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**KENYA**

**A Preliminary Assessment of National  
Housing Needs and Affordability**

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**for the**

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## EXECUTIVE SUMMARY

This preliminary assessment of housing needs in Kenya presents forecasts of housing needs in the metropolitan, other urban, and rural areas of Kenya and analyzes the investment and subsidy implications of alternative strategies to meet these needs over the upcoming 20-year period.

Housing need projections are based on population growth, urbanization, and household formation trends and on assumptions regarding the future rates of replacement and upgrading of the existing substandard stock.

The current housing output of the formal sector, including both public and private, is far below that which will be needed to meet projected housing needs. During the upcoming 1984-88 5th Development Plan Period, for example, it is estimated that 250-280 thousand new housing units and at least 30 thousand upgrades of existing units would be required to fully meet projected needs in the urban areas alone. At current capacity the formal housing construction sector is unlikely to produce more than 40 to 50 thousand urban units during the next five years. Formal sector housing output, particularly by the private formal sector, will have to be greatly increased if major additions to the informal, largely substandard, housing stock are to be avoided.

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## I. INTRODUCTION

As evidenced by the organization and start-up of the National Housing Corporation (NHC) in 1964, the provision of low-cost housing has been a priority concern of the Government of Kenya since the earliest moments of Independence. During 1981 and 1982, the NHC completed 5,663 new low-cost housing units, had an additional 3,234 units under construction, and was planning some 31 future housing schemes consisting of approximately 11,250 units for future construction.<sup>1</sup> Since the early 1970s, a number of both bilateral and multilateral international development agencies have participated in the government's efforts to increase the availability of adequate housing for low-income families in Kenya, through the provision of financial and technical support to about a dozen major urban housing projects.

Despite such efforts, the availability of adequate housing for low-income families in Kenya is seriously deficient and deteriorating rapidly. High rates of population growth and urbanization are currently generating approximately 38,000 new households per year in urban areas alone, while annual production of both public and private

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1. National Housing Corporation, 1981-82 Biennial Report. Figures include site and service, upgrading, mortgage, rental, and tenant purchase units.

formal sector urban housing has been averaging only about 6,500 units.<sup>1</sup> The substantial gap between production and demand has been filled partially by the informal sector through the provision of unauthorized and predominantly substandard housing.

Clearly, Kenya's urban housing shortfall, estimated at 140,000 units in 1979, has been growing in recent years. It will continue growing at what may justifiably be termed a dangerous rate unless bold and imaginative steps are taken to dramatically increase the rate of housing production, especially for low-income households.

To fully meet the shelter requirements of new households as well as to gradually upgrade or replace the existing substandard housing stock will obviously require that the rate of housing construction be increased severalfold in coming years. A wide variety of constraints -- financial, legal, organizational, technical, political, and social -- will need to be overcome if future housing programs are to have any appreciable impact in reversing current trends.

Central to the resolution of these constraints, as is aptly stated in the 1984-88 Development Plan, is "the adoption of realistic and performance oriented standards especially in the area of low-cost housing." The majority of Kenyans simply cannot afford housing which conforms to the by-laws of the existing Building Code, and the Government of Kenya, charged with the financial obligations of a wide-ranging development program, cannot afford to subsidize

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1. USAID, Kenya Private Sector Housing Project Paper, Project No. 615-HG-007, May 23, 1983, p. 9.

housing units built to these standards in the numbers required to meet the needs of the population.

Perversely, adherence to a high level of design standards for formal sector housing can result in lowering the standards which have to be endured by large numbers of people who are forced to turn to shanties and unauthorized squatter settlements to find shelter. For such people, a revision of paper standards to a level which may seem only barely adequate -- but affordable -- may in fact mean their first access to shelter that offers a minimum of security and hygiene. In effect, the lowering of statutory standards, to the extent that it contributes to the increased production of low cost housing on a self-sustaining and financially viable basis, can substantially elevate the standards at which people actually live.

The Government of Kenya has recently taken steps in two key areas which, it is hoped, will prove to be of fundamental importance in the development of a housing program which can realistically aspire to the eventual fulfillment of the basic shelter needs of Kenya's people. The first has consisted precisely in the focusing of serious attention, including a major study<sup>1</sup> commissioned by the then Ministry of Urban Development and Housing and the World Bank, on alternative ways and means of reforming statutory by-laws governing the construction of low-cost housing. The study, which purports to be the first such study undertaken in a Third World country, has generated widespread attention and support in governmental circles. Steps toward legal

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1. Saad Yahya Associates and Partners, Kenya Low-Cost Housing By-Law Study, Ministry of Urban Development and Housing, 1983.

enactment of reforms based on the recommendations of the study have been initiated. And, while concern has been voiced regarding the speed at which such reforms, which are adoptive rather than mandatory under Kenyan law, can be enacted by the various local governments in the country, it is hoped that a growing realization of their urgency will enable their early implementation.

Second, it is apparent that a major new thrust aimed at augmenting the role of the private sector in the financing, construction, and marketing of low-cost housing in Kenya is underway. This development is very much related to the move toward reform of building by-laws mentioned above, because existing minimum design standards have until now effectively precluded the participation of the formal private sector in the provision of low-cost housing. Until now, virtually all formal low-cost housing has been financed by the public sector on the basis of ad hoc exceptions to the building codes, usually specific to individual donor-supported projects.

However, it has become increasingly apparent in recent years that the public sector does not have the financial, administrative, or technical resources necessary to successfully implement housing programs on the scale which will be required to meet basic needs entirely on its own.

Following on another key study sponsored by the United Nations Center for Human Settlements (HABITAT) and the Government of Kenya,<sup>1</sup> several conceptually new institutional

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1. Saad Yahya Associates and Partners, The Role of the Private Sector in Housing Development in Kenya, HABITAT and the Government of Kenya, 1980.

and project initiatives aimed at rapidly expanding the role of the private sector in low-cost housing supply have been set into motion. These include, in addition to the reform of minimum standards for low-cost housing:

- . Legal and institutional measures to foster the development of secondary mortgage markets in Kenya.
- . The World Bank's Secondary Towns Project which will for the first time provide financing and technical support for the servicing of privately held land slated for low-cost residential development.
- . USAID's Private Sector Housing Project which will provide seed capital through guaranty of U.S. loans to finance low-cost housing development in Kenya. Housing financed under this project will be developed privately and targetted to the 40th through 50th income percentiles of the urban population of Kenya, a group which is estimated to be able to afford housing in the range of KShs 50,000-100,000 (U.S. \$3,700-7,400).

Virtually no housing within this cost range has been produced in Kenya in recent years, which has resulted, among other things, in the frequent displacement of low-income families from low-cost housing schemes by middle-income groups. The unavailability of housing for lower-middle income groups has led to the bidding up of rental and resale values for the few low-cost housing units available, effectively pricing the poor out of these schemes.<sup>1</sup>

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1. For further discussion of these issues and project initiatives see: IBRD, Kenya Economic Development and Urbanization Policy, Report No. 4148-KE, June 16, 1983; IBRD, Staff Appraisal Report - Kenya Secondary Towns Project, Report No. 4427-KE, May 20, 1983; and USAID, Kenya Private Sector Housing Project Paper, Project No. 615-HG-007, May 23, 1983.

This Preliminary Assessment of Housing Needs and Affordability in Kenya, sponsored by USAID's Office of Housing and Urban Programs, is intended to support the efforts of the Government of Kenya in developing effective long-term responses to the basic housing needs of its people in two ways.

First, it provides a set of preliminary estimates of future housing needs in Kenya over the next 20 years -- disaggregated by metropolitan, other urban, and rural categories -- and, through the analysis of housing affordability by income classes within these regions, provides a preliminary assessment of alternative strategies for meeting projected housing needs. The alternative strategies analyzed have been roughly patterned on the current situation and may be broadly described as follows:

- . Base Case: an analysis of the affordability and costs of meeting housing needs according to minimum design standards currently in force.
- . Alternative 1: an analysis of the affordability and costs of meeting housing needs with a lowering of statutory minimum design standards to the de facto standards which have been applied to publicly financed, low-cost housing projects -- a scenario roughly similar to that contemplated in USAID's Private Sector Housing Project.
- . Alternative 2: an analysis of the affordability and costs of meeting housing needs through a more general liberalization of minimum design standards -- providing low-income families with access to a minimally serviced plot and core unit which may be improved and/or expanded over time.

Future Housing Needs in Kenya, including population growth, urbanization, household formation, and the replacement and upgrading of the existing housing stock. Chapter IV discusses the Determinants of Housing Affordability in Kenya, including household incomes and income distribution, income growth, housing design standards, and costs. Chapters III and IV also present the basis for the estimates and assumptions used in preparing the three basic alternative policy scenarios analyzed in the report. Chapter V presents this analysis in detail, highlighting major implications and sensitivity analyses.

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## II. METHODOLOGY

The methodology used in this assessment is oriented primarily toward evaluating alternative strategies for meeting projected housing needs and identifying major contingencies inherent in each strategy through sensitivity analysis. A "model" of household formation and housing expenditures provides the logical framework for the calculations performed by the microcomputer. Like all models, this one is premised on certain basic assumptions that should be clearly understood both in structuring the scenarios to be analyzed with the methodology and in interpreting the results it provides.

The most important aspect of the methodology which needs to be kept in mind is that all calculations are based on the assumption that the total housing needs projected for each time period will be fully met by the housing program being analyzed. No future increments to the substandard housing stock are assumed to take place at any time following the base year chosen for the analysis.

If the methodology were primarily oriented toward forecasting and prediction, this would limit its applicability in some countries where future increments to the substandard stock -- the continuing proliferation of

squatter settlements -- may be inevitable. However, since the model is in fact structured to facilitate the comparative evaluation of alternative approaches, the stipulation that all housing programs analyzed be of a scale commensurate with needs provides a common standard for strategy evaluation.

The model is designed to accept up to three regional disaggregations for the projection of housing needs and the configuration of appropriate housing programs. In Kenya, the most meaningful disaggregations were "metropolitan" (including the two largest cities, Nairobi and Mombasa), "other urban" (including all other towns with a population of at least 2,000 as of the latest census), and "rural."

Housing needs for these three areas are projected for each 5-year period within a 20-year planning period on the basis of population growth, interregional migration, household formation trends, and a program defined by the user to upgrade or replace substandard components of the base year housing stock at a rate which he determines.

New housing units and upgrades of existing housing units required to meet these total needs are costed on the basis of unit costs provided by the user in accordance with the design standards specified for each strategy. These costs are compared with the maximum housing values that households in each quintile of the income distribution are estimated to be able to afford, to determine what level of public subsidy, if any, would be required to implement the program specified.

Key factors affecting the total cost of housing programs defined in this manner include: growth in total household numbers, growth in the rate of urbanization,<sup>1</sup> construction cost escalation rates, and, especially, the minimum design standards and corresponding unit costs specified for the housing program.

Housing affordability increases (and subsidy requirements decrease) with increasing household incomes, increasing shares of income devoted to housing, more favorable financial lending terms, and reduced housing costs.

Of these variables, minimum housing design standards and costs are most directly amenable to public policy intervention. Through successive iterations of the model, the interplay of total housing program costs and housing affordability can provide genuinely useful guidance to housing planners and policy analysts in structuring a realistic approach to the satisfaction of basic needs through the adoption of standards which, while offering real improvement over informal sector living conditions, are also affordable by the majority of low-income households.

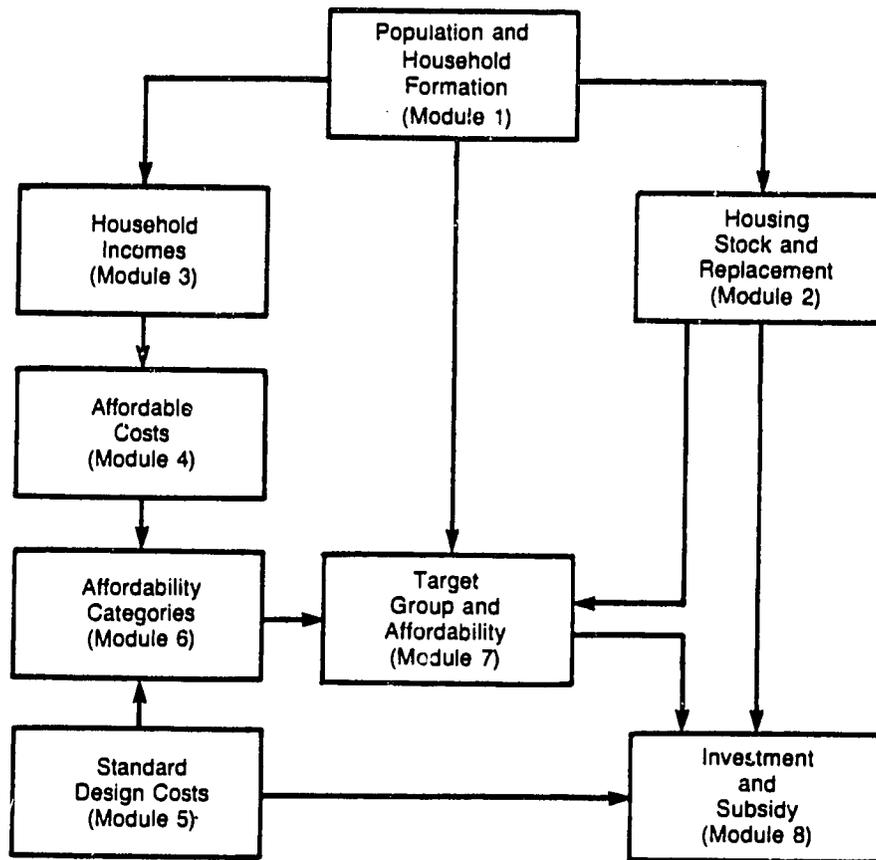
Figure 1 identifies the main components of the model in somewhat greater detail.

As was discussed above, the major determinants of projected physical needs for shelter are future population growth, household formation trends, and the adequacy of the

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1. Unit costs for urban dwelling units will generally greatly exceed rural costs primarily because on-site infrastructure needs are greater in the more densely populated urban areas.

**Figure 1. Main Components of the Housing Needs Assessment Model**



existing housing stock to meet the needs of the current population. As shown in Figure 1, these estimates and projections are developed through modules 1 and 2 of the model. Together, these determine the scale of the "housing program" to be analyzed through subsequent calculations.

The affordability of alternative housing "packages" is determined by current and projected incomes of the various sectors of the population requiring housing, and by the costs of these alternatives. These elements of a housing needs assessment are considered in modules 3, 4, 5, and 6 of the model in the following manner:

- . Module 3 projects household incomes for subsectors of the population by income distribution subgroupings;
- . Module 4 calculates housing affordability for subsectors of the population based on household incomes, housing expenditure patterns, and terms of housing finance;
- . Module 5 specifies the current and future costs of alternative shelter solutions defined on the basis of the dwelling standards established by planners; and.
- . Module 6 then classifies all households according to the housing standards that they can afford.

On the basis of total shelter needs and the housing standards which are affordable by various segments of the population, modules 7 and 8 are then used to:

- . Determine global housing investment requirements;

- . Identify those segments of the population which, on the basis of their inability to afford currently available, minimum standard, formal sector housing make up the target group for new housing programs; and
- . Estimate the level of direct subsidy that would be required to bring all housing to the chosen standard, if any.

The information provided through these last two modules enables planners to evaluate the implications of alternative housing programs in relation to macro-level projections of investment and savings, public sector expenditures, formal sector loan volume, and other indicators.

### III. DETERMINANTS OF FUTURE HOUSING NEED IN KENYA

#### Population Growth, Urbanization, and Household Formation

As is well-known, high fertility rates<sup>1</sup> and declining mortality rates have combined to produce a rate of population increase in Kenya which is among the highest in the world. The current rate of population growth stands at about 3.9 percent per year, a rate which is still increasing at current levels of fertility and mortality.

It is, however, reasonable to assume a gradual reduction in both fertility and mortality rates over the next 20 years. This would result in a reduction in the rate of total population growth by the end of the century, but only to about 3.5 percent per annum due to the current age distribution of the population and the large number of women who will be entering their childbearing years during this period. This lower range of population projections<sup>2</sup> has

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1. Total fertility rate estimated at 8.0 in 1979. See, IBRD, Kenya: Population and Development, July 1980.

2. Source: Population Projections for Kenya 1980-2000, Central Bureau of Statistics, Ministry of Economic Planning and Development, March 1983. The CBS declining fertility/mortality scenario (p. 7) is used as the base case for the housing needs assessment.

been judged most plausible for the purposes of the housing needs assessment.

As shown in Table 1, however, even these assumptions imply that population will more than double over the next 20 years, to about 38.6 million by 2003 as compared with the 18.7 million estimated for 1983.

Table 1 also shows the disaggregation of population into metropolitan, other urban, and rural areas for the 1983 base year and into household<sup>1</sup> numbers within each of these areas. Metropolitan areas, for purposes of this study, are defined as consisting of Nairobi and Mombasa, while other urban areas are defined to include all other towns with a population of 2,000 or more. There were 88 such urban centers in Kenya at the time of the 1979 Population Census.

Estimates of urban population for the 1983 base year were derived from the Central Bureau of Statistics (CBS) projections in the case of Nairobi and Mombasa and from other official sources for the other urban category.<sup>2</sup> As shown in Table 1, about 15 percent of Kenya's population is estimated to have resided in urban areas in 1983, with slightly more than half of this total concentrated in the metropolitan areas of Nairobi and Mombasa.

Data from the 1969 to 1979 intercensal period indicate a considerably higher rate of growth in the population of

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1. A household is defined as a family, an individual, or a group of persons eating together and sharing a budget for common provisions.

2. Urban Population Projections: Within the Context of Urban Development Strategy: A Preliminary Paper, Ministry of Economic Planning and Development, January 1982.

