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**HOUSING FINANCE STRATEGIES FOR LDCs:
DEVELOPING A SYSTEMATIC APPROACH**

by

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EXECUTIVE SUMMARY

For the past several years there has been a growing appreciation on the part of analysts working with developing countries to improve their housing conditions about the pivotal role which mobilization of financial resources plays in determining a country's rate of progress in easing its housing problems. The issues involved in expanding the resources available to the sector -- in part by developing or strengthening the formal housing finance system -- are quite complex. Additionally, the economic context in each country makes the issues themselves vary significantly among countries. Under these conditions, the Office of Housing and Urban Programs of the U.S. Agency for International Development has sought an organized way to think about these issues and to generate essential information for policy dialogue with host country officials.

The work reported in this paper is a first attempt to respond to these needs by initiating the development of a methodology flexible enough to be of general utility in developing countries. We are developing a method to analyze economically efficient ways to generate and deploy the resources required to finance a country's housing needs. There are four key phrases in this statement which deserve amplification. The first key phrase is resources required to finance. "Resources" encompasses all forms of financing used in developing housing: savings, government expenditures, informal and formal housing finance. The title of the paper may lead the reader to believe that only formal housing finance is being considered; quite the contrary.

The second key phrase is a country's housing needs. The quantity of resources needed, i.e., the target for the funds to be mobilized, is defined by the projected housing needs over a ten or twenty year period, including reducing or eliminating the back-log present at the beginning of the period. Presumably, such projections come from the Housing Needs Assessment Model or some very similar computations. Indeed, the method discussed here explicitly builds upon these needs estimates.

The third key phrase is to generate, i.e., to mobilize, the resources needed to meet the housing needs. Analysis of the impediments to mobilizing adequate resources for the housing sector necessarily involves an examination of the maturity and efficiency of the overall financial system and the possibilities for increasing its efficiency. It is important to note in this regard that mobilization of additional funds for housing may mean that lower interest rates enjoyed by the sector, because it has had special sources of funds such as a payroll tax, will have to be less important in the future if the sector is going to be able to compete with others for additional funds. A full examination of funds mobilization will also include estimates of the gains to the overall economy of improvements in the operation of financial markets that may result from the proposed changes as well as the costs to other sectors of housing being able to successfully compete for funds needed to carry out the larger investment program.

Because of the complexity and diversity of the issues included in the mobilization analysis, it has not been possible to develop a general model, such as the Housing Needs Assessment Model, for this

purpose. Rather, this paper presents a general way of analyzing the issues involved and developing a strategy.

The final key phrase in the statement of purpose of the method is to deploy the resources: what is the best way to use the resources generated? "Best" in this context means a program that raises the housing conditions of those living in units that do not meet minimum dwelling or infrastructure standards at the lowest social and government cost. Obviously, the extent of progress on upgrading housing will depend on the availability and cost of housing finance; hence, the two parts of the analysis are intimately connected.

It has been possible to develop a computer-assisted model to simulate the effects of deploying financial resources on the quality of housing occupied by households in various income and tenure groups. The model -- the Housing Quality Model -- deals explicitly with housing finance supplied by (a) the formal financial sector, (b) government programs (i.e, grants and loans), (c) household savings, and (d) informal financing. It is capable of simulating the effects of a range of interventions in the housing market including the provision of additional formal housing finance through public or private institutions, possibly targeted to households in various income groups; and, as well as direct government assistance programs including sites-and-services, slum upgrading, infrastructure provision, and increasing the security of tenure of homeowners who do not have fully secure title to their properties. Multiple programs can be simulated at the same time. The model shows on a year-by-year basis the change in the number

of households occupying fully adequate housing, displayed by income and tenure group that results from implementing such policies.

The present report explains and demonstrates the "Housing Finance Strategy Methodology" using Sri Lanka as the study country. It is important to note, however, that this work falls far short of a full application of the method to the country. Neither the necessary information has been available nor has it been possible to have the essential conversations with Sri Lankan and local AID officials. The latter are crucial both to understanding the policy context fully and to developing information on a number of the behavioral relationships embodied in the Housing Quality Model.

