2)



elevation




plan

plinth area 55.4 sqm

0 1 2 3 4
METERS

financial hardships and incompleted houses. Furthermore, the use of temporary shelters at the house consolidation stage in the S&S schemes needs to be officially permitted for reasonable time periods and controlled by the relevant implementation agency. The HRDU has recently prepared a report on "Low Income House Types for Kenya" in July 1979 in response to the need for appropriate and affordable house types for different parts of the country. These house types can provide useful guidelines for future low-cost house types in urban housing development projects. (See Type Plan 8.2).

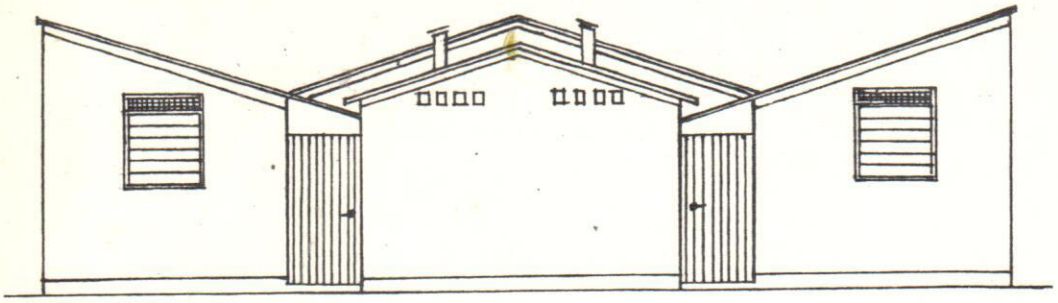
8.4 STANDARDS:

8.4.1 A detailed analysis and review of standards of construction for the house and the plot will be presented in Discussion Paper No.5 on Technical and Design Aspects. However, a summary of the major issues related to the standards for low-cost houses from the point of building control are outlined below:-

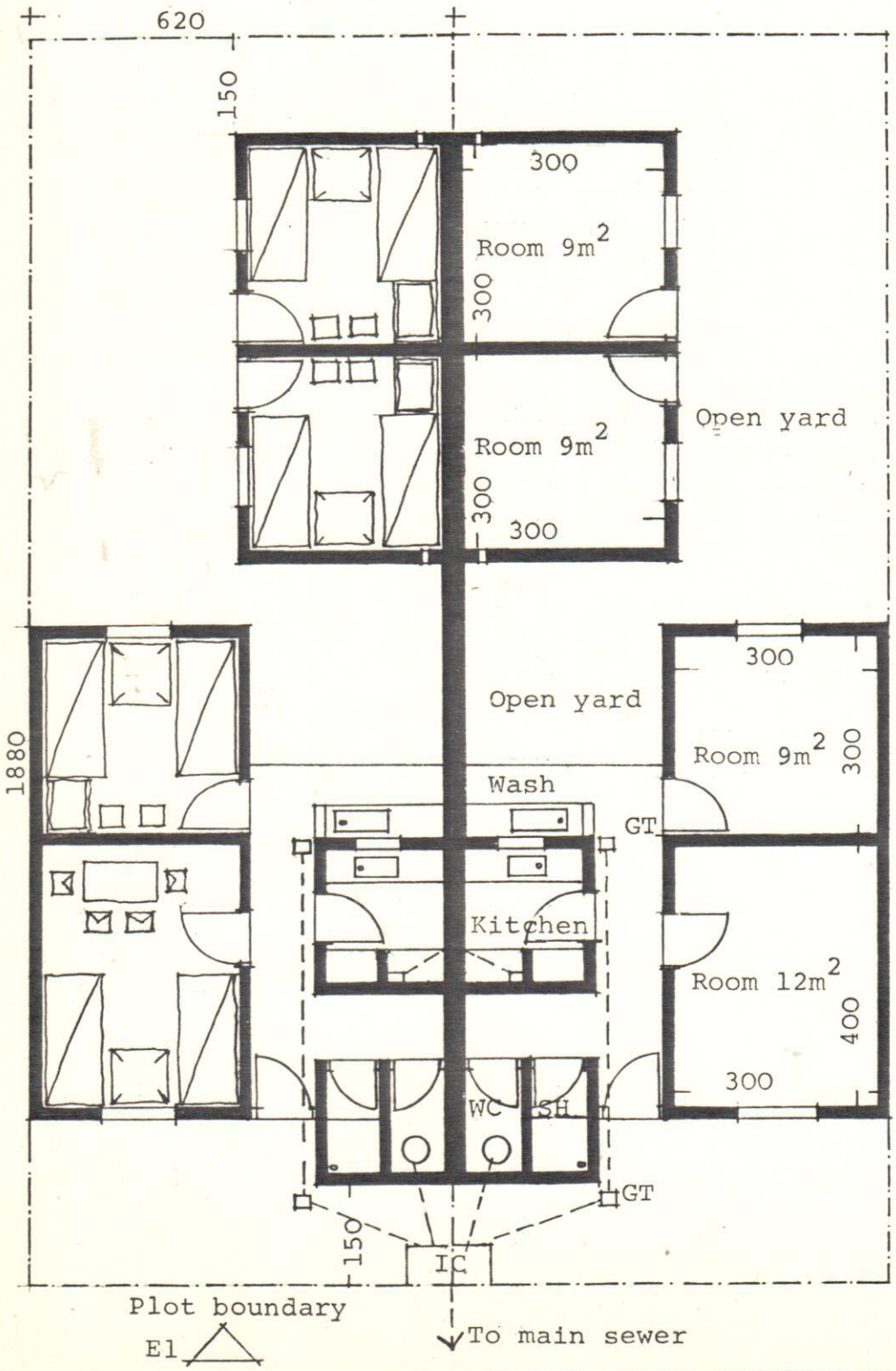
(i) The presently used Grade II building Codes as outlined in the Building Code of 1968 are inadequate and lack specific requirements especially when applied to low-cost/low-income high density housing development projects in urban areas.

Example:
Grade II Building Code No. 6 state:
"No building shall be sited on a plot otherwise than in accordance with the approval of the Council." Such a byelaw leaves tremendous amount of personal interpretation when approving a building plan for a low-cost house. Delays in the implementation of low-cost housing development projects have often occured in the past due to such vagueness and

TYPE PLAN 8.2 AN EXAMPLE OF AN HRDU TYPE PLAN



Elevation E1



personal interpretation of byelaws. The annoyance and inconvenience caused by the claimed arbitrary application of personal interpretation of the vague clauses in the legislation is aggravated by the lack of any authority to which aggrieved applicants can be appeal. In many cases, the decisions of the local authority officers, even if considered to be incorrect, is final.