Table 1. Kenya: Base Case  
Population and Household Formation

	1983	1988	1993	1998	2003
	----	----	----	----	----
<b>Metropolitan Area</b>					
Population (1000's)	1458.59	1657.85	2367.21	3019.95	3856.73
Annual Growth Rate (Percent)	0.00	4.96	4.97	4.99	5.01
Average Household Size	4.25	4.40	4.55	4.60	4.50
Total Households (1000's)	343.20	422.24	520.27	656.51	857.05
New Households per Year (1000's)	0.00	15.81	19.61	27.25	40.11
<b>Other Urban Areas</b>					
Population (1000's)	1398.60	1993.79	2856.98	4059.08	5785.09
Annual Growth Rate (Percent)	0.00	7.35	7.46	7.28	7.34
Average Household Size	4.43	4.65	4.75	4.85	5.00
Total Households (1000's)	315.71	428.77	601.47	836.92	1157.02
New Households per Year (1000's)	0.00	22.61	34.54	47.09	64.02
<b>Rural Areas</b>					
Population (1000's)	15890.80	18805.06	21985.17	25393.58	28925.46
Annual Growth Rate (Percent)	0.00	3.43	3.17	2.92	2.64
Average Household Size	5.65	5.65	5.65	5.65	5.65
Total Households (1000's)	2812.53	3328.33	3891.18	4494.44	5119.55
New Households per Year (1000's)	0.00	103.16	112.57	120.65	125.02
<b>Total Country</b>					
Population (1000's)	18748.00	22656.69	27209.37	32472.61	38567.27
Annual Growth Rate (Percent)	0.00	3.86	3.73	3.60	3.50
Average Household Size	5.40	5.42	5.43	5.42	5.41
Total Households (1000's)	3471.44	4179.34	5012.92	5987.87	7133.62
New Households per Year (1000's)	0.00	141.58	166.72	194.99	229.15

other urban as opposed to metropolitan areas. These data indicate an intercensal growth rate of about 5 percent/year for Nairobi, 3.3 percent for Mombasa, and 7.4 percent for other urban areas.<sup>1</sup>

As indicated in Table 1, these trends are assumed to continue during the 1984-2003 period, resulting in a projected total urbanization rate of 25 percent in the terminal year, a figure which is consistent with, though perhaps on the low side of, the informed judgment of urban planners in Kenya.

With respect to household size and household formation, 1979 census figures indicate an average of 4.25 persons per household in both Nairobi and Mombasa (the metropolitan areas), 4.43 in other urban areas, and 5.65 in rural areas.<sup>2</sup> As shown in Table 1, these figures, applied to 1983 population estimates, imply an estimate of 343 thousand households in the metropolitan areas, 316 thousand households in other urban areas, and 2.8 million households in rural areas during the base year.

Due to the large differences in average household size between urban and rural areas, urban areas are estimated to contain about 19 percent of the total households in Kenya, although only 15 percent of the population.

Contrary to prevalent tendencies in many developing countries around the world, intercensal comparisons show increasing average household sizes in urban areas of Kenya.

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1. IBRD, op. cit. Report No. 4148-KE, p. 106.

2. See Michael Lee, Kenya Housing Demand: An Interim Assessment, USAID/RHUDO/E&SA, Nairobi, May 1983, p. 36.

While the 1969 census showed an average of 4.18 persons per household for other urban areas, this figure had risen to 4.32 by 1979. In part, this trend may reflect the impact of the housing shortage in urban areas of Kenya, indicating perhaps that young people are extending their term of residence at their parents' home and/or deferring marriage to a later age. Whatever the underlying reasons, these trends in urban household size have been assumed to continue into the future in the projections shown in Table 1, while rural household size is projected to remain constant at 5.65 persons.

The final result of the projections and calculations summarized in Table 1 is a set of estimates of the average number of new households which may be expected to emerge annually within each area of the country and within each 5-year subperiod of the 20-year planning period ending in 2003. As shown, the combination of population growth, urbanization, and household formation trends indicates that an average 15.8 thousand new households per year will be formed in the metropolitan areas, 22.6 thousand in the other urban areas, and 103.2 thousand in the rural areas of Kenya during the upcoming 1984-88 5th Development Plan period. During this period as a whole, 192 thousand new households will require housing in the urban areas alone.

When this figure is compared with total planned public sector housing output for the 5th Development Plan period -- 28,340 new rental and mortgage units, 17,964 serviced plots, and 13,200 upgrades of existing units -- the magnitude of Kenya's prospective housing problems becomes starkly apparent. Unless something is done to greatly increase the housing output of the formal private sector, no more than 8-12 thousand additional units may be expected from this source,

and some 130 thousand new urban households, fully two-thirds of all new urban households anticipated for the 1984-88 period, will be obliged to turn to the informal sector for their shelter needs.

"Emergency" measures to dramatically boost the housing output of the formal sector in Kenya are clearly necessary. This can only be done if affordable strategies can be devised. It appears that the only approach which may offer hope of meeting this formidable challenge is one which confronts the issue of raising housing standards from the bottom up and, through "formalizing" the informal sector, strives to incorporate its energies and resources in the housing effort. Such an approach would involve measures to increase the security of land tenure, reduce minimum building standards, redirect financial savings toward low-cost housing, and provide for a greater degree of cooperation between the public and private sectors.

The rural sector has up until now received short shrift in our discussion of the projections of new household formation contained in Table 1. Rural areas of Kenya can be expected to produce about 515 thousand new households during the next five years, in addition to the 192 thousand new urban households discussed above. As will be discussed further in Chapters IV and V, the most to which the government can realistically aspire for the majority of these new rural households is to facilitate improved sanitation, safe drinking water supply, and rudimentary dwellings constructed of traditional building materials.

The Existing Housing Stock: Its Upgrading  
and Replacement

Comprehensive, up-to-date, and fully reliable figures on the quantity and condition of the housing stock are not available in Kenya. While it is anticipated that this situation will be significantly remedied within the next year with the completion of the Urban and Rural Housing Surveys being conducted by the government, as of this date it is still necessary to rely on estimates and informed judgments.

We have relied heavily on extrapolations from surveys undertaken in specific localities, applied to the base year estimates of total household numbers presented above. A key source of information and guidance on estimation procedures regarding the housing stock has been a study recently completed by Lloyd W. Morris for USAID.<sup>1</sup>

Table 2 presents the base year estimates and base case planning assumptions used in the preparation of this report. As shown, the base year housing stock in the metropolitan areas of Nairobi and Mombasa was estimated at 295 thousand dwelling units.<sup>2</sup>

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1. Lloyd W. Morris, A Computer-Based Model of Basic Housing Needs in Kenya, USAID Office of Housing and Urban Programs, September 1983.

2. A dwelling unit is defined as a place of residence for a family, an individual, or a group of persons eating together and sharing the budget for common provisions. A single housing structure may contain multiple dwelling units.

Table 2. Kenya: Base Case  
Housing Stock and Replacement

	1983	1988	1993	1998	2003
	----	----	----	----	----
<b>Metropolitan Area</b>					
<b>Dwelling Units by Construction Standard (1000's)</b>					
Acceptable Construction	206.50	319.66	451.82	622.19	856.85
(Annual Planned Replacement)	0.00	4.13	6.39	9.04	12.44
Non-Upgradable Construction	29.50	22.13	14.75	7.38	0.00
(Annual Planned Replacement)	0.00	1.48	1.48	1.48	1.48
Upgradable Construction	59.00	44.25	29.50	14.75	0.00
(Planned Annual Upgrading)	0.00	2.95	2.95	2.95	2.95
Total Dwelling Units	255.00	386.04	496.07	644.31	856.85
Total Number Overcrowded Units	48.20	36.20	24.20	12.20	.20
Planned Annual Construction to Relieve Overcrowding	0.00	2.40	2.40	2.40	2.40
New Households/Year	0.00	15.81	19.61	27.25	40.11
Construction of New Units/Year	0.00	23.81	29.87	40.16	56.43
Total Construction/Year	0.00	26.76	32.82	43.11	59.38
<b>Other Urban Areas</b>					
<b>Dwelling Units by Construction Standard (1000's)</b>					
Acceptable Construction	199.50	341.44	543.01	807.34	1156.31
(Annual Planned Replacement)	0.00	3.99	6.83	10.86	16.15
Non-Upgradable Construction	28.50	21.38	14.25	7.13	0.00
(Annual Planned Replacement)	0.00	1.43	1.43	1.43	1.43
Upgradable Construction	57.00	42.75	28.50	14.25	0.00
(Planned Annual Upgrading)	0.00	2.85	2.85	2.85	2.85
Total Dwelling Units	285.00	405.56	585.76	828.71	1156.31
Total Number Overcrowded Units	30.71	23.21	15.71	8.21	.71
Planned Annual Construction to Relieve Overcrowding	0.00	1.50	1.50	1.50	1.50
New Households/Year	0.00	22.61	34.54	47.09	64.02
Construction of New Units/Year	0.00	29.53	44.29	60.88	83.09
Total Construction/Year	0.00	32.38	47.14	63.73	85.94

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## Rural Areas

## Dwelling Units by Construction Standard (1000's)

Acceptable Construction	536.00	1620.80	2752.65	3924.91	5119.02
(Annual Planned Replacement)	0.00	10.72	32.42	55.05	78.50
Non-Upgradable Construction	268.00	201.00	134.00	67.00	0.00
(Annual Planned Replacement)	0.00	13.40	13.40	13.40	13.40
Upgradable Construction	1876.00	1407.00	938.00	469.00	0.00
(Planned Annual Upgrading)	0.00	93.80	93.80	93.80	93.80
Total Dwelling Units	2680.00	3228.80	3824.65	4460.91	5119.02
Total Number Overcrowded Units	132.53	99.53	66.53	33.53	.53
Planned Annual Construction to Relieve Overcrowding	0.00	6.60	6.60	6.60	6.60
New Households/Year	0.00	103.16	112.57	120.65	125.02
Construction of New Units/Year	0.00	133.88	164.99	195.70	223.52
Total Construction/Year	0.00	227.68	258.79	289.50	317.32

## Total Country

New Construction/Year	0.00	187.22	239.15	296.74	363.04
Total Construction/Year	0.00	286.82	338.75	396.34	462.64

Since it was estimated that there were 343 thousand households in the metropolitan areas of Kenya in 1983, the base year estimate of the housing stock in these areas indicates that about 16 percent of dwelling units are overcrowded.<sup>1</sup>

Thirty percent of the existing housing stock in Nairobi and Mombasa is estimated to be substandard because of the absence of basic water and sanitary facilities, the quality of the structure, or excessive densities. Of these, two-thirds (59 thousand units) are estimated to be upgradable -- primarily through the provision of infrastructure -- while one-third (29.5 thousand units) are not upgradable and must eventually be replaced.

In other urban areas only about 11 percent of the estimated 285 thousand total existing dwelling units are believed to be overcrowded, while the same proportions of substandard (upgradable and non-upgradable) units estimated for Nairobi and Mombasa are also assumed to apply.

In rural areas, of the total estimate of 2.68 million dwelling units, only about 5 percent are considered to be overcrowded. Seventy percent of all dwelling units are estimated to be substandard, but, of these, all but 10 percent are judged to be upgradable -- again, primarily through the provision of access to safe drinking water and sanitary facilities.

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1. An overcrowded dwelling unit is assumed to house no more than two households.

Permanent dwelling units in each of these areas are assumed to decay and be retired at the rate of 2 percent per year, thus requiring replacement.<sup>1</sup>

With regard to the improvement or replacement of the substandard stock, and to the provision of new units to relieve overcrowding, it has been assumed for the base case that such remedial actions will be taken at the rate of 5 percent per year. Thus, for this scenario, it is assumed that all of the non-upgradable stock will be replaced, the upgradable stock upgraded, and overcrowding relieved at a steady annual rate spread over the full 20-year planning period.

Combined with the results of the population, urbanization, and household formation projections presented in Table 1, these estimates and assumptions regarding the upgrading and replacement of the existing housing stock permit the estimation of total housing needs in physical terms. In the case of the metropolitan areas, for instance, it was estimated that 15.8 thousand new households per year will be formed during the 1984-88 period. As shown in Table 2, an additional 8 thousand new units per year would be required if replacement of the housing stock were to proceed as assumed for the base case (4.1 thousand to make up the obsolescence of permanent dwelling units, plus 1.5 thousand to replace non-upgradable substandard units, plus 2.4 thousand to gradually relieve overcrowding). Thus a total

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1. Alternatively, this estimate may be interpreted as meaning that investments -- additional to regular maintenance -- equivalent to 2 percent of the value of a new dwelling unit are required yearly to prevent the deterioration of these units.

of 23.8 thousand new units per year are estimated to be required in the metropolitan areas during the upcoming 5-year period if the needs of new households are to be met and remedial action with respect to the existing housing stock is taken at the gradual rates specified above. In addition, a 20-year upgrading program for the metropolitan areas would require the upgrading of an average of 2,950 units per year, bringing the total construction requirement to almost 26.8 thousand units per year during this period.

Similar calculations for the other urban areas of Kenya result in an estimated total construction requirement, 1984-88, of 32.4 thousand units per year, of which about 29.5 thousand would need to be new units to fully satisfy projected housing needs.

In the rural areas, annual construction of about 134 thousand new units is anticipated in this scenario for the upcoming period, with an additional 94 thousand upgradings per year if all substandard housing in the rural areas is to be raised to a minimum standard within 20 years.

While some degree of uncertainty regarding the housing stock estimates presented above is candidly recognized, the range of uncertainty is unlikely to exceed +/-20 percent. Furthermore, the 20-year upgrading and replacement program for substandard housing reflected in this set of estimates must be regarded as conservative. The impact of incorporating, even conservatively, the consideration of remedial action with respect to the existing housing stock is dramatic nonetheless. Rather than just the 192 thousand units required for urban areas during the upcoming 5th Development Plan period to meet the requirements of new urban households,

a conservative estimate of total urban needs for new housing during this period is more likely to fall within the range of 250-280 thousand units.<sup>1</sup> In addition, even the most modest of urban upgrading programs will require something like 30 thousand upgrades during the next 5 years.

In comparison with historical urban residential construction by the formal sector in Kenya, these figures are daunting. Estimates of upcoming housing requirements for meeting basic needs in the rural areas are truly staggering.

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1. 74.6 thousand replacement units, +/-20 percent, plus 192 thousand units for new households.

#### IV. DETERMINANTS OF HOUSING AFFORDABILITY IN KENYA

##### Household Income and Expenditure Patterns

The most authoritative source of information on household incomes and income distribution in the urban areas of Kenya is the previously cited study by Michael Lee. The study reviews primary data and estimates from 11 sources to arrive at the composite household income estimates shown in Table 3.

As shown in Table 3, Lee estimates average household incomes for the metropolitan and other urban areas in 1982 at KShs. 3,600 and KShs. 2,500 per month, respectively. These estimates are equivalent to KShs. 43,200 and KShs. 30,000 per annum.<sup>1</sup>

For the purposes of this study, Lee's 1982 estimates were brought forward to 1983 values by the following procedure:

1. Adjust for inflation estimated at 15.8 percent (GDP deflator) during 1983.
2. Adjust for real income growth in urban areas, estimated at 6.5 percent in 1983.

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1. 1 U.S. \$ = approximately 13.5 KShs.

Table 3. Monthly Household Income and Income Distribution Estimates for Metropolitan and Other Urban Areas in Kenya, 1982

	Metropolitan areas	Other urban areas
	----- KShs./month -----	
<u>Mean income, all households</u>	3,600	2,500
<u>Mean income, household quintiles</u>		
Quintile 1 ( 0- 20%)	700	600
Quintile 2 (21- 40%)	1,250	1,200
Quintile 3 (41- 60%)	2,300	1,800
Quintile 4 (61- 80%)	3,750	2,800
Quintile 5 (81-100%)	10,000	6,100
	----- percent -----	
<u>Household income shares</u>		
Quintile 1	3.9	4.8
Quintile 2	6.9	9.6
Quintile 3	12.8	14.7
Quintile 4	20.8	22.3
Quintile 5	55.6	48.6
Total households	100.0	100.0
<u>Gini coefficient</u>	.47	.40

Source: Michael Lee, op. cit., p. 16 and own calculations.

3. Adjust for growth in the number of urban households in 1983, estimated at 5 percent in the metropolitan areas and 7.4 percent in other urban areas.

Thus, mean 1983 household income for all households residing in the metropolitan areas is estimated at KShs. 50,740 per annum.<sup>1</sup> Similarly, mean household income for other urban areas in 1983 is estimated at KShs. 34,450.<sup>2</sup> Income distribution for urban areas was assumed to have remained unchanged between 1982 and 1983.

When it comes to rural areas, however, Lee admits that available information is unreliable. While Lee does present what he calls a "crude estimate," it was considered implausible by the study team for a variety of reasons:

1. His estimate of monthly household income for the poorest 20 percent of households in rural areas is only KShs. 100 (or KShs. 17/70 per capita). Equivalent to \$1.33 per capita, this is clearly an underestimation.
2. His estimate of income distribution in rural areas implies a Gini coefficient of about .46, indicating far greater income inequality in rural than in other urban areas, which is implausible.
3. Combined with his better substantiated urban household income estimates, his rural estimates account for only about 70 percent of total factor incomes (GDP at factor cost) in 1982.

For this study, total urban income, as estimated by Lee and adjusted to 1983, was subtracted from total factor

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1.  $43,200 \times 1.158 \times 1.065 \div 1.05 = 50,740$ .  
 2.  $30,000 \times 1.158 \times 1.065 \div 1.074 = 34,450$ .

incomes in 1983 (KShs. 70,716 million) and divided among rural households to arrive at an estimate of KShs. 16,100 per rural household, per annum.

For lack of a more reliable estimate, income distribution among rural households was assumed to be the same as that estimated for other urban households.<sup>1</sup> These revisions imply a monthly income for the poorest 20 percent of rural households of about KShs. 340 (KShs. 60 per capita). This is probably still an underestimate, but this is probably also true of the estimation of rural product and income in the national accounts.

On the basis of these preliminary calculations, it becomes possible to consider projecting household incomes into the future. For the study, projections of real GDP growth, disaggregated into its non-agricultural and agricultural<sup>2</sup> components, were used to project the growth of total urban and total rural incomes, respectively. Table 4 shows the projections adopted for the base case.

In Table 4, projections shown for the 1984-88 period are taken from the 5th Development Plan, while it was assumed that GDP will grow at 6 percent per year in real terms, and agricultural GDP at about 4 percent thereafter. These estimates are consistent with the views of a variety of informed observers of long-term development prospects in Kenya,<sup>3</sup> and imply a real growth rate of about 7 percent per annum for the non-agricultural sector during the 1990s.

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1. Gini coefficient of .40.

2. "Agriculture," for purposes of the study, was defined to include agriculture, forestry, fishing, mining, and the informal sector as defined in the national income accounts of Kenya.