The report does indicate the general direction that financial reform in Sri Lanka should take both to generate greater resources for the housing sector and to improve the overall efficiency of the financial sector and the economy. It also simulates the impacts on achieving minimally adequate housing of implementing several programs, including one in which financial reform of the type viewed as necessary is implemented along with an expanded mortgage lending program targeted to moderate income households.

INTRODUCTION

Good planning in the housing sector of developing countries is extremely important for several reasons. First, the sector accounts for around five percent of Gross Domestic Product and 20 percent of total investment in the typical developing country. Inefficiencies in housing production or in the housing finance sector can therefore strongly affect the overall efficiency of financial markets and the return yielded on a country's aggregate investment. Good planning is also essential because of the extremely long-lived nature of housing. Although dwellings can be modified and infrastructure services provided after initial construction, such improvements can be costly compared to providing a more complete unit initially. Errors in locating residential developments result in costs indefinitely into the future.

The close links between housing and the rest of economy, the dependence of housing improvements on the provision of infrastructure services, and the fact that housing investment typically requires households to mobilize resources beyond their own savings from either formal or informal sources combine to make planning for the housing sector quite complex. In light of these complexities, improved planning tools have been developed in recent years to help policy analysts carry out reasonable forward planning and to provide a basis for in-depth dialogue about potential policy initiatives. The Bertaud model for detailed project planning and the National Housing Needs Assessment Methodology come quickly to mind as examples. This paper presents the results of an initial effort to develop another planning tool in this

line -- a methodology for developing a housing finance strategy that can support a comprehensive program designed to deal with a country's housing needs.

The Housing Finance Strategy Methodology, designed for implementation in developing countries, can enable policy makers and analysts to assess alternative mechanisms for mobilizing and deploying resources for achieving improvements in housing quality. More specifically, the objective of the Housing Finance Strategy Methodology is to identify (a) the most economically efficient means for mobilizing financial resources for the housing sector that will allow all households -- but especially those in lower income groups -- to obtain minimally adequate housing; and (b) the most cost effective way of deploying these resources within the housing sector so as to achieve the goal of minimally adequate housing for all. Mobilization of financial resources may involve increased activity by private sector financial institutions as well as by the government; other sources of finance to be considered are informal finance and the use of a greater share of household savings for housing. The funds mobilized may be employed in the housing sector by some combination of expanded mortgage lending by formal institutions, government activity including operation of slum upgrading and similar programs, and investment by individual households of their own resources.

It is anticipated that application of this methodology will result in the identification of broad institutional reforms necessary to carry out an effective strategy, and that these reforms may well take several years to implement. Thus, from the perspective of the international

donor community, the Housing Finance Strategy Methodology can be seen as a vehicle to permit a detailed policy discussion with host country officials about resource mobilization and deployment. Funds mobilization discussions will have to include individuals concerned with a country's financial system as well as macro-economic planners, while deployment discussions will involve officials typically found at the ministry of housing.

This report provides a broad introduction to the Methodology, by discussing in general what is involved in developing a housing finance strategy with illustrations from a stylized application of the methodology to Sri Lanka. The balance of this chapter consists of an overview of the methodology. The second chapter provides a brief introduction to housing conditions in Sri Lanka. The third discusses the mobilization of the financial resources required to execute a long-term program to realize substantial gains in a country's housing and possibly improve the efficiency of its financial markets. The fourth chapter then discusses how to analyze alternatives for employing these resources and presents a tool, the Housing Quality Model, for assisting in this analysis.

Relation to the Housing Needs Assessments

Perhaps the best way to understand the present work is in relation to the National Housing Needs Assessment Methodology, which was developed by USAID's Office of Housing and Urban Programs in late 1983 and which has since been applied in at least a dozen countries.¹ The

1. For a description see Robert R. Nathan and The Urban Institute (1984). Full references to papers cited in footnotes are presented at the end of the paper.

housing finance strategy methodology both builds on and extends the estimates developed in the housing needs assessments.