(ii) The Grade II Building Code stipulate insufficient and inappropriate standards which do not respond to the changing conditions in the urban areas. For example, Grade II Building Byelaws Nos. 8, 12 and 23, which deal with Bathrooms and Latrines are insufficient and depend upon the Public Health Act for further information, especially when water-borne sanitation is provided in a low-cost housing project. Similarly, no clearly defined standards for roads, car parking and community facilities are available, except for the decisions of the Local Authorities, which are amended from time to time. There is, therefore, a need for a unified set of standards in one document.

(iii) Inappropriate standards have hindered the planning and implementation of low-cost housing development projects in the past especially with regard to the infrastructure requirements and building materials permitted. One example of such a project has been the Dandora Community Development Project. The levels of services and the expected planning and design standards as stipulated in the Building Code and the Public Health Act have a direct effect upon the cost of services and buildings. The cost in turn is related to the target income groups for the projects. One of the significant experiences of Phase I of the Dandora Project has been the issue of the

TABLE 8.2:CHANGES TO DESIGN STANDARDS & COST IMPLICATIONS FOR PHASE II OF DANDORA

| COMMENTS (SOURCE) | RECOMMENDATIONS (SOURCE) | IMPLICATIONS |
|---|---|---|
| 1. SEWER CONNECTIONS: The connection to the sewer passing through another plot is unacceptable (M.O.H.:C.P.O.:C.E) | To locate the sewer within a wayleave located in private plots and allow for separate sewer connection to each plot (C.F.) | i. Redesign:<br>ii. Additional design fee and construction cost Approx. £20,000.<br>iii. Higher costs per plot. Approx. £50 |
| 2. SEWER WAYLEAVE: No development to be allowed within a 3 meter sewer wayleave (C.A.E.) | Same as number one | Same as number one |
| 3. SEWER SIZE: Sewer lines of 150 mm (6") will increase the incidence of blockages (C.A.E.) | Minimum sewer size should be 225 mm (9") diameter (C.A,E.) | i. Redesign;<br>ii. Additional design fee and construction cost Approx. £30,000;<br>iii. Higher costs per plot, Approx. £6; |

| COMMENTS (SOURCE) | RECOMMENDATIONS (SOURCE) | IMPLICATIONS |
|---|---|---|
| 4. ROAD SURFACE:<br>Murram surface roads with concrete drains will give trouble when the murram erodes (E.& D.) | All roads should be constructed to adoptive standards | i. Redesign;<br>ii. Additional design fee and construction cost Approx. £80; |
| 5. WATER STORAGE TANKS:<br>No storage tanks are provided for the WCs and other purposes (M.O.H.) | Provide individual water storage tanks (M.O.H.) | i. Redesign;<br>ii. Additional design fee and construction cost Approx. £275,000;<br>iii. Higher costs per plot Approx. £32; |
| 6. WATER METERS:<br>Four water meters on one plot not generally acceptable | One water meter per plot | i. Redesign;<br>ii. Additional design fee and construction cost Approx. £200,000<br>iii. Higher costs per plot Approx. £40; |

| COMMENTS (SOURCE) | RECOMMENDATIONS (SOURCE) | IMPLICATIONS |
|---|---|---|
| 7. ROAD FRONTAGE:<br>Approx.6% of the plots have no road frontage and are not within 75 m of parking lot<br>(C.E.A. - E. & D) | All plots to have road frontage G.A.E. - E & D | i. Redesign;<br>ii. Additional land.<br>iii. Additional design fee Approx. £30,000.<br>iv Higher costs per plot Approx. £6 |
| 8. CAR PARKING:<br>A car parking space for every plot with no vehicular access<br>(C.A.E. - E.& D) | Car parking ratio of 1:1<br>(C.A.E. - E.& D.) | i. Redesign<br>ii. Additional land<br>iii. Additional design fee and construction cost Approx. £50,000<br>iv. Higher costs per plot Approx. £10. |
| 9. COMMUNITY FACILITIES:<br>The Community facilities do not meet the minimum land requirements (C.P.O.)<br>A planning concept of a central spine is wrong. | Modify and redesign land requirements for all facilities | i. Redesign 6 months<br>ii. Additional design fee and construction costs Approx. £60,000 |

| COMMENTS (SOURCE) | RECOMMENDATIONS (SOURCE) | IMPLICATIONS |
|---|---|---|
| 10. HOUSE TYPE PLANS: The WC/shower/kitchen facilities should be integrated with the house plan (C.E.) | Submit house type layout plans showing the integrated (C.E.) | i. Redesign;<br>ii. Additional design fee Approx. £20,000. |
| 11. BACK-TO-BACK DWELLINGS: Back-to-back dwellings make is impossible for efficient through or cross ventilation (M.O.H; C.A.E.-E.S.D.) | Operate building for cross ventilation (M.O.H) | i. Redesign<br>ii. Additional design fee and construction costs Approx. £120,000<br>iii Higher costs per plot Approx. |

Source: Wanjohi & Chana "Strategies for Housing the Lower Income Groups in the Dandora Community Development Project, Nairobi."
(HRDU May 1977)

applicability of the existing Byelaws and the Public Health rules in relation to the minimum requirements for site and services projects Table 8.2 shows the cost implications of the comments on the Phase II plans and design of the Project and the recommended changes in the design standards. A more detail review of such implications will be discussed in the Discussion Paper No. 5 of this Study.

8.5 MATERIALS, LOCAL AND IMPORTED:

8.5.1 The following is a summary of the building materials specified for different elements in Grade II Byelaws:-

TABLE 8.3:

MATERIALS PERMISSIBLE UNDER GRADE II BYELAWS:

| Building element | Byelaw No. | Specified Minimum Standard |
|---|---|---|
| 1. Foundations | 18 | Adequate to support the load to the satisfaction of the Council |
| 2. Floors | 20 | Compacted earth, or concrete or other approved material; min. 6" (152mm) above ground level |
| 3. Walls | 19 | Mud and wattle capable of carrying roof; sealed, smooth finished and decorated externally and internally; but Council may require other materials |
| 4. Roofs | 21 | Corrugated iron, aluminium or other permanent material or shingles; Council may require painting of C.I. or aluminium sheets; Council may set aside areas where grass or similar material may be permitted; pitch to conform with Council requirements. |

8.5.3 Table 8.3 above reaffirms the earlier observation that the Council or the Local Authority officers have discretionary powers leaving room for personal interpretation by the use of phrases such as "to the satisfaction of the Council";"or other approved material";"the Council may specify the materials to be used."; "the Council may set aside areas where grass or similar material may be permitted"; "to conform with the Council's requirements", etc.