3. See, IBRD, Growth and Structural Change in Kenya: A Basic Economic Report, Report No. 3350-KE, August 31, 1982.

Table 4. Kenya: Base Case  
GDP Structure and Growth

	1983	1988	1993	1998	2003
	----	----	----	----	----
<b>Total Country</b>					
Gross Domestic Product					
(Millions, constant units)	70716.00	89824.57	120205.53	160862.12	215269.80
GDP Annual Growth Rate (Percent)	0.00	4.90	6.00	6.00	6.00
<b>Agricultural Sector</b>					
Share of GDP (Percent)	36.70	35.80	32.50	29.60	26.90
Agricultural GDP (Millions)	25952.77	32157.19	39066.80	47615.19	57907.58
Avg. Annual GDP Growth (Percent)	0.00	4.38	3.97	4.04	3.99
<b>Non Agricultural Sector</b>					
Share of GDP (Percent)	63.30	64.20	67.50	70.40	73.10
Non Agricultural GDP (Millions)	44763.23	57667.37	81138.73	113246.93	157362.22
Avg. Annual GDP Growth (Percent)	0.00	5.20	7.07	6.90	6.80

Table 5 shows the results of applying these projected growth rates to base year urban and rural income estimates.

Because of the growth in the projected number of households in each area, average income per household grows much more slowly in real terms than does total income. In fact, in the other urban areas average income per household is projected to decline at a rate of about 1 percent per year in real terms during the upcoming 1984-88 Plan period. This decline is due to the combination of a low overall GDP growth rate projection and the high rate of urbanization expected to continue taking place in these areas during the next few years.

In interpreting the values shown in Table 5, it should be kept in mind that these are averages taken over rapidly growing numbers of households -- both in total and within each quintile of the income distribution for each area.

Base year income distribution shares for each area are assumed to remain constant over the 20-year planning period, and all values are expressed in thousands of 1983 shillings.

#### Housing Design Standards and Costs

The other major determinant of housing affordability is housing cost. Unlike income, housing costs for units conforming to minimum statutory design standards are directly amenable to policy intervention.

For each scenario, three levels of cost are established and analyzed for each of the three urbanization categories

Table 5. Kenya: Base Case  
Household Incomes

	1983	1988	1993	1998	2003
	----	----	----	----	----
<b>Metropolitan Area</b>					
Mean Annual Disposable Income					
All Households (Thousands)	50.70	53.09	60.62	67.05	71.37
Annual Growth Rate of					
Mean Household Income (Percent)	0.00	.93	2.69	2.04	1.26
Quintile Mean Incomes (Thousands)					
1	9.89	10.35	11.82	13.08	13.92
2	17.49	18.32	20.91	23.13	24.62
3	32.45	33.98	38.80	42.91	45.68
4	52.73	55.21	63.05	69.73	74.23
5	140.95	147.59	168.53	186.41	198.41
<b>Other Urban Areas</b>					
Mean Annual Disposable Income					
All Households (Thousands)	34.50	32.73	32.82	32.93	33.09
Annual Growth Rate of					
Mean Household Income (Percent)	0.00	-1.05	.06	.06	.10
Quintile Mean Incomes (Thousands)					
1	8.28	7.85	7.88	7.90	7.94
2	16.56	15.71	15.76	15.80	15.89
3	25.36	24.05	24.13	24.20	24.32
4	38.47	36.49	36.60	36.71	36.90
5	83.84	79.52	79.76	80.01	80.42
<b>Rural Areas</b>					
Mean Annual Disposable Income					
All Households (Thousands)	16.10	16.86	17.52	18.48	19.74
Annual Growth Rate of					
Mean Household Income (Percent)	0.00	.92	.77	1.08	1.32
Quintile Mean Incomes (Thousands)					
1	4.03	4.21	4.38	4.62	4.93
2	8.05	8.43	8.76	9.24	9.87
3	12.08	12.64	13.14	13.86	14.80
4	17.71	18.54	19.27	20.33	21.71
5	38.64	40.46	42.04	44.36	47.36

defined (i.e., metropolitan, other urban, and rural). Cost level 1 is defined as the cost of upgrading an existing unit. Cost level 2 is defined as the cost of constructing a new unit to whatever minimum standard applies in each area for the scenario in question. Cost level 3 is defined as the minimum price available from the formal sector for a new unit meeting or exceeding the minimum applicable standards.

For the base case, the definition of cost level 2 was further refined to mean specifically the estimated cost of building a new unit meeting the standards established in the current Grade I by-laws of the Building Code.

Cost level 3, in the base case, is defined as the minimum price currently available from the formal sector -- excluding those public sector projects which have received de facto exemptions from these by-laws. In essence, cost level 3 in the base case represents the minimum price currently available for a new unit built by the formal private sector.

Base case cost estimates established for each of these levels are given in Table 6. Table 6 also shows the estimated value of existing upgradable housing in Kenya. Since payments of some sort are being made by the occupants of this housing, and the level of such payments is assumed to be based on the value of these units, these estimates are necessary to avoid overstating income available among such households to pay for upgrades. These values are not counted in the capital cost of an upgrade, however.

The minimum standard assumed to be applicable for new units in metropolitan areas in the base case includes the following components:

**Table 6. Kenya: Base Case  
Design Standards and Costs**

	1983	1988	1993	1998	2003
	----	----	----	----	----
Average Inflation Rate (%)	12.00	12.00	12.00	12.00	12.00
Construction Cost Escalation Rate	12.00	12.00	12.00	12.00	12.00
<b>Metropolitan Area</b>					
Price Minimum Standard Formal Sector Housing (Cost level 3)	120.00	120.00	120.00	120.00	120.00
Design Cost New Housing Unit (Cost level 2)	90.50	90.50	90.50	90.50	90.50
Design Cost Upgrade Existing Unit (Cost level 1)	15.50	15.50	15.50	15.50	15.50
Value of an Upgradable Unit (Additional to upgrading cost)	7.00	7.00	7.00	7.00	7.00
<b>Other Urban Areas</b>					
Price Minimum Standard Formal Sector Housing (Cost level 3)	90.00	90.00	90.00	90.00	90.00
Design Cost New Housing Unit (Cost level 2)	74.10	74.10	74.10	74.10	74.10
Design Cost Upgrade Existing Unit (Cost level 1)	10.00	10.00	10.00	10.00	10.00
Value of an Upgradable Unit (Additional to upgrading cost)	5.00	5.00	5.00	5.00	5.00
<b>Rural Areas</b>					
Price Minimum Standard Formal Sector Housing (Cost level 3)	50.00	50.00	50.00	50.00	50.00
Design Cost New Housing Unit (Cost level 2)	26.00	26.00	26.00	26.00	26.00
Design Cost Upgrade Existing Unit (Cost level 1)	4.50	4.50	4.50	4.50	4.50
Value of an Upgradable Unit (Additional to upgrading cost)	2.50	2.50	2.50	2.50	2.50

Components	Cost (000s KShs.)
84 m <sup>2</sup> cleared and graded plot	4.0
Water taps in kitchen and bathroom	12.0
Flush toilet and sanitary sewer	6.0
Street lights at 60 m and electrical house connection	10.0
1 m paved footpath in 3 m wayleave	4.5
6 m paved roads in 10 m wayleave on 360 m grid	9.0
40 m <sup>2</sup> dwelling with stone walls, cement floor and corrugated iron roofing	45.0
	<u>90.5</u>

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Source: Lloyd Morris, op. cit., p. C-5.

Housing construction costs, for the base case, are projected to escalate at the same rate as projected currency inflation. Thus, housing costs are projected to remain constant in thousands of 1983 shillings, as shown in Table 6.

The assumption of constant real construction costs is subjected to sensitivity analysis for some of the other scenarios discussed below. During the recent 3-year period 1980-82, inflation, as measured by consumer prices, rose 55 percent, while the residential construction cost index published by the CBS rose by only 44 percent.<sup>1</sup>

Over the longer term future, several factors may be expected to influence the relative rate of construction cost escalation. On the one hand, a sharp increase in the volume

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1. Source: Central Bureau of Statistics, Economic Survey, 1983.

of construction would be expected, all other things being equal, to bid construction costs up relative to inflation. On the other hand, high rates of urban unemployment and a lowering of the import content of new buildings, which could result from revisions in minimum design standards, would tend to moderate the rate of increase in construction costs. On balance, constant cost levels in real terms may be quite reasonable to assume for long-term planning purposes.

#### Housing Expenditures and Financial Lending Terms

In the absence of detailed and reliable household expenditure surveys, the percentage of gross household income which may be presumed to be available for housing expenditures (mortgage service or rent, plus recurrent expenditures on items such as maintenance, utilities, and real estate taxes) must be estimated on the basis of informed judgment. Donor-funded housing project feasibility studies in Kenya<sup>1</sup> commonly use a value of 25-35 percent of household income for their affordability calculations.

One recent project paper reports that the Housing Finance Company of Kenya, which has the largest assets of such companies in the country, will allow up to 35 percent of household income in approving 25-year mortgage applications.<sup>2</sup>

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1. See, IBRD, Staff Appraisal Report: Secondary Towns Project, op. cit., p. 67; and USAID, Private Sector Housing Project Paper, op. cit., p. 68.

2. Ibid., USAID, p. K-16.

For the purposes of this study we have followed World Bank practice in assuming a maximum of 25 percent of household incomes available for total housing expenditures in urban areas,<sup>1</sup> and 20 percent in rural areas. Of these amounts, urban residents are assumed to require 15 percent for recurring expenditures, and rural residents 10 percent.

Thus, rural households are estimated to be able to devote up to 21.25 percent of their income to mortgage service or rental payments, and rural residents 18 percent. All scenarios prepared for this study use these estimates as a common basis for affordability calculations.

Because the rate of inflation is assumed to remain constant at 12 percent for the base case scenario, interest rates are kept constant at their current level of 16 percent per annum. This implies a 3.6 percent real rate of interest, a reasonable value for long-term planning purposes.

Affordability, however, is determined by the level of nominal interest rates even when cost and income variables are expressed in real terms. Sixteen percent mortgage interest rates, such as currently prevail, represent an abnormally high level in historical terms and probably result in an underestimation of affordability for long-term planning purposes. Thus, while the base case uses the 16 percent rate, several alternative scenarios assume a moderation of inflation and interest rates to more "normal" levels of 8 and 12 percent, respectively.

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1. Except for the wealthiest quintile of the income distribution, which is estimated to devote only 20 percent of income to housing expenditures.

The base case capitalizes housing expenditures over 25 years in urban areas and over 20 years in rural areas. These terms conform to common mortgage lending practices among existing low-cost housing schemes in Kenya and are presumed to be a feature of housing finance for an expanded housing program in the future. The impact of these assumptions on affordability is also tested through a sensitivity analysis which reduces the terms for mortgage lending to 20 years in urban areas and 15 years in rural. The differential in lending terms between urban and rural areas is assumed for all scenarios for two reasons:

- . The reduced liquidity of housing assets in rural areas which makes mortgage lending more risky; and
- . The generally shorter lived materials used in housing construction in rural areas.

All scenarios assume a 10 percent downpayment on housing purchases for all areas in Kenya.

## V. HOUSING PROGRAM AND POLICY ALTERNATIVES

As discussed in the Introduction, three fundamental policy alternatives emphasizing the issue of appropriate design standards for low-income housing are assessed in this study. In this chapter, the financial feasibility of implementing a housing program to meet the projected needs of all households is analyzed for each of these alternatives, from the point of view of both individual household and public sector finances.

The base case assumes the implementation of this hypothetical housing program according to the standards stipulated in the current by-laws of the Building Code; Alternative 1 assumes a general lowering of these standards to cost levels which are being currently experienced among certain of the ongoing donor-supported low-cost housing programs in Kenya; and Alternative 2 assumes a further reduction of standards to a level which legally allows the construction and secure tenure of what might be called "starter" housing, offering environmentally safe shelter at minimum technically feasible cost. Each of these alternatives is discussed below.

### Base Case

Household income and expenditure estimates and projections for the base case, combined with the assumed financial terms presented in Chapter III, give rise to the affordability estimates shown in Tables 7, 8, and 9 for metropolitan, other urban, and rural areas, respectively.

Taking first the case of the metropolitan areas, it can be seen from Table 7 that the poorest 20 percent of metropolitan households, on average, are estimated to currently receive an annual income of KShs. 9,890 and to be able to devote a maximum of about KShs. 180 per month to mortgage service or rental payments. On this basis the maximum dwelling unit cost which they could currently afford without subsidy is estimated at KShs. 14,320. While these households will, over time, gradually increase the level of housing they can afford, even by the year 2003 it is estimated that their maximum affordability will only reach 20,150 in 1983 Kenya shillings. The second quintile of metropolitan households is currently estimated to be able to afford about KShs. 300 per month for housing, which would permit the purchase, without subsidy, of a unit valued at about KShs. 25,000. The third quintile can afford housing in the KShs. 45-50 thousand range, and the fourth quintile in the KShs. 75-80 thousand range. Only the richest 20 percent of metropolitan households can afford housing currently being provided by the formal private sector.

As shown in Tables 8 and 9, a similar situation is estimated to prevail in other urban areas of Kenya while housing affordability in rural areas is only about one-third that in the metropolitan areas of Nairobi and Mombasa.

Table 7. Kenya: Base Case  
Affordable Capital Costs

Metropolitan Area					
Interest Rate (Percent)	.16				
Loan Term (Years)	25.00				
Downpayment Required (%)	.10				
	1983	1988	1993	1998	2003
	----	----	----	----	----
(Thousands of currency units)					
Quintile 1					
Mean Annual Income	9.89	10.35	11.82	13.08	13.92
% Available for Housing	25.00				
% Needed for Recurring Expenses	15.00				
Monthly Income for Mortgage Serv	.18	.18	.21	.23	.25
Affordable Dwelling Unit Cost	14.32	14.99	17.12	18.93	20.15
Quintile 2					
Mean Annual Income	17.49	18.32	20.91	23.13	24.62
% Available for Housing	25.00				
% Needed for Recurring Expenses	15.00				
Monthly Income for Mortgage Serv	.31	.32	.37	.41	.44
Affordable Dwelling Unit Cost	25.33	26.52	30.28	33.50	35.65
Quintile 3					
Mean Annual Income	32.45	33.98	38.80	42.91	45.68
% Available for Housing	25.00				
% Needed for Recurring Expenses	15.00				
Monthly Income for Mortgage Serv	.57	.60	.69	.76	.81
Affordable Dwelling Unit Cost	46.98	49.20	56.18	62.14	66.14
Quintile 4					
Mean Annual Income	52.73	55.21	63.05	69.73	74.23
% Available for Housing	25.00				
% Needed for Recurring Expenses	15.00				
Monthly Income for Mortgage Serv	.93	.98	1.12	1.23	1.31
Affordable Dwelling Unit Cost	76.35	71.94	91.29	100.97	107.48
Quintile 5					
Mean Annual Income	140.95	147.59	168.53	186.41	198.41
% Available for Housing	20.00				
% Needed for Recurring Expenses	15.00				
Monthly Income for Mortgage Serv	2.00	2.09	2.39	2.64	2.81
Affordable Dwelling Unit Cost	163.27	170.96	195.22	215.92	229.83

Table 8. Kenya: Base Case  
Affordable Capital Costs

Other Urban Areas					
Interest Rate (Percent)	.16				
Loan Term (Years)	25.00				
Downpayment Required (%)	.10				
	1983	1988	1993	1998	2003
	----	----	----	----	----
(Thousands of currency units)					
Quintile 1					
Mean Annual Income	8.28	7.85	7.88	7.90	7.94
% Available for Housing	25.00				
% Needed for Recurring Expenses	15.00				
Monthly Income for Mortgage Serv	.15	.14	.14	.14	.14
Affordable Dwelling Unit Cost	11.99	11.37	11.41	11.44	11.50
Quintile 2					
Mean Annual Income	16.56	15.71	15.76	15.80	15.8 <sup>a</sup>
% Available for Housing	25.00				
% Needed for Recurring Expenses	15.00				
Monthly Income for Mortgage Serv	.29	.28	.28	.28	.28
Affordable Dwelling Unit Cost	23.98	22.74	22.81	22.88	23.00
Quintile 3					
Mean Annual Income	25.36	24.05	24.13	24.20	24.32
% Available for Housing	25.00				
% Needed for Recurring Expenses	15.00				
Monthly Income for Mortgage Serv	.45	.43	.43	.43	.43
Affordable Dwelling Unit Cost	36.72	34.83	34.93	35.04	35.22
Quintile 4					
Mean Annual Income	38.47	36.49	36.60	36.71	36.90
% Available for Housing	25.00				
% Needed for Recurring Expenses	15.00				
Monthly Income for Mortgage Serv	.68	.65	.65	.65	.65
Affordable Dwelling Unit Cost	55.70	52.83	52.99	53.16	53.43
Quintile 5					
Mean Annual Income	83.84	79.52	79.76	80.01	80.42
% Available for Housing	20.00				
% Needed for Recurring Expenses	15.00				
Monthly Income for Mortgage Serv	1.19	1.13	1.13	1.13	1.14
Affordable Dwelling Unit Cost	97.11	92.12	92.40	92.68	93.15

Table 9. Kenya: Base Case  
Affordable Capital Costs

Rural Areas	1983	1988	1993	1998	2003
(Thousands of currency units)	----	----	----	----	----
Interest Rate (Percent)	.16				
Loan Term (Years)	20.00				
Downpayment Required (%)	.10				
Quintile 1					
Mean Annual Income	4.03	4.21	4.38	4.62	4.93
% Available for Housing	20.00				
% Needed for Recurring Expenses	10.00				
Monthly Income for Mortgage Serv	.06	.06	.07	.07	.07
Affordable Dwelling Unit Cost	4.82	5.05	5.25	5.54	5.91
Quintile 2					
Mean Annual Income	8.05	8.43	8.76	9.24	9.87
% Available for Housing	20.00				
% Needed for Recurring Expenses	10.00				
Monthly Income for Mortgage Serv	.12	.13	.13	.14	.15
Affordable Dwelling Unit Cost	9.64	10.10	10.49	11.07	11.82
Quintile 3					
Mean Annual Income	12.08	12.64	13.14	13.86	14.80
% Available for Housing	20.00				
% Needed for Recurring Expenses	10.00				
Monthly Income for Mortgage Serv	.18	.19	.20	.21	.22
Affordable Dwelling Unit Cost	14.47	15.15	15.74	16.61	17.73
Quintile 4					
Mean Annual Income	17.71	18.54	19.27	20.33	21.71
% Available for Housing	20.00				
% Needed for Recurring Expenses	10.00				
Monthly Income for Mortgage Serv	.27	.28	.29	.30	.33
Affordable Dwelling Unit Cost	21.22	22.21	23.08	24.36	26.01
Quintile 5					
Mean Annual Income	38.64	40.46	42.04	44.36	47.36
% Available for Housing	20.00				
% Needed for Recurring Expenses	10.00				
Monthly Income for Mortgage Serv	.58	.61	.63	.67	.71
Affordable Dwelling Unit Cost	46.29	48.47	50.36	53.15	56.74

Table 10 summarizes maximum affordable housing asset value estimates for each quintile of households in each of the three regional areas used for the study.