It builds on the needs estimates in two ways. First, the needs assessments produce estimates of the total resources that must be invested in the housing sector over a period as long as twenty years to reach the goal of all of a country's households living in minimally adequate housing by the end of the period. This estimate serves as a control total for the resource estimates used in a housing finance strategy.¹ The housing finance strategy focuses on how these resources can best be mobilized and deployed.

Second, the housing needs assessment provides critical assumptions about future demographic and economic developments, including the increase in the number of households, the amount of money households will likely be able to spend on housing, and the extent of urbanization. These are central inputs to the housing finance methodology.

The housing finance methodology extends the needs assessments in several ways. First, it makes explicit the sources from which the funds for investment in the housing sector are drawn, i.e., household savings, informal housing finance, formal housing finance, and government expenditures or loans. Second, it indicates how different funding

1. Note that the resource requirements estimated by the needs model are for a particular set of housing standards; for each country the same standards will be employed in the housing finance methodology calculations as in the needs methodology. Also, the investment figure cited is the investment necessary to meet housing needs. Additional investment would be required to satisfy increases in housing consumption by those already living in good quality housing. This point is discussed further in chapter 4.

sources as well as the aggregate level of resources going to housing affect housing activity and the overall economy. Third, this methodology provides estimates of the differential impacts of alternative mechanisms for deploying housing resources. The qualities of housing occupied by households of various income classes are distinguished. One can contrast the effects, for example, of expanding the volume of formal housing finance by simply allocating private institutions more funds to continue past lending patterns versus making funds available on the condition that lenders expand the range of income groups served. Such analysis helps outline the major impediments to implementing that set of allocations of the investment resources which is shown to be the most effective for the country to pursue in achieving its goal of adequate housing for all.

Finally, in contrast to the housing needs methodology, the housing finance methodology is more explicit about the rate at which households actually realize improvement in their housing.¹ The housing finance methodology provides estimates of improvements on an annual basis.

1. In the housing needs assessment methodology it is assumed for those households that are "scheduled" according to the plan to have their housing improved from deficient to standard in any period that the amount of current income going to housing investment is capitalized using standard mortgage terms. The "new unit" has the value of the mortgage amount plus an assumed downpayment. In fact, the rate at which the household will actually obtain a unit of this value is ambiguous. The ambiguity arises because it is unclear whether the household will be able to obtain mortgage financing. If it obtains a mortgage, then it realizes the full value of the unit immediately. Otherwise, the calculation corresponds to the value today of the household investing its monthly mortgage payment in gradually upgrading its unit over an extended period of 20 or more years. Since most households will not be able to obtain financing, there can be a substantial gap at any point in the planning period between the number of households the needs assessment methodology estimates to have obtained improved housing and the number of units actually improved to that level.

Hence, policymakers will be able to obtain guidance on how their policies should work in the near term -- the period in which they have the most intense interest.

Overview

As suggested earlier, the Housing Finance Strategy Methodology consists of two major components -- a method for analyzing alternative mechanisms for generating housing resources, and a method for analyzing alternative mechanisms for deploying these resources. These two parts are related in several ways. For example, if interest rates in the housing sector rise as a consequence of the sector bidding for more resources, households will not be able to purchase as much housing with the same monthly mortgage payments, and the rate at which acceptable housing is realized will be reduced. Conversely, if resources are deployed in ways that increase the willingness of households to mobilize additional savings and intra-family borrowing for housing, the volume of formal finance required will decline, which in turn may reduce interest rates and increase affordability. Thus, as the discussion of the Housing Finance Strategy Methodology proceeds, it is important to keep in mind that there are many crucial linkages between mobilization strategies and deployment strategies.

Generating the resources. There are four sources of funds for investment in housing: household savings, informal financing,¹ formal sector housing finance, and government loans or subsidies. Implementing

1. Informal financing is defined to include intra-family as well as unregulated non-family sources, including local money lenders and the like.

the housing finance methodology involves several tasks in determining the possibilities and consequences of generating funds from these alternative sources.