8.5.4 Apart from the issue of personal interpretation of the possible type of building materials for low-cost houses, there is a conflict in the use of different materials between the individual developer (e.g. in the site and services schemes) and the Local Authorities, even though the Grade II Byelaws permit the use of local semi-permanent building materials, such as mud and wattle, several local Authorities have expressed the view that structures built of semi-permanent materials 'downgrade' an area as a whole and devalue the efforts of the developer using permanent material. In addition, this view was further re-inforced by the point that there was little reason for allowing semi-permanent materials if plots in the S&S schemes were to be developed only by rich people, either through misallocation or through unauthorised transfers.

8.5.5 The above observation, according to the HRDU S&S Draft Evaluation Report, is further confirmed by the field survey findings which showed that 86% of the allottees (developers) used, or intended to use permanent materials, such as concrete blocks or stones for walls. Only 5.5% had re-used materials from older buildings. Apart from the S&S schemes in Mombasa where traditional local building techniques and materials are widely and advantageously used, only

the Kitale S&S scheme showed a significant proportion of mud-and-wattle buildings. (Kitale may also be one of the schemes where plot allocation has been most fair, shown by the prevalence of the designated low-income target population groups).

8.5.6 In the case of major urban centres, especially Nairobi, temporary structures built in semi-permanent materials (e.g. in Dandora) in the earlier stages of house consolidation stage were considered by the Local Authority officials as contributing towards the the creation of slums and that they were not to be permitted. The monitoring and evaluation study reports of the Dandora project have shown that these structures contributed to the fast rate of housing consolidation especially in the cases of the plots occupied by the low-income groups; and that these temporary structures have eventually been replaced by more permanent structures over time.

8.5.7 The content of imported building materials is higher in the materials for civil works, especially street lighting, electricity, plumbing and drainage as compared to the materials used for house building, especially for single-storey low-cost housing. The major imported materials for house building are steel for corrugated galvanized iron sheets and asbestos for asbestos-cement sheets for roofing; and plumbing and sanitary fixtures for W.C.'s, showers and kitchens. (See cost comparisions for different roofing materials prepared by the HRDU - Table 8.4)

8.5.8 The availability of building materials in various parts of the country also has a direct impact on the success and/or failure of any housing programme and especially for the low-cost housing projects, including the S&S schemes. The annual reports of the NHC in the past have underlined the impact of both the high rate of inflation of the building material cost and the limited supplies of building materials

TABLE 8.4 ROOF STRUCTURES FOR LOW-COST HOUSING
Cost comparisons for various roofing materials

especially cement and steel. In the past few years, especially since the energy crisis in 1973, the cost of building materials has been rising at very high rates. This continuous rise in building costs, has significantly contributed towards raising house prices above the reach of the low and medium income families, who have been particularly affected by shortages of adequate housing in the urban areas. Furthermore, the potential of locally available traditional materials and improved traditional construction techniques has not been fully realized. Special consideration needs to be given to pilot projects from the point of view of building control when such improved and/or innovative construction techniques and materials are proposed in future pilot housing projects, i.e. relaxation of byelaws (Grade II byelaw No. 17).

8.6 LABOUR:

8.6.1 From the point of view of labour in terms of manpower requirements, skills and management for effective building control there is a tremendous shortage of professional and para-professional staff within the Local Authorities. Apart from the major urban centres such as Nairobi, Mombasa and Kisumu where limited staff is available for the purpose of building control, most of the Local Authorities are very inadequately staffed to competently execute the various responsibilities.

8.6.2 According to the HRDU S&S Evaluation Study Draft Report there is a lack of sufficient building foremen and supervisors for approvals and technical assistance to the self-help builders in S&S schemes after the construction has commenced. Most of the Local Authorities in the smaller urban centres rely upon the field supervisors of the NHC. However, a

majority of these field supervisors do not have adequate resources, such as transport to visit sites thus causing delays in the production of low-cost housing. In the First Urban Project (and now also the Second Urban Project) there is provision for building foremen, clerks of works and resident engineers to ensure effective and efficient implementation of low-cost housing development projects.

8.6.3 Both the NHC and the Local Authorities continue to face the problem of lack of adequate and skilled professional and para-professional staff, which has had a severe negative impact upon the planning, programming, approval and implementation of low-cost housing projects, especially the S&S schemes. Many of the Local Authorities, interviewed by the study team, have expressed a desire for additional professional manpower in terms of architects, planners and engineers to improve the project preparation from the beginning to the end of the scheme. Some of these aspects will be discussed in further details in Discussion Paper No. 4/1 on Political, Administrative and Community Participation aspects.

8.6.4 The needs for labour within the building industry, in terms of manpower requirements, skills and management, does not present such a serious problem. Fortunately, the building industry in Kenya, as compared to other developing countries, is relatively more developed and organised, having evolved over the last 50 - 70 years. According to the International Labour Organization (ILO) study of 1972, the total employment in the construction industry in 1972 was estimated at at least 60,000 man-years, and could be upto 70,000 - 80,000 man-years if the casual workers were included. The structure of this industry showed a three-tier pattern,

with a few large European contractors dominating the large civil engineering projects, (and large non-residential building contracts to a lesser extent); the Asian firms mostly in medium scale and large residential building projects; and the African contractors ranging from the large contracting firms to the one-man self-employed 'fundi'. In spite of the commendable efforts of the National Construction Corporation, the participation of Africans in housing (especially medium income housing projects and large scale civil engineering projects) and construction activity remains limited.

8.6.5 At the lower end of the scale, the self-employed 'fundi' (craftsmen) are actively involved in the house building process in many S&S schemes in the country, especially since many of the plot allottees (developers) in these schems are either wage-employed or self-employed. This has had a significant impact in generating employment opportunities for these small-scale contractors and fundis. In other cases especially in the Dandora project, the plot allottees have pooled their labour and financial resources to form building groups to construct their houses (see also Chapter 6 of this Discussion Paper - on the Dandora Case Study) while others have built their houses on self-help basis with the technical and community development assistance provided by the implementation agency (i.e. the Housing Development Department of the Nairobi City Council). The experience gained from the Dandora Project could be effectively utilized in other low-cost housing projects in order to increase the production of such housing.

## 8.7 EQUIPMENT AND CAPITAL:

8.7.1 The provision of resources, such as equipment and capital, to the low-income groups,(who are intended to be beneficaries of the public low-cost housing projects), remains a major issue in the delivery of housing services. The individual self-help builder or the 'fundi' does not have easy access to capital to purchase equipment for the construction of houses in the S&S schemes.

8.7.2. The plot allottees (developers) in the S&S schemes have been provided with the materials loan needed to cover the cost of materials (permanent) and simple tools and equipment to build a minimum of a two-roomed structure, including the wetcore (shower, WC) and the kitchen. This amounts to an average of about K.shs. 7,000/- per serviced plot. The HRDU study on the S&S evaluation has pointed out that this amount is insufficient and needs to be reviewed. The study further recommends that the amount for the materials loan has to be proportional to the prevailing costs of building materials in the specific urban centres at the time the allottee takes possession of the plot and that adequate provision for price escalation for the materials loan component needs to be made at the project preparation and planning stage.