In Table 11 the maximum housing cost affordable by each quintile of households is matched against the three levels of design cost specified for the base case.<sup>1</sup> If only these three cost levels of housing were available, Table 11 shows that the poorest metropolitan households could not currently even afford the cost of upgrade, and that only the richest 20 percent of households could afford a new formal sector unit without subsidy. Affordable levels for the three middle quintiles are above that of an upgrade, but do not quite reach the estimated cost of a new unit fully conforming to Grade I by-law minimum standards. To be able to afford such housing each of these quintiles would require varying degrees of subsidy.

In Table 12, estimated numbers of households falling within each affordability category are presented.

Recall from Chapter II, that it was estimated that an average annual rate of construction of 26,760 units would be required during the 1984-88 period in the metropolitan areas. Of these, 2,950 units per year would be upgrades of existing units, while 23,810 would be new dwelling units destined to fulfill the following components of projected housing needs:

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1. Only the results for metropolitan area households are shown in Table 11 for illustrative purposes. Recall that the cost of upgrading existing units in the metro area is estimated at KShs. 15,500; that of a new unit meeting grade I by-laws, KShs. 90,500; and that the minimum price of a formal private sector unit was established at KShs. 120,000.

Table 10. Kenya: Base Case  
Affordable Costs by Income Class and Region

	1983	1988	1993	1998	2003
	----	----	----	----	----
(Thousands of currency units)					
Metropolitan Area					
Affordable Costs By Quintile					
1	14.32	14.99	17.12	18.93	20.15
2	25.33	26.52	30.28	33.50	35.65
3	46.98	49.20	56.18	62.14	66.14
4	76.35	79.94	91.29	100.97	107.48
5	163.27	170.96	195.22	215.92	229.83
Other Urban Areas					
Affordable Costs By Quintile					
1	11.99	11.37	11.41	11.44	11.50
2	23.98	22.74	22.81	22.88	23.00
3	36.72	34.83	34.93	35.04	35.22
4	55.70	52.83	52.99	53.16	53.43
5	97.11	92.12	92.40	92.68	93.15
Rural Areas					
Affordable Costs By Quintile					
1	4.82	5.05	5.25	5.54	5.91
2	9.64	10.10	10.49	11.07	11.82
3	14.47	15.15	15.71	16.61	17.73
4	21.22	22.21	23.08	24.36	26.01
5	46.29	48.47	50.34	53.15	56.74

Table 11. Kenya: Base Case  
Quintile Design Costs Classification

	1983	1988	1993	1998	2003
	----	----	----	----	----
Metropolitan Area					
Quintiles					
Affordable Cost	14.32	14.99	17.12	18.93	20.15
Affordable Level	0.00	0.00	0.00	0.00	0.00
Design Cost	0.00	0.00	0.00	0.00	0.00
Affordable Cost	25.33	26.52	30.28	33.50	35.65
Affordable Level	1.00	1.00	1.00	1.00	1.00
Design Cost	22.50	22.50	22.50	22.50	22.50
Affordable Cost	46.98	49.20	56.18	62.14	66.14
Affordable Level	1.00	1.00	1.00	1.00	1.00
Design Cost	22.50	22.50	22.50	22.50	22.50
Affordable Cost	76.35	79.94	91.29	100.97	107.48
Affordable Level	1.00	1.00	2.00	2.00	2.00
Design Cost	22.50	22.50	90.50	90.50	90.50
Affordable Cost	163.27	170.96	195.22	215.92	229.83
Affordable Level	3.00	3.00	3.00	3.00	3.00
Design Cost	120.00	120.00	120.00	120.00	120.00

Table 12. Kenya: Base Case  
Target Group Identification

	1983	1988	1993	1998	2003
	----	----	----	----	----
(Thousands of Households)					
Metropolitan Area					
Affordable Level 0	0.00	5.69	6.91	8.96	12.22
Affordable Level 1	0.00	17.08	13.81	17.93	24.43
Affordable Level 2	0.00	0.00	6.91	8.96	12.22
Subtotal, Target Group	0.00	22.78	27.62	35.85	48.87
Affordable Level 3	0.00	3.99	5.20	7.26	10.51
Total	0.00	26.76	32.82	43.11	59.38
Other Urban Areas					
Affordable Level 0	0.00	6.76	9.72	13.03	17.48
Affordable Level 1	0.00	20.29	29.15	39.10	52.43
Affordable Level 2	0.00	0.00	0.00	0.00	0.00
Subtotal, Target Group	0.00	27.06	38.87	52.14	69.91
Affordable Level 3	0.00	5.32	8.27	11.59	16.03
Total	0.00	32.38	47.14	63.73	85.94
Rural Areas					
Affordable Level 0	0.00	45.54	57.45	63.59	69.15
Affordable Level 1	0.00	136.61	172.34	190.77	138.31
Affordable Level 2	0.00	45.54	0.00	0.00	69.15
Subtotal, Target Group	0.00	227.68	229.79	254.36	276.62
Affordable Level 3	0.00	0.00	29.00	35.14	40.70
Total	0.00	227.68	258.79	289.50	317.32

New households	15,810 units/year
Replacement of acceptable units	<u>4,130</u>
Subtotal	19,940
Replacement of non-upgradable units	1,480
New units to relieve overcrowding	<u>2,400</u>
Subtotal	3,880
Total, new units	23,810
Planned upgrades	<u>2,950</u>
Total construction	26,760 units/year

Two basic assumptions are used in allocating this total requirement among maximum affordable cost levels. First, household quintiles which are able to afford cost level 3 (formal sector housing) without subsidy are classified out of the target group. Second, all substandard and overcrowded housing in the base year is assumed to be found among the remaining households that make up the target group.

Thus, since only one quintile in the metropolitan areas in 1988 is estimated to be able to afford formal sector housing without subsidy, 20 percent of new households plus 20 percent of replacements of acceptable dwellings ( $.2 \times 15,810 + .2 \times 4,130 = 3,988$ ) are classified out of the target group. The remainder ( $26,760 - 3,988 = 22,772$ ) are allocated proportionately among target group affordable levels according to the number of quintiles falling within each level. As was shown in Table 11, three metropolitan area quintiles falls into affordable level "1" and one quintile falls into affordable level "0" (signifying that they are not able to afford an upgrade). Therefore, in Table 12, three-fourths of the dwelling units allocated to target group households are classified into affordable level "1," and one-fourth into affordable level "0."

None of the target group households can afford formal sector housing. Some, however, can afford upgrades and will be receiving upgrades, therefore requiring no subsidy. All others would, in order for their housing needs to be met fully at the standards specified for the base case, have to receive a subsidy to make up the difference between their affordable costs and the design costs of the new units allocated to them.

Table 12 indicates that by 1993 some metropolitan households, through income growth, will have moved into affordable level 2. These will require no subsidy. Of those remaining at affordable level 1 in 1993, households receiving an upgrade<sup>1</sup> of an existing unit will not require subsidy. The remainder, who would need to be allocated new units to meet their housing needs, would require a subsidy to make up the difference between the maximum asset values they can afford and the cost of new units meeting Grade I standards.

In Table 13, estimated total numbers of target group households requiring some amount of subsidy are presented, as are the total annual capital costs of providing the target group with housing meeting base case standards, and the amount of subsidy which would be required to implement a program based on such standards.

Looking again at 1988 metropolitan area estimates shown in Table 13, it can be seen that about 90 percent of target group households would require some level of subsidy if a

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1. It is assumed that upgradable units are evenly distributed among the quintiles making up the target group.

**Table 13. Kenya: Base Case  
Target Group Investment and Subsidy Requirements**

	1983	1988	1993	1998	2003
	----	----	----	----	----
<b>Country</b>					
No. Target Households (1000's)	0.00	277.51	296.28	342.35	395.39
No. Requiring Subsidy (1000's)	0.00	171.35	215.41	259.43	263.51
Target Group Housing Cost(Mill.)	0.00	7565.10	8934.12	11300.79	14373.94
Subsidy Portion of Cost (Mill.)	0.00	3428.67	4333.41	5336.44	6595.09
<b>Metropolitan Area</b>					
No. Target Households (1000's)	0.00	22.78	27.62	35.85	48.87
No. Requiring Subsidy (1000's)	0.00	20.56	19.24	25.41	35.17
Target Group Housing Cost(Mill.)	0.00	1839.92	2278.74	3023.47	4271.86
Subsidy Portion of Cost (Mill.)	0.00	953.93	1039.81	1293.55	1718.50
<b>Other Urban Areas</b>					
No. Target Households (1000's)	0.00	27.06	38.87	52.14	69.91
No. Requiring Subsidy (1000's)	0.00	24.92	36.73	50.00	67.77
Target Group Housing Cost(Mill.)	0.00	1822.22	2697.56	3680.56	4997.47
Subsidy Portion of Cost (Mill.)	0.00	1059.33	1571.69	2144.96	2906.94
<b>Rural Areas</b>					
No. Target Households (1000's)	0.00	227.68	229.79	254.36	276.62
No. Requiring Subsidy (1000's)	0.00	125.86	159.44	184.01	160.56
Target Group Housing Cost(Mill.)	0.00	3902.96	3957.81	4596.76	5175.32
Subsidy Portion of Cost (Mill.)	0.00	1415.41	1721.92	1897.93	1969.66

housing program based on Grade I standards were to be implemented to meet projected housing needs. The total annual capital cost of housing the metropolitan area target group is estimated at KShs. 1,840 million. Of this amount, KShs. 886 million could be financed on the basis of maximum payments affordable by target group households. Thus, KShs. 954 million per year would be required in the form of direct subsidies.

To implement a program such as specified for the base case throughout Kenya would cost about KShs. 7.5 billion per year and require about KShs. 3.4 billion in direct annual subsidies during the 1984-88 planning period.

These numbers are placed in a broader macroeconomic perspective in Table 14. First, target group investment is added to non-target group investment<sup>1</sup> to obtain an estimate of average annual total housing investment during each 5-year planning period. As shown in Table 14, total housing investment associated with a program designed to fully meet projected housing needs in Kenya during the 1984-88 period according to base case standards is estimated at about KShs. 10.7 billion (thousand million) per year, or about 12 percent of real GDP projected for 1988. The implementation of such a program would require annual subsidies on the order of KShs. 3.4 billion, a figure which is equivalent to 36 percent of the public sector capital budget<sup>2</sup> projected for 1988.

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1. Investment for both the target and non-target groups is based on affordability estimates.

2. Central government capital expenditures (development and investment) have averaged 10.7 percent of GDP over the last 10 years and are projected on this basis.

Table 14. Kenya: Base Case  
Housing Investment in Relation to GDP

	1983	1988	1993	1998	2003
	----	----	----	----	----
(In Millions of currency units)					
Country					
Non-target Group Investment	0.00	1171.81	3239.96	4508.69	6218.73
Target Group Investment	0.00	6123.87	5397.70	6920.62	8936.44
Subsidy Required	0.00	3428.67	4333.41	5336.44	6595.09
Total Housing Investment	0.00	10724.35	12971.07	16765.75	21750.27
Metropolitan Area					
Non-target Group Investment	0.00	681.71	1015.10	1566.98	2415.62
Target Group Investment	0.00	951.01	1325.11	1911.27	2782.07
Subsidy Required	0.00	953.93	1039.81	1293.55	1718.50
Total Housing Investment	0.00	2586.65	3380.01	4771.80	6916.18
Other Urban Areas					
Non-target Group Investment	0.00	490.10	764.45	1074.15	1493.53
Target Group Investment	0.00	809.49	1172.71	1582.69	2138.02
Subsidy Required	0.00	1059.33	1571.69	2144.96	2906.94
Total Housing Investment	0.00	2358.92	3508.85	4801.79	6538.49
Rural Areas					
Non-target Group Investment	0.00	0.00	1460.41	1867.57	2309.58
Target Group Investment	0.00	4363.37	2899.87	3426.67	4016.35
Subsidy Required	0.00	1415.41	1721.92	1897.93	1969.66
Total Housing Investment	0.00	5778.78	6082.21	7192.16	8295.59
Total Housing Investment in the Base Year	4500.00				
Subsidy as a Percent of Public Capital Expenditures	0.00	35.67	33.69	31.00	28.63
Total Housing Investment As a Percent of GDP	6.36	11.94	10.79	10.42	10.10

Obviously, such a program is not likely to be affordable. \_ Either Kenya must resign itself to ever-growing numbers of its people occupying the squatter shanties of the informal sector, or more realistic low-cost housing alternatives must continue to be actively sought.

### Alternative 1

What of the standards which have been implemented on a modest scale through a variety of public sector low-cost housing schemes in Kenya?

As shown in Table 15, new housing units built to these slightly lower standards can be produced for a cost of about KShs. 60,000 in the metropolitan areas of Kenya, and for about KShs. 50,000 in other urban areas. Is a nationwide program aimed at meeting the total projected housing needs of the Kenyan population at these lower standards financially viable?

The answer indicated through the estimates shown in Table 16 is "Probably not." Although such a program clearly could reach a much wider portion of the population than could one based on Grade I design standards, subsidy amounts required for its implementation would still absorb a very large portion of public sector capital expenditures -- probably unacceptable given the other pressing development needs of the country.

At KShs. 2.3 billion per year during 1984-88, subsidies required for the full implementation of a program based even on these lower costs would amount to about the same level of expenditure as the total fiscal 1983 government development

Table 15. Kenya: Alternative 1  
Design Standards and Costs

	1983	1988	1993	1998	2003
	----	----	----	----	----
Average Inflation Rate (%)	12.00	12.00	12.00	12.00	12.00
Construction Cost Escalation Rate	12.00	12.00	12.00	12.00	12.00
<b>Metropolitan Area</b>					
Price Minimum Standard Formal Sector Housing (Cost level 3)	120.00	120.00	120.00	120.00	120.00
Design Cost New Housing Unit (Cost level 2)	60.00	60.00	60.00	60.00	60.00
Design Cost Upgrade Existing Unit (Cost level 1)	15.50	15.50	15.50	15.50	15.50
Value of an Upgradable Unit (Additional to upgrading cost)	7.00	7.00	7.00	7.00	7.00
<b>Other Urban Areas</b>					
Price Minimum Standard Formal Sector Housing (Cost level 3)	90.00	90.00	90.00	90.00	90.00
Design Cost New Housing Unit (Cost level 2)	50.00	50.00	50.00	50.00	50.00
Design Cost Upgrade Existing Unit (Cost level 1)	10.00	10.00	10.00	10.00	10.00
Value of an Upgradable Unit (Additional to upgrading cost)	5.00	5.00	5.00	5.00	5.00
<b>Rural Areas</b>					
Price Minimum Standard Formal Sector Housing (Cost level 3)	50.00	50.00	50.00	50.00	50.00
Design Cost New Housing Unit (Cost level 2)	26.00	26.00	26.00	26.00	26.00
Design Cost Upgrade Existing Unit (Cost level 1)	4.50	4.50	4.50	4.50	4.50
Value of an Upgradable Unit (Additional to upgrading cost)	2.50	2.50	2.50	2.50	2.50

Table 16. Kenya: Alternative 1  
Housing Investment in Relation to GDP

	1983	1988	1993	1998	2003
	----	----	----	----	----
(In Millions of currency units)					
Country					
Non-target Group Investment	0.00	1171.81	3239.96	4508.69	6218.73
Target Group Investment	0.00	6123.87	5397.70	6920.62	8936.44
Subsidy Required	0.00	2356.62	2927.88	3452.46	4056.62
Total Housing Investment	0.00	9652.31	11565.53	14881.78	19211.79
Metropolitan Area					
Non-target Group Investment	0.00	681.71	1015.10	1566.98	2415.62
Target Group Investment	0.00	951.01	1325.11	1911.27	2782.07
Subsidy Required	0.00	448.11	475.38	558.47	738.63
Total Housing Investment	0.00	2080.83	2815.59	4036.71	5936.32
Other Urban Areas					
Non-target Group Investment	0.00	490.10	764.45	1074.15	1493.53
Target Group Investment	0.00	809.49	1172.71	1582.69	2138.02
Subsidy Required	0.00	493.10	730.57	996.07	1348.33
Total Housing Investment	0.00	1792.69	2667.74	3652.90	4979.88
Rural Areas					
Non-target Group Investment	0.00	0.00	1460.41	1867.57	2309.58
Target Group Investment	0.00	4363.37	2899.87	3426.67	4016.35
Subsidy Required	0.00	1415.41	1721.92	1897.93	1969.66
Total Housing Investment	0.00	5778.78	6082.21	7192.16	8295.59
Total Housing Investment in the Base Year	4500.00				
Subsidy as a Percent of Public Capital Expenditures	0.00	24.52	22.76	20.06	17.61
Total Housing Investment As a Percent of GDP	6.36	10.75	9.62	9.25	8.92

outlay on agriculture, forestry, fishing, mining, manufacturing, and construction combined.

Except for the housing design costs postulated, all other data inputs and estimates used in the calculation of Alternative 1 results are identical with those used for the base case. Are these too pessimistic? Or are they perhaps too optimistic?

Two sensitivity analyses were prepared to test the impacts of key factors such as interest rates, GDP growth, and construction cost escalation rates on the results of Alternative 1. These are designated "Alternative 1 - Best Case" and "Alternative 1 - Worst Case" and are presented in Tables 17 and 18, respectively.

For the Best Case it was assumed that inflation moderates substantially, and that housing finance becomes available at an average 12 percent nominal interest rate. As in the base case, GDP is projected to grow at a 6 percent real annual rate, 1989 to 2003, and construction costs remain constant in real terms at the base year levels specified for Alternative 1.

As shown in Table 17, under these conditions housing affordability would increase substantially among both the target and non-target groups (raising the level of projected total investment in housing) but large amounts of government subsidy would still be required on a continuing basis over the 20-year planning period.

Under less optimistic assumptions regarding these three key macroeconomic factors, the implausibility of implementing Alternative 1 on a nationwide scale becomes apparent.