First, one must have an appreciation of financial markets generally and the place of formal housing finance in this larger system. Second, within this context, the possibilities for expanding alternative sources of investment resources are examined. Increasing the volume of funds in the private formal housing finance sector may well depend on altering existing institutional arrangements or government financial policies which prevent these institutions from effectively competing for funds in financial markets. Likewise, the amount of savings households are willing to devote to housing, the amount of informal finance that may go to the sector, and the share of income households are willing to devote to monthly housing expenses are all sensitive to the housing opportunities available. The analyst needs to assess whether these opportunities can be structured in such a way as to generate a larger share of total investment from these sources than has been available in the past.

After this initial work, alternative programs for obtaining the total level of resources needed to achieve housing objectives are defined. Note that the mix of sources channeled to the housing sector can vary over time -- indeed it could vary annually. Hence, it is entirely possible to analyze a phased program in which, for example, government initially takes a larger role while the institutional changes needed to expand the volume of privately mobilized formal housing finance are effected.

Each alternative can be examined from two rather different perspectives. The first is the effectiveness in improving housing conditions; this is discussed below. The second are the impacts on the balance of the economy.

One impact is the consequences of diverting resources to housing, including effects on the balance of payments.¹ The objective here is to identify the consequences for economic growth in the medium term of pursuing the alternative policies under consideration. The second set of impacts involves possible gains in the efficiency with which the financial sector operates, that could result from implementation of some mobilization policies. Improved efficiency would result, for example, from policies that caused the housing finance sector to be more fully integrated with the rest of the financial sector, as well as policies that caused more households to use formal institutions for holding their savings and as a source of loans. It is only through this broad analytic perspective that housing and housing finance programs can be seen as effective macro-economic policies that improve overall economic activity. Without such a perspective, housing sector interventions are often seen as another low priority demander of resources rather than as an effective channel to mobilize and increase the savings pool.

Impacts on housing quality. The incremental financial resources mobilized for use in the housing sector can be employed in a variety of ways, ranging from a simple expansion of formal mortgage financing to implementation of creative schemes for providing water and sanitation

1. Given the typically low import content of housing, especially lower cost housing, one typically expects a positive balance of payments effect from shifting resources into the housing sector.

services to established slum areas. The way in which the resources are employed affect both (a) the overall economy and the efficiency of financial markets, and (b) the efficiency with which the upgrading of housing is achieved.

The heart of the analysis on the impact on housing quality is a simple micro-simulation model (i.e., one that operates at the household level and on a micro-computer) that traces the effects of alternative deployment programs on the housing quality of different household groups. The particular concern is to determine the impact of alternative deployment strategies on the dwelling and infrastructure attributes of the housing occupied by lower income households and by other households whose initial housing quality level is less than minimally acceptable. The model employs a simple formulation in which housing units either meet or fail separate minimum standards for dwelling and infrastructure quality. These are essentially the same standards as used in the Housing Needs Assessment estimates.

Thus, each household occupies a dwelling in one of four statuses (fails both dwelling and infrastructure standards; passes one, fails the other; fails one, passes the other; passes both). The explicit policy concern is the efficiency of different interventions in shifting households into the "passes both standards" status over an extended time horizon of 10 to 20 years. Households are classified in the first year on the basis of income level, tenure, and condition of the housing they occupy.

The calculations of housing impacts are performed on an annual basis, which should heighten the interest of policymakers in the

analysis and will yield a considerable improvement in the realism of the estimates. The annual time-period allows one, for example, to consider the effects of a staged start-up of new programs.

The computer model is designed to deal with a substantial range of housing policies. These include:

- o Increasing the availability of formal housing finance (includes government operating or forming a secondary mortgage facility to provide additional liquidity to mortgage originators). These are "free-standing" loans not associated with direct government housing programs:
 - "business as usual" - institutions (private and public) continue to serve their traditional clientele.
 - institutions shift their practices so as to serve lower income households (loans can be targeted to alternative groups, including differences in maximum loan principal amounts that could be serviced and differences in underwriting standards on the quality of units on which loans are made).
- o Government assistance programs (beneficiary population can be defined by income group and initial tenure status). All programs may be formulated with or without an associated loan program:
 - slum upgrading - provision of infrastructure and secure title
 - upgrading of rural units; infrastructure only or with some key dwelling improvements
 - provision of secure title only; household purchases site, possibly with bundle of services
 - sites & services projects
 - direct construction - ranging from core (or shell) units to complete dwellings (may involve units for owner occupancy or rental).