8.7.3 In most of the S&S schemes implemented by the NHC (e.g. in Kitale, Kakamega and Bungoma) simple hand-operated block- making machines have been provided to the Local Authorities to enable the plot allottees to make their own concrete/ cement blocks to build their houses. Such appropriate technology equipment needs to be provided and encouraged in future low-cost housing projects.

8.7.4 Furthermore, the HRDU study team observed that apart from the construction guidelines provided to the plot allottees in Kitale and Dandora, no construction manual showing simple techniques and the use of different equipment was being used by either the NHC field staff or the local Authorities to assist the allottees in the construction of their houses. For those allottees who build their own houses and for the fundis, an illustrated simple construction manual with the bills of quantities for the different building stages in both English and Kiswahili is desirable. The HRDU has recently embarked on the preparation of such a manual.

8.8 ENERGY:

8.8.1 Petroleum and petroleum products constitue about 80% of Kenya's total energy requirements. With the dramatic increases in the price of crude oil in 1973, the cost of living and cost of construction in the large cities and towns has also risen dramatically. There is therefore, the need to seriously review the utilization of this resource, which is available as commercial or non-commercial energy.

8.8.2 In terms of commercial energy, Kenya uses about 49% fossil fuels and 6% thermo-and hydro-electric power. The energy resources which constitute the remaining 45% are wood fuels in the form of firewood and charcoal (i.e. the non-commercial energy).

8.8.3 There seems to be no existing coherent policy on energy at the national level. Fundamental data on non-commercial energy supply and demand, patterns of energy use at the house-hold and commercial consumer level, the structure of the charcoal industry, and the impacts of energy consumption on resource depletion in the short and long term,

are also extremely deficient. Inadequate provision has been made in development planning to conserve energy, either to protect natural resources (timber) or to reduce balance of payments deficits through oil imports.

8.8.4 There is great need for further research and development work with regard to the impact of the increasing energy costs on the low-cost housing projects and to find alternative sources of energy, especially solar energy and biogas. Steps need to be taken to control excessive energy consumption through controls and incentives to industrial, commercial and domestic users.

## 8.9 SUMMARY OF RECOMMENDATIONS:

- Resources, such as building materials, labour, equipment, capital and energy, must be efficiently and effectively used in the production of low-cost housing (and types of housing)
- House types, for the low income groups need to be designed to suit the concept of progressive development of the houses in relation to income, affordability and partial sub-letting criteria, and byelaws should reflect this.
- Specific Grade II building byelaws should be amended with regard to the design standards for low-cost houses (example: Byelaws Nos. 6,8,12, and 23, amongst others)
- A unified set of standards should be prepared (in one document) incorporating relevant sections from the Grade I and II building byelaws, public Health Act, and local authority byelaws and policy decisions.
- The amount of personal interpretation of the building byelaws and public health rules and regulations must be minimized (especially with reference to infrastructure standards).

- The various cost implications of changes in the planning and design standards at the approval of building plans must be recognized.
- The use of available local building materials and construction techniques for low-cost housing must be emphasised and promoted.
- The use of temporary structures for reasonable time period during the house consolidation stage must be approved.
- Byelaws must be relaxed for pilot low-cost housing projects which aim to develop appropriate and innovate construction techniques and materials.
- Adequate professional and para-professional staff must be provided to local authorities to improve the building control procedures.
- The budget for materials loans should be proportional to the prevailing building costs.
- The use of appropriate technology using simple equipment for house construction must be encouraged.
- Further research and development must be undertaken on alternative sources of energy, especially solar energy and biogas.
- Excessive energy consumption must be reduced through controls and incentives to industrial, commercial and domestic users.

CHAPTER 9

LAND AND INFRASTRUCTURE

9.1.1 There is a case for discussing land together with infrastructure. The laying of infrastructure services is one step forward towards preparing land for development. That is the developer is interested not so much in the land itself but in the services and amenities it offers; he is interested in its potential for accommodating a liveable dwelling. To that extent then, it is necessary that dwelling standards must include land suitability standards as well as infrastructure standards. The suitability of the land for development ought in normal circumstances to be determined by the town planning mechanism. That is land suitable for low-income housing, or any housing for that matter, will have been inspected and carefully evaluated by the town planners before preparing the municipal development plan. A second screening process occurs when the developer files an application for town planning and building approval. And in public projects the designer should inspect and analyse the site before the decision to build on that particular site is taken. In spite of all these available safeguards disasters do happen. The Sites and Services Evaluation Study sites several cases where the wrong choice of a site or inadequate investigations resulted in very costly adjustments to the design and tender figure.1/ In Isiolo a sites and services project on black cotton soil had to be abandoned during construction. The project has been delayed for four years while a suitable site is being sought. In Nyeri 46% of the total plots designed had to be abandoned because the site was later found to be in the flood plain. In Bungoma a sewer was discovered after communual septic tanks had been built. In Kericho the USAID/NHC tenant purchase project was sited on steep land several kilometers out of town, resulting in complex problems of stormwater drainage, site preparation, and accessibility.

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1/ Personal interviews with HRDU Staff

9.1.2 In formulating suitable standards of land acceptability the following considerations are relevant:-

- clear title to the land
- zoning
- plot sizes
- grade or slope
- land quality
- location

9.1.3 Title: This is not a direct concern of building control as such, except that it saves a lot of subsequent expense and confusion if the local authority makes sure that the person applying for a building permit is legally authorised to build on that plot, or that he is not encroaching on his neighbour's or public land. For instance the County Clerk of Lamu has informed us that several cases have occured where permission to develop was given, only for the Council to find out later that the structure encroaches on someone else's land or on the road reserve. Lamu, however, is a special case since it has to send all plans for permanent buildings to Mombasa for approval. Many local authorities insist that their plans be approved by the Town Planning Department or Provincial Physical Planning Officer, as well as the Commissioner of Lands. Nairobi and Mombasa have their own estates officers who can ensure that land title and boundary complications will not arise. Where a building spans two plots belonging to the same owner, the City Council insists that the plots be consolidated into one title, although there is nothing in law that requires this. These complications can better be avoided through administrative procedures in scruitinising plans before approval than through specific legal provision in the building code. 2/ Morever, competent and regular inspections are absolutely necessary.

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2/ Bye-law 42 requires the developer merely to prove the boundaries of the plot, not its ownership.