**Table 17: Kenya: Alternative 1 - Best Case  
Housing Investment in Relation to GDP**

	1983	1988	1993	1998	2003
	----	----	----	----	----
(In Millions of currency units)					
<b>Country</b>					
Non-target Group Investment	0.00	2906.67	4141.28	6712.78	9419.32
Target Group Investment	0.00	5445.51	6958.74	7825.96	9890.14
Subsidy Required	0.00	1819.27	2219.10	2639.68	3090.20
Total Housing Investment	0.00	10171.46	13319.12	17178.41	22399.67
<b>Metropolitan Area</b>					
Non-target Group Investment	0.00	879.56	1309.70	2967.16	4574.11
Target Group Investment	0.00	1233.00	1715.68	1388.31	1990.91
Subsidy Required	0.00	331.65	363.29	447.58	566.49
Total Housing Investment	0.00	2444.21	3388.66	4803.06	7131.51
<b>Other Urban Areas</b>					
Non-target Group Investment	0.00	632.34	986.30	1385.89	1926.98
Target Group Investment	0.00	1048.56	1517.19	2046.14	2762.65
Subsidy Required	0.00	369.66	547.49	745.66	1006.73
Total Housing Investment	0.00	2050.55	3050.99	4177.69	5696.37
<b>Rural Areas</b>					
Non-target Group Investment	0.00	1394.78	1845.28	2359.73	2918.23
Target Group Investment	0.00	3163.96	3725.87	4391.50	5136.58
Subsidy Required	0.00	1117.97	1308.33	1446.44	1516.98
Total Housing Investment	0.00	5676.70	6879.48	8197.67	9571.79
Total Housing Investment in the Base Year	4500.00				
Subsidy as a Percent of Public Capital Expenditures	0.00	18.93	17.25	15.34	13.42
Total Housing Investment As a Percent of GDP	6.36	11.32	11.08	10.68	10.41

**Table 18. Kenya: Alternative 1 - Worst Case  
Housing Investment in Relation to GDP**

	1983	1988	1993	1998	2003
	----	----	----	----	----
(In Millions of currency units)					
<b>Country</b>					
Non-target Group Investment	0.00	681.71	968.11	1427.29	2098.33
Target Group Investment	0.00	6685.20	8122.53	9799.84	11878.29
Subsidy Required	0.00	2668.63	3912.67	5556.43	7803.86
Total Housing Investment	0.00	10035.55	13003.31	16783.56	21780.48
<b>Metropolitan Area</b>					
Non-target Group Investment	0.00	681.71	968.11	1427.29	2098.33
Target Group Investment	0.00	951.01	1262.82	1739.05	2413.93
Subsidy Required	0.00	510.26	665.17	955.69	1487.33
Total Housing Investment	0.00	2142.98	2896.09	4122.04	5999.59
<b>Other Urban Areas</b>					
Non-target Group Investment	0.00	0.00	0.00	0.00	0.00
Target Group Investment	0.00	1370.82	1914.97	2484.01	3215.25
Subsidy Required	0.00	545.62	995.02	1617.96	2563.69
Total Housing Investment	0.00	1916.44	2910.00	4101.97	5778.94
<b>Rural Areas</b>					
Non-target Group Investment	0.00	0.00	0.00	0.00	0.00
Target Group Investment	0.00	4363.37	4944.74	5576.78	6249.11
Subsidy Required	0.00	1612.76	2252.48	2982.77	3752.84
Total Housing Investment	0.00	5976.13	7197.22	8559.55	10001.95
Total Housing Investment in the Base Year	4500.00				
Subsidy as a Percent of Public Capital Expenditures	0.00	27.76	31.90	35.49	39.05
Total Housing Investment As a Percent of GDP	6.36	11.17	11.34	11.47	11.66

For the Worst Case scenario, interest rates are assumed to remain at the 16 percent level specified for the base case; real GDP growth rate projections for the period 1989-2003 are reduced to 5 percent per annum; and construction costs are assumed to escalate at 1.5 percent per year in real terms.

While none of these assumptions could be considered extreme, their combined impact on the affordability of a housing program implemented along the lines of Alternative 1 is dramatic. As shown in Table 18, not only would required subsidy amounts exceed those estimated for either of the two preceding scenarios -- but they would in fact absorb an ever increasing share of public sector capital expenditures in the future.

Even at a unit cost of only KShs. 60,000 in the metropolitan areas and KShs. 50,000 in other urban areas, it does not appear that Alternative 1 can provide a viable basis for meeting the total projected housing needs of Kenya's population.

### Alternative 2

Alternative 2 involves a two-pronged approach to the solution of the low-cost housing problem in Kenya. First, it presumes that all necessary steps -- including the revision of Building Code By-Laws, streamlining of administrative procedures particularly as regards land titling, and the further development of financial markets -- permitting the rapid development of low-cost housing production by the formal private sector are taken. These measures, it is assumed, will permit the formal private sector to provide

housing down to the level currently being provided in public sector low-cost housing schemes (i.e., down to new units costs of about KShs. 60, 50, and 26 thousand in the metropolitan, other urban, and rural areas, respectively) without the need for further public sector intervention of any sort. This would permit the public sector, as a facilitator of low-cost housing development, to focus its energies and resources on the provision of housing tailored specifically to meet the needs of the lowest income strata of the population.

The second feature of Alternative 2 therefore consists in the presumption that both the central government and local authorities will accept the large-scale construction of very basic "starter" housing units to meet the needs of these lower income groups. Such units would consist of small, minimally serviced plots with a small, 2-room dwelling unit built of semi-permanent materials which could be gradually upgraded and expanded over time. Cost estimates for such units in urban areas, based on bids received by the National Housing Corporation during December 1983, are presented in Table 19.<sup>1</sup>

As shown, the total cost for such units is estimated at KShs. 30,793 in metropolitan areas and KShs. 27,007 in other urban areas. These estimates include a 10 percent contingency on construction costs as well as all professional fees, survey and conveyancing, interest during construction (at 18 percent), and land costs.

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1. Thanks are due to Mr. Richard Martin, USAID Resident Technical Advisor to the National Housing Corporation for the provision of these estimates.

Table 19. Cost Estimates for New  
Low-Cost Housing Units  
(1983 Kenya Shillings)

Components	Metro cost	Other urban cost
<u>1. 2-room 20m2 dwelling unit</u>		
Flooring (25mm screed)	762	553
Roofing (galvanized)	3,220	2,820
Walling (soil cement)	6,374	7,124
Doors	844	844
Window shutters	347	297
Water tap	<u>72</u>	<u>72</u>
Basic house cost	11,619	11,810
<u>2. On-site infrastructure</u>		
Gravel roads	308 <sup>a</sup>	152 <sup>a</sup>
Street lighting	1,888	--
SW drainage	276 <sup>b</sup>	274 <sup>b</sup>
Water	1,150 <sup>b</sup>	572 <sup>b</sup>
Double-vault latrine	<u>5,000</u>	<u>5,000</u>
Subtotal infrastructure	7,922	5,998
<u>3. Serviced dwelling unit cost</u>	19,541	17,808
10% contingency	<u>1,954</u>	<u>1,781</u>
	21,495	19,589
11% professional fees	<u>2,364</u>	<u>2,155</u>
	23,859	21,744
Land	3,000	1,500
Survey/conveyancing	2,000	2,000
Interest during construction	<u>1,934</u>	<u>1,763</u>
<u>4. Total unit cost</u>	30,793	27,007

a. Metro: 4m. side, 1m. front; other urban: 4m. side only.

b. Metro: 1 tap/plot; other urban: communal water kiosks.

For rural areas, a 20 m<sup>2</sup> unit built initially of mud and wattle and provided with a VIP latrine and a safe source of water on site is estimated to cost KShs. 10,000.

Table 20 summarizes the design standards and costs assumed for Alternative 2. As shown, the minimum cost now available from the formal sector is set at the costs formerly used to represent public sector low-cost units exempted from Grade I by-laws, and cost level 2 now reflects the estimated costs of the starter units described above.

Table 21 indicates the impact of adopting Alternative 2 standards on the investment and subsidy requirements of implementing the program on a nationwide scale.

The number of non-target group households increases substantially in this scenario, and these are assumed to purchase housing from the formal sector at costs ranging from cost level 3 upwards.

Within the target group, a far greater number of households are now able to afford the new low-cost housing units being provided without subsidy than was the case under Alternative 1. Subsidy requirements are focussed on only the very poorest of the poor and are reduced in overall magnitude to about 4 percent of public sector capital expenditures. At a level of about 21.3 million pounds per year, the direct subsidy costs of implementing such a program might well be accommodated within the development budget without threatening the stability of public sector finances.<sup>1</sup>

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1. Public sector housing expenditures are currently estimated at about 10 million pounds per year (1 pound = 20 shillings) and are currently projected to rise to about 15 million annually during the 5th Plan period.

Table 20. Kenya: Alternative 2  
Design Standards and Costs

	1983	1988	1993	1998	2003
	----	----	----	----	----
Average Inflation Rate (%)	12.00	12.00	12.00	12.00	12.00
Construction Cost Escalation Rate	12.00	12.00	12.00	12.00	12.00
<b>Metropolitan Area</b>					
Price Minimum Standard Formal					
Sector Housing (Cost level 3)	60.00	60.00	60.00	60.00	60.00
Design Cost New Housing Unit (Cost level 2)	30.79	30.79	30.79	30.79	30.79
Design Cost Upgrade Existing Unit (Cost level 1)	15.50	15.50	15.50	15.50	15.50
Value of an Upgradable Unit (Additional to upgrading cost)	7.00	7.00	7.00	7.00	7.00
<b>Other Urban Areas</b>					
Price Minimum Standard Formal					
Sector Housing (Cost level 3)	50.00	50.00	50.00	50.00	50.00
Design Cost New Housing Unit (Cost level 2)	27.01	27.01	27.01	27.01	27.01
Design Cost Upgrade Existing Unit (Cost level 1)	10.00	10.00	10.00	10.00	10.00
Value of an Upgradable Unit (Additional to upgrading cost)	5.00	5.00	5.00	5.00	5.00
<b>Rural Areas</b>					
Price Minimum Standard Formal					
Sector Housing (Cost level 3)	26.00	26.00	26.00	26.00	26.00
Design Cost New Housing Unit (Cost level 2)	10.00	10.00	10.00	10.00	10.00
Design Cost Upgrade Existing Unit (Cost level 1)	4.50	4.50	4.50	4.50	4.50
Value of an Upgradable Unit (Additional to upgrading cost)	2.50	2.50	2.50	2.50	2.50

Table 21. Kenya: Alternative 2  
Housing Investment in Relation to GDP

	1983	1988	1993	1998	2003
	----	----	----	----	----
(In Millions of currency units)					
Country					
Non-target Group Investment	0.00	2875.57	4153.10	6308.47	9958.67
Target Group Investment	0.00	3487.85	4344.47	4888.63	4548.34
Subsidy Required	0.00	425.35	486.58	578.59	698.88
Total Housing Investment	0.00	6788.77	8984.15	11775.69	15205.89
Metropolitan Area					
Non-target Group Investment	0.00	1000.50	1489.78	2750.66	4240.36
Target Group Investment	0.00	547.41	753.57	538.73	756.31
Subsidy Required	0.00	113.37	97.38	114.32	135.92
Total Housing Investment	0.00	1661.28	2340.74	3403.71	5132.60
Other Urban Areas					
Non-target Group Investment	0.00	771.20	1202.90	1690.24	2350.16
Target Group Investment	0.00	485.29	691.03	923.23	1237.81
Subsidy Required	0.00	128.69	186.46	250.75	335.17
Total Housing Investment	0.00	1385.18	2080.39	2864.22	3923.14
Rural Areas					
Non-target Group Investment	0.00	1103.87	1460.41	1867.57	3368.14
Target Group Investment	0.00	2455.15	2899.87	3426.67	2554.22
Subsidy Required	0.00	183.29	202.74	213.52	227.79
Total Housing Investment	0.00	3742.31	4563.03	5507.76	6150.15
Total Housing Investment in the Base Year	4500.00				
Subsidy as a Percent of Public Capital Expenditures	0.00	4.43	3.78	3.36	3.03
Total Housing Investment As a Percent of GDP	6.36	7.56	7.47	7.32	7.06

In Alternative 2 it appears that we begin to see the outlines of a feasible program.

Account must still be taken, however, of contingencies regarding the underlying macroeconomic assumptions used in generating these results. As for Alternative 1, Best Case and Worst Case sensitivity analyses have been prepared for Alternative 2. These vary the basic macroeconomic premises of the base case in exactly the same manner as was described for Alternative 1. Results of these sensitivity tests are shown in Tables 22 and 23.

As might have been expected, the results of the Best Case look promising indeed. At less than 3 percent of project public sector capital expenditures (less than 1 percent of total central government expenditures) the subsidies required for such a program -- directed only at the very poorest households -- would not require other aspects of Kenya's development program to be seriously compromised, if at all. The assumptions underlying Alternative 2 - Best Case (6 percent real GDP growth and 12 percent nominal interest rates) are optimistic but certainly not grossly unrealistic.

What happens, though, if everything goes badly? Table 23 presents the results of the Worst Case sensitivity analysis for Alternative 2. The affordability picture is of course not as favorable under Worst Case assumptions. Still, at 5-7 percent of public sector capital expenditures (1.5 - 2 percent of total public expenditures) the subsidy implications of Alternative 2, even under Worst Case assumptions, are far more manageable than either the Base Case or Alternative 1 under the best of assumptions.

Table 22. Kenya: Alternative 2 - Best Case  
Housing Investment in Relation to GDP

	1983	1988	1993	1998	2003
	----	----	----	----	----
(In Millions of currency units)					
Country					
Non-target Group Investment	0.00	4573.04	6542.07	9171.00	12758.97
Target Group Investment	0.00	3095.06	3829.27	4728.73	5872.11
Subsidy Required	0.00	276.50	308.53	338.41	386.71
Total Housing Investment	0.00	7944.60	10679.87	14238.14	19017.78
Metropolitan Area					
Non-target Group Investment	0.00	1543.97	2299.03	3548.96	5470.99
Target Group Investment	0.00	375.67	506.05	701.07	981.80
Subsidy Required	0.00	72.52	62.77	58.54	59.66
Total Housing Investment	0.00	1992.17	2867.85	4308.56	6512.45
Other Urban Areas					
Non-target Group Investment	0.00	995.02	1552.01	2180.78	3032.22
Target Group Investment	0.00	630.26	895.71	1195.31	1601.18
Subsidy Required	0.00	77.95	113.92	154.07	207.11
Total Housing Investment	0.00	1703.24	2561.64	3530.16	4840.51
Rural Areas					
Non-target Group Investment	0.00	2034.05	2691.03	3441.27	4255.75
Target Group Investment	0.00	2089.12	2427.51	2832.35	3289.14
Subsidy Required	0.00	126.02	131.84	125.80	119.94
Total Housing Investment	0.00	4249.19	5250.38	6399.42	7664.83
Total Housing Investment in the Base Year	4500.00				
Subsidy as a Percent of Public Capital Expenditures	0.00	2.88	2.40	1.97	1.68
Total Housing Investment As a Percent of GDP	6.36	8.84	8.88	8.85	8.83

Table 23. Kenya: Alternative 2 - Worst Case  
Housing Investment in Relation to GDP

	1983	1988	1993	1998	2003
	----	----	----	----	----
(In Millions of currency units)					
Country					
Non-target Group Investment	0.00	2594.47	3542.70	4766.07	6368.54
Target Group Investment	0.00	3812.05	4590.30	5498.70	6600.32
Subsidy Required	0.00	508.79	765.33	1133.73	1720.01
Total Housing Investment	0.00	6915.31	8898.33	11398.50	14688.88
Metropolitan Area					
Non-target Group Investment	0.00	1000.50	1420.82	2094.73	3092.18
Target Group Investment	0.00	547.41	717.74	974.04	1339.20
Subsidy Required	0.00	136.78	171.46	243.06	383.45
Total Housing Investment	0.00	1684.69	2310.02	3311.83	4814.83
Other Urban Areas					
Non-target Group Investment	0.00	490.10	729.06	978.40	1302.67
Target Group Investment	0.00	809.49	1117.77	1440.33	1862.98
Subsidy Required	0.00	145.95	265.64	445.08	758.50
Total Housing Investment	0.00	1445.54	2112.48	2863.81	3924.16
Rural Areas					
Non-target Group Investment	0.00	1103.87	1392.81	1692.94	1973.69
Target Group Investment	0.00	2455.15	2754.79	3084.33	3398.13
Subsidy Required	0.00	226.05	328.23	445.59	578.06
Total Housing Investment	0.00	3785.08	4475.83	5222.86	5949.88
Total Housing Investment in the Base Year	4500.00				
Subsidy as a Percent of Public Capital Expenditures	0.00	5.29	6.24	7.24	8.61
Total Housing Investment As a Percent of GDP	6.36	7.70	7.76	7.79	7.87

As Worst Case conditions are unlikely to persist continuously over a 20-year period -- as is assumed in the results shown in Table 23 -- this Worst Case scenario might best be interpreted as indicating that even during the periodic short-term economic downturns which may occur in the future, the implementation of a nationwide housing program following the broad parameters of Alternative 2 is probably feasible. With the demands of a growing population and the large and growing backlog of substandard housing which currently faces Kenya, this does not appear to be the case for programs conforming to existing standards.

#### Further Sensitivities

As indicated above, Alternative 2 seems to provide the general outline of a feasible housing program that can realistically aspire to satisfy Kenya's projected housing needs. It merits further investigation and development.

Also, it is the judgment of the study team that long-term interest rates may realistically be expected to fall in the near to medium-term and resume the levels indicated by long-term historical trends. The Alternative 2 - Best Case scenario therefore is recommended for serious attention by housing planners who may wish to refine and extend the results which have been provided in this Preliminary Assessment.

Taking Alternative 2 - Best Case as a starting point, therefore, three additional sensitivity analyses have been prepared to provide a preliminary response to certain issues raised during discussions with Kenyan housing officials and planners.

The first of these, designated "Alternative 2 - Accelerated Upgrading," examines the impacts of accelerating the replacement and upgrading of squatter settlements in the urban areas of Kenya.

With respect to replacement and upgrading, it will be recalled that all scenarios presented up to this point have assumed that such activities would take place at the very modest rate of 5 percent of the existing substandard housing stock per year. At this rate, it would take a full 20 years to bring the existing substandard stock up to acceptable condition, even assuming that no further growth of the substandard stock is permitted to take place.

Alternative 2 - Accelerated Upgrading asks the question "What will be the impact on affordability if all of the non-upgradable urban housing stock is replaced in 5 years (1984-88), and all the upgradable urban housing stock is upgraded in 10 years." As indicated in Table 24, accelerated upgrading, plus the provision of new units required under Alternative 2, would imply a level of total annual construction of about 34,000 units in Nairobi and Mombasa, 1984-88, and about 39,500 units per year in other urban areas (versus 26,760 and 32,380 in these areas under base case replacement and upgrading assumptions).

The financial implications of an accelerated upgrading and replacement program in urban areas are given in Table 25. As indicated, total investment and subsidy requirements are marginally increased during the upcoming decade, but not to obviously intolerable levels. This alternative is therefore also strongly recommended for further investigation by Kenyan housing planners on the basis of the more

**Table 24. Kenya: Alternative 2 - Accelerated  
Upgrading Housing Stock and Replacement**

	1983	1988	1993	1998	2003
	----	----	----	----	----
<b>Metropolitan Area</b>					
<b>Dwelling Units by Construction Standard (1000's)</b>					
Acceptable Construction	206.50	356.54	496.07	644.31	856.85
(Annual Planned Replacement)	0.00	4.13	7.13	9.92	12.89
Non-Upgradable Construction	29.50	0.00	0.00	0.00	0.00
(Annual Planned Replacement)	0.00	5.90	0.00	0.00	0.00
Upgradable Construction	59.00	29.50	0.00	0.00	0.00
(Planned Annual Upgrading)	0.00	5.90	5.90	0.00	0.00
Total Dwelling Units	295.00	386.04	496.07	644.31	856.85
Total Number Overcrowded Units	48.20	36.20	24.20	12.20	.20
Planned Annual Construction to Relieve Overcrowding	0.00	2.40	2.40	2.40	2.40
New Households/Year	0.00	15.81	19.61	27.25	40.11
Construction of New Units/Year	0.00	28.24	29.14	39.57	55.39
Total Construction/Year	0.00	34.14	35.04	39.57	55.39
<b>Other Urban Areas</b>					
<b>Dwelling Units by Construction Standard (1000's)</b>					
Acceptable Construction	199.50	377.06	585.76	828.71	1156.31
(Annual Planned Replacement)	0.00	3.99	7.54	11.72	16.57
Non-Upgradable Construction	28.50	0.00	0.00	0.00	0.00
(Annual Planned Replacement)	0.00	5.70	0.00	0.00	0.00
Upgradable Construction	57.00	28.50	0.00	0.00	0.00
(Planned Annual Upgrading)	0.00	5.70	5.70	0.00	0.00
Total Dwelling Units	285.00	405.56	585.76	828.71	1156.31
Total Number Overcrowded Units	30.71	23.21	15.71	8.21	.71
Planned Annual Construction to Relieve Overcrowding	0.00	1.50	1.50	1.50	1.50
New Households/Year	0.00	22.61	34.54	47.09	64.02
Construction of New Units/Year	0.00	33.80	43.58	60.31	82.09
Total Construction/Year	0.00	39.50	49.28	60.31	82.09

**Table 25. Kenya: Alternative 2 - Accelerated  
Upgrading Housing Investment in Relation to GDP**

	1983	1988	1993	1998	2003
	----	----	----	----	----
(In Millions of currency units)					
<b>Country</b>					
Non-target Group Investment	0.00	4573.04	6634.02	9289.74	12821.20
Target Group Investment	0.00	3468.91	3903.59	4513.72	5633.59
Subsidy Required	0.00	324.38	300.19	330.89	378.70
Total Housing Investment	0.00	8366.34	10837.79	14134.34	18833.49
<b>Metropolitan Area</b>					
Non-target Group Investment	0.00	1543.97	2364.25	3635.52	5517.06
Target Group Investment	0.00	552.51	539.52	584.04	849.52
Subsidy Required	0.00	102.52	58.25	54.97	56.55
Total Housing Investment	0.00	2199.01	2962.01	4274.52	6423.13
<b>Other Urban Areas</b>					
Non-target Group Investment	0.00	995.02	1578.74	2212.95	3048.39
Target Group Investment	0.00	827.28	936.56	1097.33	1494.93
Subsidy Required	0.00	95.84	110.11	150.12	202.22
Total Housing Investment	0.00	1918.14	2625.40	3460.40	4745.54
<b>Rural Areas</b>					
Non-target Group Investment	0.00	2034.05	2691.03	3441.27	4255.75
Target Group Investment	0.00	2089.12	2427.51	2832.35	3289.14
Subsidy Required	0.00	126.02	131.84	125.80	119.94
Total Housing Investment	0.00	4249.19	5250.38	6399.42	7664.83
Total Housing Investment in the Base Year	4500.00				
Subsidy as a Percent of Public Capital Expenditures	0.00	3.37	2.33	1.92	1.64
Total Housing Investment As a Percent of GDP	6.36	9.31	9.02	8.79	8.75

precise estimates of the substandard urban housing stock which are soon expected to be available from the CBS Urban Housing Survey.

Two additional concerns of housing planners in Kenya have also been investigated through sensitivity analysis. They are (1) the effects of higher population growth rates than those assumed for all scenarios presented up to this point, and (2) the effect of shorter mortgage repayment periods (20 years in urban areas and 15 in rural areas) than those assumed heretofore.

Population projections assuming constant fertility and constant mortality to the year 2000 are available from the Central Bureau of Statistics reference cited earlier. These assumptions produce the highest population projections presented by the CBS and would imply a total country population of 43.7 million people by the year 2003, as shown in Table 26. The near-term financial impact of higher population growth on a housing program patterned after Alternative 2 -- with accelerated upgrading -- would be minimal and really quite moderate even in the long-term relative to projected public sector capital expenditures. The results of the high population growth sensitivity analysis are shown in Table 27.

Finally, the impacts of reduced mortgage repayment periods on investment and subsidy requirements are shown in Table 28. Again, they are shown to be relatively modest.

#### Summary of the Results

Tables 29 and 30 summarize the results of the three main scenarios analyzed for the preliminary housing needs

**Table 26. Kenya: Alternative 2UP - High  
Pop. Growth Population and Household Formation**

	1983	1988	1993	1998	2003
	----	----	----	----	----
<b>Metropolitan Area</b>					
Population (1000's)	1458.59	1888.46	2473.06	3278.69	4372.40
Annual Growth Rate (Percent)	0.00	5.30	5.54	5.80	5.93
Average Household Size	4.25	4.40	4.55	4.60	4.50
Total Households (1000's)	343.20	429.20	543.53	712.76	971.64
New Households per Year (1000's)	0.00	17.20	22.87	33.85	51.78
<b>Other Urban Areas</b>					
Population (1000's)	1398.60	2026.64	2984.73	4406.84	6558.60
Annual Growth Rate (Percent)	0.00	7.70	8.05	8.10	8.28
Average Household Size	4.43	4.65	4.75	4.85	5.00
Total Households (1000's)	315.71	435.84	628.36	908.63	1311.72
New Households per Year (1000's)	0.00	24.02	38.51	56.05	80.62
<b>Rural Areas</b>					
Population (1000's)	15890.80	19114.88	22968.17	27569.21	32793.01
Annual Growth Rate (Percent)	0.00	3.76	3.74	3.72	3.53
Average Household Size	5.65	5.65	5.65	5.65	5.65
Total Households (1000's)	2812.53	3383.17	4065.16	4879.51	5804.07
New Households per Year (1000's)	0.00	114.13	136.40	162.87	184.91
<b>Total Country</b>					
Population (1000's)	18748.00	23029.98	28425.96	35254.74	43724.02
Annual Growth Rate (Percent)	0.00	4.20	4.30	4.40	4.40
Average Household Size	5.40	5.42	5.43	5.42	5.41
Total Households (1000's)	3471.44	4248.20	5237.06	6500.89	8087.44
New Households per Year (1000's)	0.00	155.35	197.77	252.77	317.31

Table 27. Kenya: Alternative 2UP - High Pop.  
Growth Housing Investment in Relation to GDP

	1983	1988	1993	1998	2003
	----	----	----	----	----
(In Millions of currency units)					
Country					
Non-target Group Investment	0.00	4849.62	7228.23	10346.52	14332.36
Target Group Investment	0.00	3529.74	4023.25	4736.94	5924.51
Subsidy Required	0.00	351.42	370.36	471.85	631.82
Total Housing Investment	0.00	8730.78	11621.84	15555.32	20888.69
Metropolitan Area					
Non-target Group Investment	0.00	1624.94	2550.87	3984.85	6041.27
Target Group Investment	0.00	557.55	554.47	625.95	911.84
Subsidy Required	0.00	109.27	73.79	93.32	112.84
Total Housing Investment	0.00	2291.77	3179.13	4694.13	7065.95
Other Urban Areas					
Non-target Group Investment	0.00	1030.88	1658.66	2367.61	3290.53
Target Group Investment	0.00	838.14	965.41	1167.36	1604.80
Subsidy Required	0.00	101.68	127.53	189.88	298.29
Total Housing Investment	0.00	1970.70	2751.60	3724.85	5193.62
Rural Areas					
Non-target Group Investment	0.00	2193.80	3018.70	3994.06	5000.55
Target Group Investment	0.00	2134.05	2503.37	2943.63	3407.87
Subsidy Required	0.00	140.47	169.05	198.65	220.70
Total Housing Investment	0.00	4468.32	5691.11	7136.34	8629.12
Total Housing Investment in the Base Year	4500.00				
Subsidy as a Percent of Public Capital Expenditures	0.00	3.66	2.88	2.74	2.74
Total Housing Investment As a Percent of GDP	6.36	9.72	9.67	9.67	9.70

Table 28. Kenya: Alternative 2 - Reduced  
Mortgage Term Housing Investment in Relation to GDP

	1983	1988	1993	1998	2003
	----	----	----	----	----
(In Millions of currency units)					
Country					
Non-target Group Investment	0.00	3708.26	6240.46	8751.42	12097.54
Target Group Investment	0.00	4200.18	3616.62	4187.44	5240.78
Subsidy Required	0.00	355.93	352.85	390.12	436.61
Total Housing Investment	0.00	8264.36	10209.94	13328.98	17774.92
Metropolitan Area					
Non-target Group Investment	0.00	1476.86	2261.48	3477.49	5277.24
Target Group Investment	0.00	526.70	514.27	558.65	812.59
Subsidy Required	0.00	111.84	67.36	64.13	69.89
Total Housing Investment	0.00	2115.40	2843.12	4100.27	6159.72
Other Urban Areas					
Non-target Group Investment	0.00	951.77	1510.12	2116.76	2915.88
Target Group Investment	0.00	790.08	894.61	1049.63	1429.95
Subsidy Required	0.00	101.97	117.03	157.99	212.94
Total Housing Investment	0.00	1843.83	2521.75	3324.38	4558.77
Rural Areas					
Non-target Group Investment	0.00	1279.63	2468.87	3157.17	3904.41
Target Group Investment	0.00	2883.39	2207.74	2579.16	2998.24
Subsidy Required	0.00	142.11	168.47	168.00	153.78
Total Housing Investment	0.00	4305.13	4845.07	5904.33	7056.43
Total Housing Investment in the Base Year	4500.00				
Subsidy as a Percent of Public Capital Expenditures	0.00	3.70	2.74	2.27	1.90
Total Housing Investment As a Percent of GDP	6.36	9.20	8.49	8.29	8.26

Table 29. Main Scenarios of the Kenya Housing Needs Assessment: Results for the 1984-88 5th Development Plan Period

	Base case	Alternative 1	Alternative 2
---thousands of households/ units per year---			
<u>Total housing needs</u>			
Metropolitan	26.8	26.8	26.8
Other urban	32.4	32.4	32.4
Rural	<u>227.7</u>	<u>227.7</u>	<u>227.7</u>
Total	286.9	286.9	286.9
<u>Size of the target group</u>			
Metropolitan	22.8	22.8	18.8
Other urban	27.1	27.1	21.7
Rural	<u>227.7</u>	<u>227.7</u>	<u>204.9</u>
Total	277.6	277.6	245.4
<u>Households needing subsidy</u>			
Metropolitan	20.6	15.6	11.5
Other urban	24.9	18.9	13.5
Rural	<u>125.9</u>	<u>125.9</u>	<u>51.2</u>
Total	171.4	160.4	76.2
-millions of shillings per year-			
<u>Total housing investment</u>			
Metropolitan	2,587	2,080	1,661
Other urban	2,359	1,793	1,385
Rural	<u>5,779</u>	<u>5,779</u>	<u>3,742</u>
Total	10,725	9,652	6,788
(percent of GDP)	(11.9)	(10.7)	(7.5)
<u>Subsidies required</u>			
Metropolitan	954	448	113
Other rural	1,059	493	129
Rural	<u>1,415</u>	<u>1,415</u>	<u>183</u>
Total	3,428	2,356	425
(percent of public sector capital expenditures)	(35.7)	(24.5)	(4.4)

Table 30. Sensitivity Analyses of the Kenya  
Housing Needs Assessment, 1984-88

	Capital cost of target group housing	Total housing investment	Subsidies	
			Million shillings/ year	% of public capital expenditures
--million shillings/year--				
<u>Alternative 1</u>				
Best case	5,785	10,171	1,819	18.9
Worst case	7,080	10,036	2,669	27.8
<u>Alternative 2</u>				
Best case	2,255	7,945	276	2.9
Worst case	2,938	6,915	508	5.3
<u>Alternative 2 - Best Case/ Accelerated Upgrading</u>				
With high population growth	2,686	8,731	351	3.7
With reduced loan term	2,808	8,264	356	3.7

assessment and of the sensitivity analyses performed on them.

As shown in Table 28, the implementation of housing standards based on affordability can have a marked impact on the financial viability of a nationwide housing program designed to meet the basic needs of all households. Standards such as represented by Alternative 2 could reduce total housing investment during the upcoming 1984-88 period by about 37 percent in comparison with the base case. And, what may be more important, such standards would reduce the subsidies required to implement the housing program on a national scale by almost 90 percent, to a level which, at 4.4 percent of projected public sector capital expenditures, might realistically be considered for implementation following detailed analysis and refinement of designs.

As shown in Table 30, Alternative 1 is unlikely to be feasible on a national scale even under the best of economic conditions. Alternative 2, on the other hand, remains manageable even under worst case assumptions regarding economic growth, inflation, real cost escalation, and interest rates -- assumptions which are very unlikely to persist in combination over a 20-year period.

With more favorable economic developments (6 percent long-term real GDP growth and a return to 12 percent nominal interest rates), it may be possible to consider the acceleration of urban upgrading and slum clearance programs, as is shown in the last three sensitivity analyses presented in Table 30. Each of these assumes the complete replacement of non-upgradable urban housing in 5 years and the upgrading of all other substandard housing in urban areas within 10 years.

### Conclusions and Recommendations

While Kenya faces an enormous housing challenge in the upcoming 20-year period, the results of our preliminary analyses clearly indicate that this challenge is not insurmountable. Successfully meeting the projected housing needs of its growing population will, however, require decisive action and dramatic reversals of historical trends and precedent:

1. Minimum design standards for low-cost housing should be sharply reduced from prevailing levels in the formal sector, while raising those which are becoming increasingly prevalent in the informal sector.
2. Private sector participation in the financing, construction, and marketing of low-cost housing units should be greatly increased. Public sector administrative procedures at both central and local levels of authority must be streamlined and abbreviated.
3. Public sector subsidies, which can never be entirely eliminated if the housing needs of the very poor are to be met, should be strictly contained and narrowly targeted.
4. New financial instruments and markets need to be developed to augment the flow of financial savings into low-cost housing finance.
5. Low-income families should be encouraged in their self-help efforts to gradually upgrade the quality of their dwellings. Government measures to increase the availability of credit to support such efforts may be required.

While none of these conclusions is novel, it is hoped that the analyses presented herein will serve to reinvigorate the planning dialogue on the subject of housing needs

in Kenya by having shown, however broadly, that feasible and attractive strategies do exist. It is further hoped that the methodologies developed for this preliminary assessment will be of continuing usefulness to Kenyan planners and decision-makers who will carry forward the refinement of the strategies we have proposed.

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**APPENDIX A  
SUPPLEMENTARY TABLES**

**Base Case**

**Alternative 1**

**Best Case  
Worst Case**

**Alternative 2**

**Best Case  
Worst Case**

**Alternative 2 - Best Case**

**Accelerated Upgrading  
With High Population Growth  
With Reduced Mortgage Terms**

KENYA: BASE CASE  
COMPONENTS OF TARGET GROUP HOUSING COST

	1983	1988	1993	1998	2003
	----	----	----	----	----
(In millions of currency units)					
Country					
Cost of Upgrading					
Existing units	0.00	496.33	496.33	496.33	496.33
of which:					
Infrastructure component	0.00	484.68	484.68	484.68	484.68
Construction component	0.00	11.64	11.64	11.64	11.64
Cost of New Housing Units	0.00	7068.77	8437.79	10804.46	13277.61
of which:					
Land component	0.00	423.06	492.60	623.72	788.95
Infrastructure component	0.00	2942.62	3639.63	4726.25	6171.44
Construction component	0.00	3703.10	4305.56	5454.49	6917.23
Total Target Group Housing Cost	0.00	7565.10	8934.12	11300.79	14373.94
Metropolitan Area					
Cost of Upgrading					
Existing units	0.00	45.73	45.73	45.73	45.73
of which:					
Infrastructure component	0.00	39.78	39.78	39.78	39.78
Construction component	0.00	5.94	5.94	5.94	5.94
Cost of New Housing Units	0.00	1794.19	2233.02	2977.74	4155.42
of which:					
Land component	0.00	89.71	111.65	148.89	207.77
Infrastructure component	0.00	807.39	1004.86	1339.98	1869.94
Construction component	0.00	897.10	1116.51	1488.87	2077.71
Total Target Group Housing Cost	0.00	1839.92	2278.74	3023.47	4201.15

--Continued--

(Continued)

Other Urban Areas					
Cost of Upgrading					
Existing units	0.00	28.50	28.50	28.50	28.50
of which:					
Infrastructure component	0.00	22.80	22.80	22.80	22.80
Construction component	0.00	5.70	5.70	5.70	5.70
Cost of New Housing Units	0.00	1793.72	2669.06	3652.06	4968.97
of which:					
Land component	0.00	89.69	133.45	182.60	248.45
Infrastructure component	0.00	986.54	1467.98	2008.63	2732.93
Construction component	0.00	717.49	1067.62	1460.82	1987.59
Total Target Group Housing Cost	0.00	1822.22	2697.56	3680.56	4997.47
Rural Areas					
Cost of Upgrading					
Existing units	0.00	422.10	422.10	422.10	422.10
of which:					
Infrastructure component	0.00	422.10	422.10	422.10	422.10
Construction component	0.00	0.00	0.00	0.00	0.00
Cost of New Housing Units	0.00	3480.86	3535.71	4174.66	4753.22
of which:					
Land component	0.00	243.66	247.50	292.23	332.73
Infrastructure component	0.00	1148.68	1166.79	1377.64	1568.56
Construction component	0.00	2088.52	2121.43	2504.80	2851.93
Total Target Group Housing Cost	0.00	3702.96	3957.81	4596.76	5175.32

**KENYA: ALTERNATIVE 1  
TARGET GROUP IDENTIFICATION**

86.