9.1.4 Zoning: Before land can be used for housing, whether by a public or private developer, it must be zoned for that particular category i.e. low, medium or high density and so on, in the town development plan. Where a development plan does not exist, or where the plan needs amendment, the Director of Physical Planning prepares a part development plan. The procedure for preparing a draft part development plan and getting it approved, before land can be made available to a public developer, is quite lengthy. 3/ Once land is earmarked for a certain grade of housing it is implicit that the land meets the minimum acceptable technical and environmental standards. It is therefore necessary that planning methodology should be more analytical and precise in designating land for housing, especially low cost housing. There is also a strong case for zoning land not only in terms of density or cost levels, but also to specify the type of building code that should apply i.e. whether grade I, II or any other code that may be relevant at the time. We will discuss this point further in the Discussion Paper on Political and Administrative Aspects.

9.1.5 Plot sizes: Again the prescription of plot sizes is the joint responsibility of town planning and building control. The latter is however more concerned with open space around and between buildings and distances between pit latrines or septic tanks and habitable rooms. Apart from health considerations, another major determinant of plot size should be the cost of infrastructure. It must be remembered however that although plot sizes are important, efficiency in actual layout design can go a long way towards reducing infrastructure costs e.g. through varying

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3/ The procedure is set out in a circular letter dated 10.12.77 from the Director of Physical Planning; the letter lists 13 steps from site indentification to commencement of development. It refers specifically to NHC projects.

accessibility standards, plot shapes, location of the wet-core, e.t.c. These approaches will be discussed in greater detail in the paper on Environment and Site Planning.

9.1.6 Recent sites and services projects in Kenya have created plots as large as $100m^2$. By international standards this is still a large plot. A survey of 80 sites and services projects in 27 countries carried out by the World Bank shows that 41% of the total plots are less than $100m^2$ and 62% not bigger than $200m^2$. The smaller plots are found in Latin America and Asia and the bigger generally in Africa. Only about a quarter of the plots are over $300m^2$, and these are all to be found in African countries. 4/ While it is premature to specify an optimum range of plot sizes, it does seem as if $100m^2$ is pushing the limits dangerously on the low side. This concern is further justified by the fact that the land is almost as important as the shelter in the African scheme of values; the plot is valued in its own right. It may be significant that a recent survey by the Dandora Monitoring and Evaluation Team has shown that the proportion of residents growing vegetables on the plot is actually declining. Only 15% grow vegetables, 11% keep chickens and 2% keep goats, these figures being roughly half of what was observed in March, 1978. 5/ The cash obtained from these activities was reported to be negligible. This is in sharp constrast to observations made a few years ago in a Kibera low-cost housing scheme where plots were larger and residents were vigorously cultivating their plots.

The HRDU has recently completed a study of plot sizes and space requirements for low-cost housing schemes. Its findings will be evaluated in greater detail in the relevant Discussion Paper; however, one could note here that although design guidelines and space standards are necessary, the

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4/ Praful Patel Sites and Services Projects: Survey and analysis of Urbanisation Standards and On-Site Infrastructure, Washington: IBRD 1974.

5/ Senga, Ndeti & Associates MEDIS, No March, 1979.

question of plot sizes is in many cases decided on political grounds and new regulations must attempt to make it easy for local promoters to get schemes accepted by the beneficiaries and local leaders.

9.1.7 Grade: The maximum acceptable slope is not regulated by the Building Code. In fact it may be difficult and undesirable to do so. Nonetheless some type of guideline or code of practice is needed because as good land becomes scarce and expensive there is an increasing tendency to move to the more maginal sites, which are expensive to develop. In some towns such as Embu, Kitui and Kericho itis difficult to get a sizeable piece of flat land. Extra attention has to be given to the foundations, retaining walls, and surface water drainage. Cost differentials will vary from site to site and according to the type of development; nonetheless it would be wise to avoid grades steeper than 10%.

9.1.8 Land Quality: This is a blanket term meant to include such physical parameters as soil types, vegetation surface water drainage, view and so on. The Code has placed certain restrictions on building on black contton soil-"black cotton soil shall be deemed to have no bearing capacity" (Byelaw 44 (2)) - and has specified the maximum permissible bearing capacity for various types of soils. The subsoil is merely required to be "effectually drained" (Byelaw 38 (1)). The maximum permissible bearing capacity of other types of soils is specified by Byelaw 44.

9.1.9 There are no standards regarding the preservation of existing vegetation. As a result existing trees on building sites are indiscrimnately felled, whereas a little more thought on the part of desgners could save many trees. For instance building sites in

Mombasa, especially in Likoni and on the West Mainland are normally endowed with beautiful mature mango trees, baobab and coconut palms. It is necessary that new housing layouts attempt to preserve as many of these trees as possible.

9.1.10 Location: We have already examined this topic from a variaty of angles. The point at issue here is that a mixture or wider range of locational possibilities for low-income families is difficult to achieve. The market has a major role to play in selecting sites for specific income levels. The result is that the redistribution of locational opportunities, if desired as a social goal, has to be done as a deliberate planning and land allocation measure.

9.1.11 The problem of land assembly for low cost housing is beyond the scope of this study; nonetheless it is a question which cannot escape notice, especially as the subject has come up time and again in our interviews with local authority and Government officials. In fact in many cases building approval is taken for granted once one has been allocated a plot. For instance in sites and services schemes approval is almost automatic. The recent Sites and Services Evaluation Study recommends the establishment of a Land Acquisition Committee to coordinate land acquisition and to create land banks for the sites and services programme. There is much to be said for this recommendation, especially if the Committee were a small ad hoc committee while the actual responsibility vested in the relevant officers i.e. the Commissioner of Lands, the Chief Housing Officer and the General Manager of N.H.C. The /needs to have its own land experts who could /NHC identify and purchase suitable sites. At the same time it should find sufficient funds to assist local

authorities in land purchase.

9.1.12 A more ambitious proposal is that made by the National Urban Development Strategy for Kenya which suggests a Land Development Corporation to acquire, develop and sell land at market prices to the rich and at cost to the poor, the latter being cross-subsidized. This suggestion calls for such major institutional changes that it does not warrant further consideration in this study. 6/

## 9.2 INFRASTRUCTURE:

9.2.1 The types of services that need to be provided in a residential area are taken for granted. They are well known. However as soon as an attempt is made to reduce costs so as to provide the lowest acceptable standards doubts begin to arise and questions are asked as to whether say the roads should be tarred or not, whether public sewers are necessary or pit latrines are adequate, whether individual water connections are extravagant as opposed to communual standpipes. Decisions have thus to be made on what to provide and what to omit. Within this framework, further refinements have to be devised regarding the quality of what is provided as well as leaving options open for reintroducing what has been omitted at a later date. In this difficult task planners and designers are often guided by attitudinal surveys. Many such surveys have shown that after security of tenure and shelter the most desired amenities are water, an acceptable toilet, and personal security. This order of priority will vary from place to place. In most cases the respondents will emphasise those facilities which they do not already have.

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6/ National Urban Development Strategy for Kenya,(Draft) Kenya Government/World Bank, December 1977.

Table 9.1: - Estimated Infrastructure Cost per Plot on Second Urban Project Sites (Kshs)

| | MANYATTA KISUMU | | MIGOSI KISUMU | | MIKINDANI MOMBASA | | CHAANI MOMBASA | | MATHARE VALLEY NAIROBI | | KAYOLE-VILLAFRANCA NAIROBI | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Site Preparation | cost per plot | % | cost per plot | % | cost per plot | % | cost per plot | % | cost per plot | % | cost per plot | % |
| Clearing and grading | 92.4 | 1.2 | 92.4 | 1.2 | 92.4 | 1.2 | 92.4 | 1.4 | 178. | 2.9 | 92.4 | 1.3 |
| Topography & Soil survey | 37.4 | 0.5 | 37.4 | 0.5 | 99.0 | 1.3 | 99.0 | 1.4 | 71. | 1.2 | 37.4 | 0.5 |
| Lot demarcation | 550.0 | 7.0 | 220.0 | 3.0 | 550.0 | 7.0 | 550.0 | 8.1 | 224. | 3.7 | 220.0 | 3.2 |
| Sub-total | 679.8 | 8.7 | 349.8 | 4.7 | 741.4 | 9.5 | 741.4 | 10.9 | 473. | 7.8 | 349.8 | 5.0 |
| On-site Infrastructure | | | | | | | | | | | | |
| Roads and Drainage | 3507.9 | 44.7 | 3477.1 | 46.6 | 3325.5 | 42.3 | 2413.4 | 35.6 | 1676. | 27.7 | 2695.0 | 38.7 |
| Patho and Drainage | 144.7 | 1.8 | 392.7 | 5.3 | 182.0 | 2.3 | 451.0 | 6.7 | 156. | 2.6 | 301.4 | 4.4 |
| Water reticulation | 677.6 | 8.6 | 566.5 | 11.9 | 638.0 | 8.1 | 424.6 | 6.3 | 478. | 7.9 | 811.8 | 11.7 |
| Sewage reticulation | 2196.7 | 28.0 | 1988.8 | 26.7 | 2323.2 | 29.6 | 2095.5 | 30.9 | 2571. | 42.4 | 2142.8 | 30.8 |
| Security lighting | 312.4 | 4.0 | 353.1 | 4.7 | 312.4 | 4.0 | 321.8 | 4.7 | 337. | 5.6 | 330.0 | 4.7 |
| Refuse collection | 330.0 | 4.2 | 330.0 | 4.4 | 330.0 | 4.2 | 330.0 | 4.9 | 337. | 5.6 | 330.0 | 4.7 |
| Others (Filling) | - | | - | | - | | - | | 31. | 0.5 | - | |
| Sub- Total | 7169.3 | 91.3 | 7108.2 | 95.3 | 7110.9 | 90.5 | 6036.3 | 89.1 | 5586. | 92.2 | 6611 | 95.0 |
| TOTAL | 7849.1 | 100.0 | 7458.0 | 100.0 | 7852.3 | 100.0 | 6777.7 | 100.0 | 6059. | 100 | 6960.8 | 100 |

Source: Adapted from the Second Urban Project. Appraisal Report

The Sites and Services Evaluation Study shows that first priority among allottees was given, by order of the number of respondents, to dispensary, electricity, street lighting, nursery school, and improved roads. Among tenants the order was electricity, dispensary, police post, street lighting and nursery school. These responses are characteristic of sites and services project residents who already enjoy basic services such as running water and water-borne sanitation. The responses have to be counter-balanced against preceived needs in the interests of community health, safety and social advancement.

9.2.2 The bulk of infrastructure costs is attributable to roads, sewerage and water, with roads being normally the most expensive item, depending on specification. Table 9.1 shows the estimated servicing costs per plot on the Second Urban Project Sites. It is too early to start comparing the estimates with actual tender prices. Nonetheless the figures do show that excluding Mathare Valley, roads and surface water drainage account for 35% to 45% of the total plot costs. Sewerage reticulation accounts for between 27% and 42%, water from 6% to 12%. Table 9.2 shows plot costs for two NCC sites and services schemes in Mathare. If building work, representing the wet cores, and preliminaries were excluded the next largest item would be foul sewers followed by roads/footpaths/ surface drainage. Again water costs constitute a very small proportion. An analysis of recent tenant purchase schemes built by NHC with USAID finance (Table 9.3), in which total figures have been adjusted to exclude superstructure costs, shows that sewerage is by far the largest item followed,(except in Thika) by roads/footpaths/surface drainage. Again water here is a fairly minor item. That is,it costs much

TABLE 9.2- SERVICING COSTS PER PLOT ON SITE & SERVICING SCHEME AT MATHARE

| | MATHARE S & S PHASE 1 | | MATHARE PHASE 1 COMMUNAL S & S | |
|---|---|---|---|---|
| | K.Shs. Elemental Cost | % | K.shs. Elemental Cost | % |
| Preliminaries | 187,500 | 12.5 | 41,600 | 14.3 |
| Building work | 600,000 | 40.0 | 104,000 | 35.7 |
| Road ways | 75,000 | 5.0 | 20,800 | 7.1 |
| Foot path | 37,500 | 2.5 | 10,400 | 3.6 |
| Foul sewers | 300,000 | 20.0 | 41,600 | 14.3 |
| Surface sewers | 75,000 | 5.0 | 20,800 | 7.1 |
| Water Mains | 75,000 | 5.0 | 10,400 | 3.6 |
| Electrical mains, street lighting and security lighting | 75,000 | 5.0 | 20,800 | 7.1 |
| Land scaping | 37,500 | 2.5 | 10,400 | 3.6 |
| Contingencies | 37,500 | 2.5 | 10,400 | 3.6 |
| Special purpose Item | - | - | - | - |
| Total Cost | 1,500,000 | 100 | 291,200 | 1000 |

TABLE 9.3 - USAID NHC PROJECTS INFRASTRUCTURE COSTS (£)

| | THIKA | KERICHO | NANYUKI | KISUMU |
|---|---|---|---|---|
| 1. Site investigation, survey | 4,000 | 1,700 | 3,286 | 6,300 |
| 2. Sewerage, sewage disposal | 16,302 | 7,300 | 6,985 | 61,800 |
| 3. Roads, footpath, drainage, leveling | 2,917 | 3,740 | 3,992 | 8,801<br>19,108 |
| 4. Water supply | (incl. in 2) | 8,530<br>950 | 1,243 | (incl. in 2) |
| 5. Electricity supply | 6,000 | 2,800 | 1,627 | 10,800 |
| 6. Professional fees (NHC & QS) | 7,500 | 3,800 | 4,590 | 05,825 |
| 7. Supervision & out of pocket & plan fees | 5,000 | 3,500 | 2,421 | 16,000 |
| 8. Interest on construction finance | 9,600 | 4,500 | 4,406 | 19,000 |
| 9. (Contigencies) | (4,058) | (2,500) | (1,140) | (20,025) |
| Extra work on foundation | - | 2,350 | - | 7,158 |
| Total | £51,319 | £39,170 | £28,550 | 154,792 |
| Total number of plots | 99 | 46 | 38 | 180 |
| Plot dimension | 147m$^2$ | 147m$^2$ | 147m$^2$ | 215m$^2$ |
| Since cost per m$^2$ (k) | Shs.71/= | 115/= | 102/= | 80/= |

much more to get rid of spent water than to obtain fresh.