	1983 ----	1988 ----	1993 ----	1998 ----	2003 ----
<b>(Thousands of Households)</b>					
<b>Metropolitan Area</b>					
Affordable Level 0	0.00	5.69	6.91	8.96	12.22
Affordable Level 1	0.00	11.39	13.81	8.96	12.22
Affordable Level 2	0.00	5.69	6.91	17.93	24.43
Subtotal, Target Group	0.00	22.78	27.62	35.85	48.87
Affordable Level 3	0.00	3.99	5.20	7.26	10.51
<b>Total</b>	<b>0.00</b>	<b>26.76</b>	<b>32.82</b>	<b>43.11</b>	<b>59.38</b>
<b>Other Urban Areas</b>					
Affordable Level 0	0.00	6.76	9.72	13.03	17.48
Affordable Level 1	0.00	13.53	19.43	26.07	34.95
Affordable Level 2	0.00	6.76	9.72	13.03	17.48
Subtotal, Target Group	0.00	27.06	38.87	52.14	69.91
Affordable Level 3	0.00	5.32	8.27	11.59	16.03
<b>Total</b>	<b>0.00</b>	<b>32.38</b>	<b>47.14</b>	<b>63.73</b>	<b>85.94</b>
<b>Rural Areas</b>					
Affordable Level 0	0.00	45.54	57.45	63.59	69.15
Affordable Level 1	0.00	136.61	172.34	190.77	138.31
Affordable Level 2	0.00	45.54	0.00	0.00	69.15
Subtotal, Target Group	0.00	227.68	229.79	254.36	276.62
Affordable Level 3	0.00	0.00	29.00	35.14	40.70
<b>Total</b>	<b>0.00</b>	<b>227.68</b>	<b>258.79</b>	<b>289.50</b>	<b>317.32</b>

KENYA: ALTERNATIVE 1  
TARGET GROUP INVESTMENT AND SUBSIDY REQUIREMENTS

87.

	1983	1988	1993	1998	2003
	----	----	----	----	----
<b>Country</b>					
No. Target Households (1000's)	0.00	277.51	296.28	342.35	395.39
No. Requiring Subsidy (1000's)	0.00	160.34	206.41	238.88	235.26
Target Group Housing Cost (Mill.)	0.00	6377.04	7313.48	9109.46	11357.40
Subsidy Portion of Cost (Mill.)	0.00	2356.62	2927.88	3452.46	4056.62
<b>Metropolitan Area</b>					
No. Target Households (1000's)	0.00	22.78	27.62	35.85	48.87
No. Requiring Subsidy (1000's)	0.00	15.61	19.24	17.19	23.70
Target Group Housing Cost (Mill.)	0.00	1235.25	1526.18	2019.92	2800.70
Subsidy Portion of Cost (Mill.)	0.00	448.11	475.38	558.47	738.63
<b>Other Urban Areas</b>					
No. Target Households (1000's)	0.00	27.06	38.87	52.14	69.91
No. Requiring Subsidy (1000's)	0.00	18.87	27.73	37.68	51.01
Target Group Housing Cost (Mill.)	0.00	1238.83	1829.49	2492.78	3381.38
Subsidy Portion of Cost (Mill.)	0.00	493.10	730.57	996.07	1348.33
<b>Rural Areas</b>					
No. Target Households (1000's)	0.00	227.68	229.79	254.36	276.62
No. Requiring Subsidy (1000's)	0.00	125.86	159.44	184.01	160.56
Target Group Housing Cost (Mill.)	0.00	3902.96	3957.81	4596.76	5175.32
Subsidy Portion of Cost (Mill.)	0.00	1415.41	1721.92	1897.93	1969.66

KENYA: ALTERNATIVE 1 - BEST CASE  
 TARGET GROUP IDENTIFICATION

88.

	1983	1988	1993	1998	2003
(Thousands of Households)	----	----	----	----	----
<b>Metropolitan Area</b>					
Affordable Level 0	0.00	5.69	6.91	0.00	0.00
Affordable Level 1	0.00	5.69	6.91	19.06	25.57
Affordable Level 2	0.00	11.39	13.81	9.53	12.79
Subtotal, Target Group	0.00	22.78	27.62	28.60	38.36
Affordable Level 3	0.00	3.99	5.20	14.51	21.02
Total	0.00	26.76	32.82	43.11	59.38
<b>Other Urban Areas</b>					
Affordable Level 0	0.00	6.76	9.72	13.03	17.48
Affordable Level 1	0.00	13.53	19.43	26.07	34.95
Affordable Level 2	0.00	6.76	9.72	13.03	17.48
Subtotal, Target Group	0.00	27.06	38.87	52.14	69.91
Affordable Level 3	0.00	5.32	8.27	11.59	16.03
Total	0.00	32.38	47.14	63.73	85.94
<b>Rural Areas</b>					
Affordable Level 0	0.00	51.23	57.45	63.59	0.00
Affordable Level 1	0.00	102.45	114.89	127.18	207.46
Affordable Level 2	0.00	51.23	57.45	63.59	69.15
Subtotal, Target Group	0.00	204.90	229.79	254.36	276.62
Affordable Level 3	0.00	22.78	29.00	35.14	40.70
Total	0.00	227.68	258.79	289.50	317.32

KENYA: ALTERNATIVE 1 - BEST CASE  
TARGET GROUP INVESTMENT AND SUBSIDY REQUIREMENTS

	1983	1988	1993	1998	2003
	----	----	----	----	----
<b>Country</b>					
No. Target Households (1000's)	0.00	254.74	296.28	335.10	384.88
No. Requiring Subsidy (1000's)	0.00	136.30	166.24	198.65	211.72
Target Group Housing Cost(Mill.)	0.00	5784.87	7313.48	8674.03	10726.78
Subsidy Portion of Cost (Mill.)	0.00	1819.27	2219.10	2639.68	3090.20
<b>Metropolitan Area</b>					
No. Target Households (1000's)	0.00	22.78	27.62	28.60	38.36
No. Requiring Subsidy (1000's)	0.00	10.65	13.07	17.10	23.60
Target Group Housing Cost(Mill.)	0.00	1235.25	1526.18	1584.49	2170.08
Subsidy Portion of Cost (Mill.)	0.00	331.65	363.29	447.58	566.49
<b>Other Urban Areas</b>					
No. Target Households (1000's)	0.00	27.06	38.87	52.14	69.91
No. Requiring Subsidy (1000's)	0.00	18.87	27.73	37.68	51.01
Target Group Housing Cost(Mill.)	0.00	1238.83	1829.49	2492.78	3381.38
Subsidy Portion of Cost (Mill.)	0.00	369.66	547.49	745.66	1006.73
<b>Rural Areas</b>					
No. Target Households (1000's)	0.00	204.90	229.79	254.36	276.62
No. Requiring Subsidy (1000's)	0.00	106.78	125.44	143.87	137.11
Target Group Housing Cost(Mill.)	0.00	3310.79	3957.81	4596.76	5175.32
Subsidy Portion of Cost (Mill.)	0.00	1117.97	1308.33	1446.44	1516.98

**KENYA: ALTERNATIVE 1 - WORST CASE  
GDP STRUCTURE AND GROWTH**

	1983 ----	1988 ----	1993 ----	1998 ----	2003 ----
<b>Total Country</b>					
<b>Gross Domestic Product</b>					
(Millions, constant units)	70716.00	89824.57	114641.44	146314.75	186738.82
GDP Annual Growth Rate (Percent)	0.00	4.90	5.00	5.00	5.00
<b>Agricultural Sector</b>					
Share of GDP (Percent)	36.70	35.80	32.50	29.50	26.80
Agricultural GDP (Millions)	25952.77	32157.19	37258.47	43162.85	50046.00
Avg. Annual GDP Growth (Percent)	0.00	4.38	2.99	2.99	3.00
<b>Non Agricultural Sector</b>					
Share of GDP (Percent)	63.30	64.20	67.50	70.50	73.20
Non Agricultural GDP (Millions)	44763.23	57667.37	77382.97	103151.90	136692.82
Avg. Annual GDP Growth (Percent)	0.00	5.20	6.06	5.92	5.79

KENYA: ALTERNATIVE 1 - WORST CASE  
 TARGET GROUP IDENTIFICATION

91.

	1983	1988	1993	1998	2003
	----	----	----	----	----
(Thousands of Households)					
<b>Metropolitan Area</b>					
Affordable Level 0	0.00	5.69	6.91	8.96	12.22
Affordable Level 1	0.00	11.39	13.81	17.93	24.43
Affordable Level 2	0.00	5.69	6.91	8.96	12.22
Subtotal, Target Group	0.00	22.78	27.62	35.85	48.87
Affordable Level 3	0.00	3.99	5.20	7.26	10.51
Total	0.00	26.76	32.82	43.11	59.38
<b>Other Urban Areas</b>					
Affordable Level 0	0.00	6.48	9.43	12.75	17.19
Affordable Level 1	0.00	19.43	28.29	38.24	51.56
Affordable Level 2	0.00	6.48	9.43	12.75	17.19
Subtotal, Target Group	0.00	32.38	47.14	63.73	85.94
Affordable Level 3	0.00	0.00	0.00	0.00	0.00
Total	0.00	32.38	47.14	63.73	85.94
<b>Rural Areas</b>					
Affordable Level 0	0.00	45.54	51.76	57.90	63.46
Affordable Level 1	0.00	136.61	155.27	173.70	190.39
Affordable Level 2	0.00	45.54	51.76	57.90	63.46
Subtotal, Target Group	0.00	227.68	258.79	289.50	317.32
Affordable Level 3	0.00	0.00	0.00	0.00	0.00
Total	0.00	227.68	258.79	289.50	317.32

KENYA: ALTERNATIVE 1 - WORST CASE  
TARGET GROUP INVESTMENT AND SUBSIDY REQUIREMENTS

	1983	1988	1993	1998	2003
	----	----	----	----	----
<b>Country</b>					
No. Target Households (1000's)	0.00	282.83	333.55	389.08	452.13
No. Requiring Subsidy (1000's)	0.00	165.66	206.00	250.01	299.79
Target Group Housing Cost (Mill.)	0.00	7099.99	9687.91	12944.38	17246.53
Subsidy Portion of Cost (Mill.)	0.00	2668.63	3912.67	5556.43	7803.86
<b>Metropolitan Area</b>					
No. Target Households (1000's)	0.00	22.78	27.62	35.85	48.87
No. Requiring Subsidy (1000's)	0.00	15.61	19.24	25.41	35.17
Target Group Housing Cost (Mill.)	0.00	1320.21	1743.35	2466.05	3654.46
Subsidy Portion of Cost (Mill.)	0.00	510.26	665.17	955.69	1487.33
<b>Other Urban Areas</b>					
No. Target Households (1000's)	0.00	32.38	47.14	63.73	85.94
No. Requiring Subsidy (1000's)	0.00	24.19	36.00	49.27	67.04
Target Group Housing Cost (Mill.)	0.00	1608.36	2562.36	3750.85	5458.19
Subsidy Portion of Cost (Mill.)	0.00	545.62	995.02	1617.96	2563.69
<b>Rural Areas</b>					
No. Target Households (1000's)	0.00	227.68	258.79	289.50	317.32
No. Requiring Subsidy (1000's)	0.00	125.86	150.75	175.32	197.58
Target Group Housing Cost (Mill.)	0.00	4171.42	5382.20	6727.48	8133.88
Subsidy Portion of Cost (Mill.)	0.00	1612.76	2252.48	2982.77	3752.84

KENYA: ALTERNATIVE 2  
TARGET GROUP IDENTIFICATION

93.

	1983 ----	1988 ----	1993 ----	1998 ----	2003 ----
(Thousands of Households)					
<b>Metropolitan Area</b>					
Affordable Level 0	0.00	6.26	7.47	10.67	13.92
Affordable Level 1	0.00	6.26	7.47	0.00	0.00
Affordable Level 2	0.00	6.26	7.47	10.67	13.92
Subtotal, Target Group	0.00	18.79	22.42	21.34	27.85
Affordable Level 3	0.00	7.98	10.40	21.77	31.53
Total	0.00	26.76	32.82	43.11	59.38
<b>Other Urban Areas</b>					
Affordable Level 0	0.00	7.25	10.20	13.52	17.96
Affordable Level 1	0.00	7.25	10.20	13.52	17.96
Affordable Level 2	0.00	7.25	10.20	13.52	17.96
Subtotal, Target Group	0.00	21.74	30.60	40.55	53.87
Affordable Level 3	0.00	10.64	16.55	23.18	32.07
Total	0.00	32.38	47.14	63.73	85.94
<b>Rural Areas</b>					
Affordable Level 0	0.00	51.23	57.45	63.59	78.64
Affordable Level 1	0.00	0.00	0.00	0.00	0.00
Affordable Level 2	0.00	153.68	172.34	190.77	157.27
Subtotal, Target Group	0.00	204.90	229.79	254.36	235.91
Affordable Level 3	0.00	22.78	29.00	35.14	81.41
Total	0.00	227.68	258.79	289.50	317.32

KENYA: ALTERNATIVE 2  
TARGET GROUP INVESTMENT AND SUBSIDY REQUIREMENTS

94.

	1983	1988	1993	1998	2003
	----	----	----	----	----
<b>Country</b>					
No. Target Households (1000's)	0.00	245.43	282.81	316.25	317.63
No. Requiring Subsidy (1000's)	0.00	76.31	90.86	100.34	127.53
Target Group Housing Cost (Mill.)	0.00	2605.09	3205.20	3686.22	4062.02
Subsidy Portion of Cost (Mill.)	0.00	425.35	486.58	578.59	698.88
<b>Metropolitan Area</b>					
No. Target Households (1000's)	0.00	18.79	22.42	21.34	27.85
No. Requiring Subsidy (1000's)	0.00	11.54	13.97	10.67	13.92
Target Group Housing Cost (Mill.)	0.00	533.42	645.40	611.98	812.34
Subsidy Portion of Cost (Mill.)	0.00	113.37	97.38	114.32	135.92
<b>Other Urban Areas</b>					
No. Target Households (1000's)	0.00	21.74	30.60	40.55	53.87
No. Requiring Subsidy (1000's)	0.00	13.54	19.45	26.08	34.97
Target Group Housing Cost (Mill.)	0.00	538.54	777.81	1046.50	1406.47
Subsidy Portion of Cost (Mill.)	0.00	128.69	186.46	250.75	335.17
<b>Rural Areas</b>					
No. Target Households (1000's)	0.00	204.90	229.79	254.36	235.91
No. Requiring Subsidy (1000's)	0.00	51.23	57.45	63.59	78.64
Target Group Housing Cost (Mill.)	0.00	1533.13	1721.99	2027.74	1843.22
Subsidy Portion of Cost (Mill.)	0.00	183.29	202.74	213.52	227.79

KENYA: ALTERNATIVE 2 - BEST CASE  
 \_ TARGET GROUP IDENTIFICATION

	1983	1988	1993	1998	2003
	----	----	----	----	----
(Thousands of Households)					
Metropolitan Area					
Affordable Level 0	0.00	7.40	8.61	0.00	0.00
Affordable Level 1	0.00	0.00	9.00	10.67	13.92
Affordable Level 2	0.00	7.40	8.61	10.67	13.92
Subtotal, Target Group	0.00	14.80	17.22	21.34	27.85
Affordable Level 3	0.00	11.96	15.60	21.77	31.53
Total	0.00	26.76	32.82	43.11	59.38
Other Urban Areas					
Affordable Level 0	0.00	7.25	10.20	13.52	17.96
Affordable Level 1	0.00	0.00	0.00	0.00	0.00
Affordable Level 2	0.00	14.49	20.40	27.03	35.92
Subtotal, Target Group	0.00	21.74	30.60	40.55	53.87
Affordable Level 3	0.00	10.64	16.55	23.18	32.07
Total	0.00	32.38	47.14	63.73	85.94
Rural Areas					
Affordable Level 0	0.00	60.71	66.93	73.07	0.00
Affordable Level 1	0.00	0.00	0.00	0.00	78.64
Affordable Level 2	0.00	121.42	133.86	146.15	157.27
Subtotal, Target Group	0.00	182.13	200.79	219.22	235.91
Affordable Level 3	0.00	45.55	57.99	70.28	81.41
Total	0.00	227.68	258.79	289.50	317.32

KENYA: ALTERNATIVE 2 - BEST CASE  
TARGET GROUP INVESTMENT AND SUBSIDY REQUIREMENTS

	1983 ----	1988 ----	1993 ----	1998 ----	2003 ----
<b>Country</b>					
No. Target Households (1000's)	0.00	218.66	248.61	281.11	317.63
No. Requiring Subsidy (1000's)	0.00	75.35	85.74	95.78	77.78
Target Group Housing Cost (Mill.)	0.00	2254.55	2755.11	3334.81	4062.02
Subsidy Portion of Cost (Mill.)	0.00	276.50	308.53	338.41	386.71
<b>Metropolitan Area</b>					
No. Target Households (1000's)	0.00	14.80	17.22	21.34	27.85
No. Requiring Subsidy (1000's)	0.00	7.40	8.61	9.19	12.45
Target Group Housing Cost (Mill.)	0.00	410.63	485.28	611.98	312.34
Subsidy Portion of Cost (Mill.)	0.00	72.52	62.77	58.54	59.66
<b>Other Urban Areas</b>					
No. Target Households (1000's)	0.00	21.74	30.60	40.55	53.87
No. Requiring Subsidy (1000's)	0.00	7.25	10.20	13.52	17.96
Target Group Housing Cost (Mill.)	0.00	538.54	777.81	1046.50	1406.47
Subsidy Portion of Cost (Mill.)	0.00	77.95	113.92	154.07	207.11
<b>Rural Areas</b>					
No. Target Households (1000's)	0.00	182.13	200.79	219.22	235.91
No. Requiring Subsidy (1000's)	0.00	60.71	66.93	73.07	47.37
Target Group Housing Cost (Mill.)	0.00	1305.38	1492.02	1676.33	1843.22
Subsidy Portion of Cost (Mill.)	0.00	126.02	131.84	125.80	119.94

KENYA: ALTERNATIVE 2 - WORST CASE  
TARGET GROUP IDENTIFICATION

	1983 ----	1988 ----	1993 ----	1998 ----	2003 ----
(Thousands of Households)					
<b>Metropolitan Area</b>					
Affordable Level 0	0.00	6.26	7.47	9.53	12.79
Affordable Level 1	0.00	6.26	7.47	9.53	12.79
Affordable Level 2	0.00	6.26	7.47	9.53	12.79
Subtotal, Target Group	0.00	18.79	22.42	28.60	38.36
Affordable Level 3	0.00	7.98	10.40	14.51	21.02
Total	0.00	26.76	32.82	43.11	59.38
<b>Other Urban Areas</b>					
Affordable Level 0	0.00	6.76	9.72	13.03	17.48
Affordable Level 1	0.00	6.76	9.72	26.07	34.95
Affordable Level 2	0.00	13.53	19.43	13.03	17.48
Subtotal, Target Group	0.00	27.06	38.87	52.14	69.91
Affordable Level 3	0.00	5.32	8.27	11.59	16.03
Total	0.00	32.38	47.14	63.73	85.94
<b>Rural Areas</b>					
Affordable Level 0	0.00	51.23	57.45	63.59	69.15
Affordable Level 1	0.00	51.23	57.45	63.59	69.15
Affordable Level 2	0.00	102.45	114.89	127.18	138.31
Subtotal, Target Group	0.00	204.70	229.79	254.36	276.62
Affordable Level 3	0.00	22.78	29.00	35.14	40.70
Total	0.00	227.68	258.79	289.50	317.32

KENYA: ALTERNATIVE 2 - WORST CASE  
 TARGET GROUP INVESTMENT AND SUBSIDY REQUIREMENTS

98.