9.2.3 There is a remarkable uniformity in infrastructure costs per $m^2$ of plot area. In the second urban project plot sizes will vary but if we take an average of $120m^2$ we get a figure of shs. 60/= to shs.70/= per $m^2$ of net plot area. The USAID/NHC figures show a range of between shs. 71/= and shs. 80/= per $m^2$. Lower unit costs are however evident from Table 9.4, which is based on data collected by the HRDU. The Dandora figure of shs. 66/= per $m^2$ seems to be consistent with the analyses in the preceding tables.

9.2.4 Although all the schemes discussed exhibit more or less similar infrastructure standards i.e. sewered sanitation or communal septic tanks, individual water connections and murram estate roads (there are some with tarmac roads) variations in unit costs are to be expected, since there are so many factors that can influence the ultimate cost per plot or cost per $m^2$ including:

- site characteristics i.e. soil type, slope e.t.c.
- density
- plot sizes
- design standards
- construction techniques and materials used
- layout efficiency
- size of project
- developer's overheads

The method used in allocating the cost of trunk infrastructure and remote auxillary works e.g. sewage or water treatment will also influence plot costs.

9.2.5 The question of design standards will be discussed in greater detail in the relevant Discussion Paper. It is worth noting that on the basis of recent and current projects some feasible

Table 9.4-NHC Sites and Services Schemes - Project costs based on Tender Price (Kshs)

| Site & Services Schemes | DANDORA | | KITALE | | BUNGOMA | | NAKURU - NAIVASHA | | EMBU | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Total Project | Per Plot | Total Project | Per Plot | Total Project | Per Plot | Total Project | Per Plot | Total Project | Per Plot |
| Site investigation | 260,280 | - | 10,000 | 182 | - | - | 248,700 | 1115 | 90,000 | 484 |
| Sewerage | 1,327,960 | - | 92,300 | 1678 | 34,200 | 1140 | 860,000 | 3856 | 646,000 | 3441 |
| Roads and drainage | 2,116,980 | - | 156,240 | 2841 | 24,200 | 807 | 816,600 | 3662 | 623,600 | 3353 |
| Water supply | 309,300 | - | 128,240 | 2332 | 10,600 | 353 | 804,500 | 3608 | 198,560 | 1068 |
| Street lightings | 312,180 | - | 25,000 | 455 | - | - | - | - | - | - |
| Professional fee & supervision | 3,966,980 | - | 26,400 | 480 | (15,100<br>( 3,660 | 503<br>123 | 257,880<br>76,680 | 1156<br>344 | 166,300<br>56,780 | 894<br>305 |
| Interest on finance | - | - | 4,000 | 73 | 19,900 | 663 | 153,580 | 689 | 44,780 | 241 |
| Contingency (exclude in the total cost) | (1,632,620) | | (36,000) | (654) | (47,460 | 1582) | (485,060 | 2175) | (233,920 | 1258) |
| Total | 8,294,000 | 7998 | 442,180 | 8041 | 107,660 | 3589 | 3,703,000 | 16605 | 966,400 | 11043 |
| Total number of plots | 1,037 (Phase I) | | 35 | | 30 | | 223(?) | | 186(?) | |
| Plot dimensions | 120m$^2$ | | 187m$^2$ | | 169m$^2$ | | 293m$^2$ | | 293m$^2$ | |
| Service costs per m$^2$ (Kshs) | Shs.66.65 | | Shs.43/= | | Shs.21.25 | | Shs.56.65 | | Shs.37.70 | |

solutions used elsewhere would seem to be unacceptable to the Kenya people and authorities, hence their examination will be of academic interest only. Our discussions with local authority officials have for example shown an official dislike for the use of pit latrines and communual standpipes. For the purpose of formulating standards however, it is necessary that all the available low-cost options be thoroughly examined. The ideal and most expensive solution in all cases is unrestricted individual access to a publicly run and ma maintained facility, while the other extreme is no facility at all. Permutations are available within the following framework:

| | |
|---|---|
| ROADS & | Track |
| SURFACE WATER | stabilised earth |
| DRAINAGE | murram |
| | tarmac |
| | no vehicular access |
| | limited " " |
| | direct " " |
| | no drainage |
| | ditches |
| | open drains unlined |
| | " " lined |
| | covered drains |
| SEWERS | pit off-site |
| | " on-site |
| | conservancy tank |
| | improved pit/aqua privy |
| | septic |
| | public sewers |
| WATER | communual stand pipe |
| | single outlet on site |
| | multiple outlets on site |

| | |
|---|---|
| ELECTRICITY | no connection |
| | lighting only |
| | lighting & other uses |
| STREET LIGHTING | none |
| | at essential points |
| | at intervals. |

9.2.6 All the situations listed above actually exist in Kenyan towns. Planners could easily devise a simple way of measuring infrastructure quality by using the above list in conjunction with a points system. A cut-off level arrived at on policy criteria would then form the minimum acceptable environment. The device can also be used to compare the cost-effectiveness of alternative design solutions.

## 9.3 UPGRADING AREAS:

9.3.1 In the upgrading areas infrastructure design is constrained within the limits of what is already existing in the form of wayleaves; existing buildings; demolitions and compensation; existing service lines and connections, e.g. electricity; topography; local adaptations and habits which may hinder the acceptance of innovations. Yet shilling for shilling, investment in upgrading yields a lot more benefits than in sites and services. There are two reasons for this. First, in spite of demolitions and an irrational layout the cost per plot is lower because of the sparse infrastructure density. Secondly, the provision of infrastructure almost always results in:

(a) ramarkable improvements in individual dwelling structures;
(b) the opening of shops along the newly created roads;
(c) improved access to most dwellings for private cars, taxis, ambulances, the fire brigade, police and other vehicles;
(d) improved delivery of social services; more electricity and water connections, with obvious advantages to

family welfare;

(e) improved personal security resulting from street lighting and the opening up of the neighbourhood;

(f) increased involvement of house owners in the urban economy through a revised tenure system;

(g) an enhanced tax base, and

(h) a more manageable urban environment with a reduced threat to the established administrative and political systems.

These are observations which we have made in the course of working on upgrading projects elsewhere in East Africa. Benefits in the fields of nutrition and health are more difficult to isolate and identify, especially as public health monitoring is a lengthy and expensive process.

## 9.4 MAINTENANCE:

9.4.1 Legislation governing the maintenance of public services is contained in the Local Government Act as well as in the various enabling Acts for the utilities. However, the actual maintenance standards are governed by whether or not the consumer pays a user charge. Thus electricity and water facilities enjoy a high standard of maintenance, such as one would expect from a commercial undertaking; on the other hand roads, drains, sewers, and refuse collection tend to suffer especially in a low-cost residential area. The reason is largely the poor state of local authority finances. For instance a survey of USAID tenant purchase schemes at Umoja, Nairobi, and in other towns has shown that it does not take long before a new estate begins to show signs of neglect in the form of damaged roads, clogged drains, litter and overgrown open spaces. The Sites and Services

Evaluation Study laments that "in general maintenance of public utilities is poor. Roads in older schemes are not well-maintained and severe erosion has occured in several places" 7/ The same study showed a high degree of satisfaction in the wet-cores and the sewerage system both among allottees and tenants; however 58% of the allottee expressed disatisfaction with the refuse collection system while 76.9% of the allottees and 81.3% of the tenants were not satisfied with the estate roads. The latter finding is corraborated by our own discussion with various town clerks and town engineers, many of whom are of the opinion that tarmac roads are in the long run cheaper because of the lower maintenance costs. The question of maintenance is closely related to local government finances and technical capabilities; not much progress should be expected until local authority revenue and capital sources are improved.

## 9.5 INFRASTRUCTURE FINANCING:

9.5.1 While electricity and water undertakings are operating at a profit and can afford to finance part of their capital requirements from revenue, the other services have to operate under severe handicaps. The Local Government Loans Authority has not been effective in raising the required capital finance, partly due to poor organisation and to restriction imposed by the Treasury.

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7/ Evaluation of the Sites and Services Programme in Kenya (Draft), HRDU, University of Nairobi, 1979

Only Nairobi has managed to raise money in the market by issueing stocks. A recent study by HRDU suggests different ways in which more capital finance could be made available to local authorities. 8/ But even with a vastly improved financial situation infrastructure standards will still have to be relatively low since such additional money as becomes available will be needed to provide for additional numbers and for those who now have to do without.

9.6 CONCLUSIONS AND RECOMMENDATIONS:

The formulation of standards for housing sites is in some respects more difficult than for the superstructure. Quite apart from physical criteria, the plot's performance must be judged against acceptable standards relating to tenure, location and town planning. The site in fact consists of serviced land. Therefore, the type and quality of infrastructure available to and on the site are a measure of land suitability for building. Whereas no legal standards may be necessary for this aspect of development process it is essential that some practical guidelines be formulated for professionals and lay builders. We therefore, RECOMMEND as follows:-

- Devote more attention and professional expertize to site selection for public projects and sites and services schemes.

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8/ J.D. Hagger Finance for Housing Infrastructure Nairobi HRDU, 1979

- Develop standards or guidelines on land suitability for housing purposes.
- Intergrate building control with the land use zoning system.
- Widen the locational opportunities of the low-income households.
- Restrict the felling of trees on building sites.
- Assist the National Housing Corporation to draw up a land acquisition programme and to create a land bank.
- Seek further reductions in roads and sewerage standards and costs.
- Promote non-waterborne sanitation and mobilize support for its use in appropriate circumstances.
- Develop and test suitable techniques for measuring site quality.
- Devise appropriate infrastructure standards for upgrading areas.
- Improve the capabilities of local authorities in the management and budgetting of infrastructure maintenance.

# CHAPTER 10

## CONCLUSIONS

The rate at which new households are being formed makes it unrealistic to expect all of them to be housed in conventional housing that meets acceptable legal standards. Even the Sites and Services programme does not fully address the issue. It seems as if more emphasis needs to be put on the upgrading of the existing housing stock and providing sufficient plots serviced to the minimum standard.

10.2 While the beneficiaries of such a strategy are easily identifiable, in that they are or should be households in the lowest income brackets, policy measures aimed at raising these standards are confounded by moral issues relating to the proprietry of subsidising the non-poor. Hence the preoccupation with defining low cost housing, which is an irrelevant task. What is relevant and possible is a set of criteria for identifying the main target area - be it people, structures or locations - and the shady or marginal zones surrounding it. That is we would then be talking of a primary target, secondary target and so on. This approach, coupled with more reliable statistics on relevant variables such as incomes, rents, household budgets and construction costs should make the low cost/high cost argument less acrimonious. This approach is reinforced by the fact that housing costs have by and large remained fairly stable in real terms.

10.3 The substandard structures that poor people live in are not dangerous or hazardous in themselves. Rather it is the family life-style which creates dangerous situations. For example the method of food preparation is a potential fire hazard. Site planning and house design can only achieve so much. Investment in education, policing and control needs also to be increased.

10.4 The reduction of fire hazard at reasonable cost and the preservation of structural durability are the pre-conditions for extending conventional credit facilities to minimum standard housing. The problem of devising acceptable titles can easily be solved. There is a large and profitable market here for finance institutions and insurance companies, both of which stand to benefit from more imaginative design and administrative methods. But the Government must be prepared to offer the necessary encouragement and incentives.

10.5 Individual builders too need encouragement and guidance. They find it difficult to help themselves otherwise. The design of projects based on self-build methods still need further refinement in terms of technical support, appropriate documentation and methods of instilling the confidence to build. Self-build has in fact been forced by the realities of urban life to evolve towards self-management. The allotee combines the role of the inventor/developer/project manager/builder/fundi; now let the experts design the costume and write the script to go with the role.

10.6 And what is the outcome of all these efforts? Will the builder spend less and the renter have more to spend on other necessities such as food? Will taxes and other expenses rise or fall? It is quite clear that any reductions in cost that could be made have already been made, but they have been made in the wrong, or illegal sector, and new legislation would have the effect of legalising these innovations. No dramatic reductions in cost should therefore be expected. Progress will be incremental; nonetheless the acceptable housing stock will be enhanced, both in quantity and quality.

10.7 The value of the housing stock, and its contribution to the national economy, will to a large extent be determined by the rate at which housing inputs are consumed. Materials, energy and equipment are becoming scarcer. Insufficient effort is directed towards research in these areas. More needs to be done than exhortations on the use of local materials. A dramatic increase in materials and energy prices will completely cancel any gains made through byelaw revisions. Even the one resource we would appear to have plenty of, that is land, is being priced out of the poor man's reach. The relationship between land and services needs to be re-examined so that the largest possible plots and open spaces are made available to the low-income household.