	1983	1988	1993	1998	2003
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<b>Country</b>					
No. Target Households (1000's)	0.00	250.75	291.08	335.10	384.88
No. Requiring Subsidy (1000's)	0.00	103.36	124.13	159.49	190.45
Target Group Housing Cost(Mill.)	0.00	2937.84	3916.52	5155.34	6818.70
Subsidy Portion of Cost (Mill.)	0.00	508.79	765.33	1133.73	1720.01
<b>Metropolitan Area</b>					
No. Target Households (1000's)	0.00	18.79	22.42	28.60	38.36
No. Requiring Subsidy (1000's)	0.00	11.54	13.97	18.08	24.59
Target Group Housing Cost(Mill.)	0.00	570.11	737.24	1019.97	1482.27
Subsidy Portion of Cost (Mill.)	0.00	136.78	171.46	243.06	383.45
<b>Other Urban Areas</b>					
No. Target Households (1000's)	0.00	27.06	38.87	52.14	69.91
No. Requiring Subsidy (1000's)	0.00	12.82	18.72	37.68	51.01
Target Group Housing Cost(Mill.)	0.00	729.15	1143.72	1659.77	2400.20
Subsidy Portion of Cost (Mill.)	0.00	145.95	265.64	445.08	758.50
<b>Rural Areas</b>					
No. Target Households (1000's)	0.00	204.90	229.79	254.36	276.62
No. Requiring Subsidy (1000's)	0.00	79.00	91.44	103.73	114.86
Target Group Housing Cost(Mill.)	0.00	1638.59	2035.56	2475.59	2936.23
Subsidy Portion of Cost (Mill.)	0.00	226.05	328.23	445.59	578.06

KENYA: ALTERNATIVE 2 - ACCELERATED UPGRADING  
 TARGET GROUP INVESTMENT AND SUBSIDY REQUIREMENTS

99.

	1983	1988	1993	1998	2003
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<b>Country</b>					
No. Target Households (1000's)	0.00	233.16	252.23	273.27	309.37
No. Requiring Subsidy (1000's)	0.00	81.42	87.24	93.97	75.79
Target Group Housing Cost(Mill.)	0.00	2580.48	2766.06	3201.44	3916.27
Subsidy Portion of Cost (Mill.)	0.00	324.38	300.19	330.89	378.70
<b>Metropolitan Area</b>					
No. Target Households (1000's)	0.00	22.18	18.99	17.27	23.60
No. Requiring Subsidy (1000's)	0.00	11.09	9.50	8.63	11.80
Target Group Housing Cost(Mill.)	0.00	592.61	494.67	531.74	726.64
Subsidy Portion of Cost (Mill.)	0.00	102.52	58.25	54.97	56.55
<b>Other Urban Areas</b>					
No. Target Households (1000's)	0.00	28.86	32.45	36.78	49.86
No. Requiring Subsidy (1000's)	0.00	9.62	10.82	12.26	16.62
Target Group Housing Cost(Mill.)	0.00	682.49	779.37	993.37	1346.41
Subsidy Portion of Cost (Mill.)	0.00	95.84	110.11	150.12	202.22
<b>Rural Areas</b>					
No. Target Households (1000's)	0.00	182.13	200.79	219.22	235.91
No. Requiring Subsidy (1000's)	0.00	60.71	66.93	73.07	47.37
Target Group Housing Cost(Mill.)	0.00	1305.38	1492.02	1676.33	1843.22
Subsidy Portion of Cost (Mill.)	0.00	126.02	131.84	125.80	119.94

KENYA: ALTERNATIVE 2UP - HIGH POP. GROWTH  
TARGET GROUP INVESTMENT AND SUBSIDY REQUIREMENTS

	1983 ----	1988 ----	1993 ----	1998 ----	2003 ----
<b>Country</b>					
No. Target Households (1000's)	0.00	241.15	271.01	309.22	365.86
No. Requiring Subsidy (1000's)	0.00	84.17	93.73	106.42	146.96
Target Group Housing Cost (Mill.)	0.00	2686.32	3024.05	3716.54	4771.63
Subsidy Portion of Cost (Mill.)	0.00	351.42	370.36	471.85	631.82
<b>Metropolitan Area</b>					
No. Target Households (1000's)	0.00	22.73	20.35	20.09	28.72
No. Requiring Subsidy (1000's)	0.00	11.37	10.18	10.05	14.36
Target Group Housing Cost (Mill.)	0.00	609.75	536.55	618.72	814.23
Subsidy Portion of Cost (Mill.)	0.00	109.27	73.79	83.32	112.84
<b>Other Urban Areas</b>					
No. Target Households (1000's)	0.00	29.71	34.91	42.48	60.68
No. Requiring Subsidy (1000's)	0.00	9.90	11.64	14.16	40.45
Target Group Housing Cost (Mill.)	0.00	705.39	845.92	1147.31	1638.62
Subsidy Portion of Cost (Mill.)	0.00	101.68	127.53	189.88	298.29
<b>Rural Areas</b>					
No. Target Households (1000's)	0.00	188.71	215.75	246.64	276.47
No. Requiring Subsidy (1000's)	0.00	62.90	71.92	82.21	92.16
Target Group Housing Cost (Mill.)	0.00	1371.18	1641.57	1950.51	2248.78
Subsidy Portion of Cost (Mill.)	0.00	140.47	169.05	198.65	220.70

KENYA: ALTERNATIVE 2 - REDUCED MORTGAGE TERM  
TARGET GROUP INVESTMENT AND SUBSIDY REQUIREMENTS

	1983 ----	1988 ----	1993 ----	1998 ----	2003 ----
<b>Country</b>					
No. Target Households (1000's)	0.00	255.94	252.23	273.27	309.37
No. Requiring Subsidy (1000's)	0.00	71.93	87.24	93.97	107.05
Target Group Housing Cost(Mill.)	0.00	2808.24	2766.06	3201.44	3916.27
Subsidy Portion of Cost (Mill.)	0.00	355.93	352.85	390.12	436.61
<b>Metropolitan Area</b>					
No. Target Households (1000's)	0.00	22.18	18.99	17.27	23.60
No. Requiring Subsidy (1000's)	0.00	11.09	9.50	8.63	11.80
Target Group Housing Cost(Mill.)	0.00	592.61	494.67	531.74	726.64
Subsidy Portion of Cost (Mill.)	0.00	111.84	67.36	64.13	69.89
<b>Other Urban Areas</b>					
No. Target Households (1000's)	0.00	28.86	32.45	36.78	49.86
No. Requiring Subsidy (1000's)	0.00	9.62	10.82	12.26	16.62
Target Group Housing Cost(Mill.)	0.00	682.49	779.37	993.37	1346.41
Subsidy Portion of Cost (Mill.)	0.00	101.97	117.03	157.99	212.94
<b>Rural Areas</b>					
No. Target Households (1000's)	0.00	204.90	200.79	219.22	235.91
No. Requiring Subsidy (1000's)	0.00	51.23	66.93	73.07	78.64
Target Group Housing Cost(Mill.)	0.00	1533.13	1492.02	1676.33	1843.22
Subsidy Portion of Cost (Mill.)	0.00	142.11	168.47	168.00	153.78

APPENDIX B  
DATA INPUT - BASE CASE

RRNA HOUSING NEEDS MODEL  
INPUT DATA

COUNTRY: SCENARIO	KENYA: BASE CASE				
BASE YEAR	1983.000				
INFLATION RATE	.120				
INCREASE IN CONSTRUCTION COSTS	.120				
URBAN BUILDING DECAY RATE	.020				
RURAL DECAY RATE	.020				
METRO AVG. HOUSEHOLD INCOME, (1000s)	50.700				
OTHER URBAN AVG. HOUSEHOLD INCOME	34.500				
RURAL AVG. HOUSEHOLD INCOME	16.100				
TOTAL HOUSING INVESTMENT, (MILLIONS)	4500.000				
	1983	1988	1993	1998	2003
TOTAL COUNTRY					
POPULATION, (1000s)	18748.000	22656.694	27209.366	32472.610	38567.275
POP. SHARE	0.000	0.000	0.000	0.000	0.000
POP. GROWTH	0.000	.039	.037	.036	.035
HOUSEHOLD SIZE	0.000	0.000	0.000	0.000	0.000
YEARLY CONSTR. TO RELIEVE OVERCROWDING (1000s)	0.000	0.000	0.000	0.000	0.000
METRO					
POPULATION, (1000s)	1458.594	1857.849	2367.215	3019.953	3856.727
POP. SHARE	.078	.082	.087	.093	.100
POP. GROWTH	0.000	.050	.050	.050	.050
HOUSEHOLD SIZE	4.250	4.400	4.550	4.600	4.500
YEARLY CONSTR. TO RELIEVE OVERCROWDING (1000s)	0.000	2.400	2.400	2.400	2.400
OTHER URBAN					
POPULATION, (1000s)	1398.601	1993.789	2856.983	4059.076	5785.091
POP. SHARE	.075	.088	.105	.125	.150
POP. GROWTH	0.000	.073	.075	.073	.073
HOUSEHOLD SIZE	4.430	4.650	4.750	4.850	5.000
YEARLY CONSTR. TO RELIEVE OVERCROWDING (1000s)	0.000	1.500	1.500	1.500	1.500

## RURAL

POPULATION, (1000s)	15890.805	18805.056	21985.168	25393.581	28925.456
POP. SHARE	.848	.830	.808	.782	.750
POP. GROWTH	0.000	.034	.032	.029	.026
HOUSEHOLD SIZE	5.650	5.650	5.650	5.650	5.650
YEARLY CONSTR. TO RELIEVE OVERCROWDING (1000s)	0.000	6.600	6.600	6.600	6.600

GDP (MILLIONS)	70716.000	89824.566	120205.532	160862.117	215269.800
GDP GROWTH RATE	0.000	.049	.060	.060	.060
AGRICULTURAL SHARE GDP	.367	.358	.325	.296	.269
NON-AGRI. SHARE GDP	.633	.642	.675	.704	.731
AGRICULTURAL GDP (MILLIONS)	25952.772	32157.195	39066.798	47615.187	57907.576
NON AGRI. GDP (MILLIONS)	44763.228	57667.371	81138.734	113246.931	157362.224
AGRICULTURAL GDP GROWTH RATE	0.000	.044	.040	.040	.040
NON AGRI. GDP GROWTH RATE	0.000	.052	.071	.069	.068
PUBLIC CAPITAL EXPENDITURES (MILLIONS)	7567.000	9611.721	12862.651	17213.129	23035.050

## QUINTILE 1

METRO DISP. INCOME (1000s)	.039	.039	.039	.039	.039
OTHER URBAN DISP. INCOME (1000s)	.048	.048	.048	.048	.048
RURAL DISP. INCOME (1000s)	.050	.050	.050	.050	.050

## QUINTILE 2

METRO DISP. INCOME (1000s)	.069	.069	.069	.069	.069
OTHER URBAN DISP. INCOME (1000s)	.096	.096	.096	.096	.096
RURAL DISP. INCOME (1000s)	.100	.100	.100	.100	.100

## QUINTILE 3

METRO DISP. INCOME (1000s)	.128	.128	.128	.128	.128
OTHER URBAN DISP. INCOME (1000s)	.147	.147	.147	.147	.147
RURAL DISP. INCOME (1000s)	.150	.150	.150	.150	.150

## QUINTILE 4

METRO DISP. INCOME (1000s)	.208	.208	.208	.208	.208
OTHER URBAN DISP. INCOME (1000s)	.223	.223	.223	.223	.223
RURAL DISP. INCOME (1000s)	.220	.220	.220	.220	.220

## QUINTILE 5

METRO DISP. INCOME (1000s)	.556	.556	.556	.556	.556
OTHER URBAN DISP. INCOME (1000s)	.486	.486	.486	.486	.486
RURAL DISP. INCOME (1000s)	.480	.480	.480	.480	.480

## METRO

(ALL UNITS THOUSANDS)

DESIGN COST UPGRADE	15.500	15.500	15.500	15.500	15.500
DESIGN COST NEW HOUSE	90.500	90.500	90.500	90.500	90.500
DESIGN COST FORMAL SECTOR	120.000	120.000	120.000	120.000	120.000
TOTAL DWELLING UNITS	295.000	0.000	0.000	0.000	0.000
OF WHICH, NOT UPGRADABLE	29.500	0.000	0.000	0.000	0.000
OF WHICH, UPGRADABLE	59.000	0.000	0.000	0.000	0.000
OF WHICH, PERMANENT	206.500	0.000	0.000	0.000	0.000
YEARLY REPLACEMENT, NOT UPGRADABLE	0.000	1.475	1.475	1.475	1.475
RECURRING EXPENSE/HOUSING EXPENSE	.150	.150	.150	.150	.150
HOUSING EXPENSE/HH INCOME	.250	.250	.250	.250	.200
YEARLY TOTAL REPLACEMENT UNITS	0.000	8.005	8.005	8.005	8.005
YEARLY UPGRADING	0.000	2.950	2.950	2.950	2.950

## OTHER URBAN

(ALL UNITS THOUSANDS)

DESIGN COST UPGRADE	10.000	10.000	10.000	10.000	10.000
DESIGN COST NEW HOUSE	74.100	74.100	74.100	74.100	74.100
DESIGN COST FORMAL SECTOR	90.000	90.000	90.000	90.000	90.000
TOTAL DWELLING UNITS	285.000	0.000	0.000	0.000	0.000
OF WHICH, NOT UPGRADABLE	28.500	0.000	0.000	0.000	0.000
OF WHICH, UPGRADABLE	57.000	0.000	0.000	0.000	0.000
OF WHICH, PERMANENT	199.500	0.000	0.000	0.000	0.000
YEARLY REPLACEMENT, NOT UPGRADABLE	0.000	1.425	1.425	1.425	1.425
RECURRING EXPENSE/HOUSING EXPENSE	.150	.150	.150	.150	.150
HOUSING EXPENSE/HH INCOME	.250	.250	.250	.250	.200
YEARLY TOTAL REPLACEMENT UNITS	0.000	6.915	6.915	6.915	6.915
YEARLY UPGRADING	0.000	2.850	2.850	2.850	2.850

## RURAL

(ALL UNITS THOUSANDS)

DESIGN COST UPGRADE	4.500	4.500	4.500	4.500	4.500
DESIGN COST NEW HOUSE	26.000	26.000	26.000	26.000	26.000
DESIGN COST FORMAL SECTOR	50.000	50.000	50.000	50.000	50.000
TOTAL DWELLING UNITS	2680.000	0.000	0.000	0.000	0.000
OF WHICH, NOT UPGRADABLE	268.000	0.000	0.000	0.000	0.000
OF WHICH, UPGRADABLE	1876.000	0.000	0.000	0.000	0.000
OF WHICH, PERMANENT	536.000	0.000	0.000	0.000	0.000
YEARLY REPLACEMENT, NOT UPGRADABLE	0.000	13.400	13.400	13.400	13.400
RECURRING EXPENSE/HOUSING EXPENSE	.100	.100	.100	.100	.100
HOUSING EXPENSE/HH INCOME	.200	.200	.200	.200	.200
YEARLY TOTAL REPLACEMENT UNITS	0.000	30.720	30.720	30.720	30.720
YEARLY UPGRADING	0.000	93.800	93.800	93.800	93.800

## METRO

INTEREST RATE	.160
LOAN TERMS	25.000
DOWNPAYMENT REQUIRED	.100
SHARE OF UPGRADE TO INFRA.	.870
SHARE OF UPGRADE TO CONSTRUCTION	.130
SHARE OF NEW UNIT TO LAND	.050
SHARE OF NEW UNIT TO INFRA.	.450
SHARE OF NEW UNIT TO CONST.	.500

## OTHER URBAN

INTEREST RATE	.160
LOAN TERMS	25.000
DOWNPAYMENT REQUIRED	.100
SHARE OF UPGRADE TO INFRA.	.800
SHARE OF UPGRADE TO CONSTRUCTION	.200
SHARE OF NEW UNIT TO LAND	.050
SHARE OF NEW UNIT TO INFRA.	.550
SHARE OF NEW UNIT TO CONST.	.400

## RURAL

INTEREST RATE	.160
LOAN TERMS	20.000
DOWNPAYMENT REQUIRED	.100
SHARE OF UPGRADE TO INFRA.	1.000
SHARE OF UPGRADE TO CONSTRUCTION	0.000
SHARE OF NEW UNIT TO LAND	.070
SHARE OF NEW UNIT TO INFRA.	.330
SHARE OF NEW UNIT TO CONST.	.600

APPENDIX C  
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