The results of the Housing Quality Model provide information on the rate of improvement in the quality of housing occupied by households classified by income, initial housing circumstances, and tenure

status. It is possible to examine the number of households achieving the minimum standard of housing quality each year. Thus, alternative policies can be explicitly compared in terms of the efficiency with which they achieve improvement in the housing circumstances of target groups.

Conditions for Using the Methodology

In closing this introduction, it is worth emphasizing that successful implementation of the Housing Finance Strategy Methodology in any country will have a few important preconditions. One key condition is a completed housing needs assessment or the availability of comparable information. A related consideration is the availability of data on housing quality by income class beyond that necessary for the housing needs methodology.

A second condition is the willingness on the part of the host country to work closely with an outside team in designing and analyzing alternative policies. At least at this stage, the Housing Quality Model is not yet in a form to be employed independently of its creators. Likewise, developing options for mobilizing the necessary financial resources may benefit from the "fresh look" provided by members of the team applying the Methodology.

2. SRI LANKA: CURRENT HOUSING CONDITIONS AND HOUSING NEEDS

This chapter provides a brief introduction to housing in Sri Lanka. It focuses on current (1981, the date of the most recent census) physical housing conditions, on trends in these conditions, and on private housing production over the inter-censal period, 1971-1981. Also, discussed in this section are estimates of the country's housing needs over the 1983-2003 period, computed using the National Housing Needs Assessment methodology, upon which the Housing Finance Strategy Methodology explicitly builds. The final section provides a quick overview of housing policy in recent years.

Housing in 1981

The 1981 population of Sri Lanka was 14.8 million -- about 3.1 million households. The occupied housing stock totaled some 2.8 million housing units. Thus, nationally, there was about 10 percent overcrowding.

The figures in Table 2.1 provide some essential descriptive facts about housing in Sri Lanka. The country is only about 20 percent urbanized; a share that has been remarkably stable over the past decade. A significant minority of the population (8 percent) continues to live on estates or plantations, where housing is furnished to workers and their families as part of the compensation package.

The second panel in the table reports the distribution of units classified by the strength of the materials from which their roofs,

Table 2.1

HOUSING IN SRI LANKA
(percentages)

	SECTOR			
	Total	Urban	Rural	Estate
Distribution of units by location	100	18	74	8
<u>Percentage distribution of units by building materials^a</u>				
permanent	42	68	37	23
semi-permanent	52	24	56	76
improvised	6	8	7	1
Total	100	100	100	100
<u>Percentage distribution of units source of drinking water</u>				
pipad water within premises	8	24	2	29
pipad water outside premises	9	22	3	37
protected well	52	44	58	17
unprotected well	21	5	26	4
river, tank, other	7	1	8	6
not reported	3	4	2	8
Total	100	100	100	100
<u>Percentage distribution of units by toilet facilities</u>				
flush toilet	5	16	2	5
water sealed	22	39	18	25
pit	38	17	42	32
bucket type	2	9	b	2
none	31	16	35	28
not stated	2	3	2	8
Total	100	100	100	100
<u>Percentage distribution of units by tenure</u>				
owned	69	57	80	1
rented or leased	10	29	6	1
occupied rent free	12	8	6	79
other	5	3	5	6
not stated	4	4	3	13
Total	100	100	100	100

a. Definition of classification is provided in Table B.1.

b. Less than 0.5 percent

Source: Census of Population and Housing, Sri Lanka-1981: Housing Tables
(Colombo: Department of Census and Statistics, Preliminary Release
No. 3, 1982).

walls and floors are constructed. Only about 40 percent of all units are rated as "permanent" overall; but, on the other hand, less than 10 percent are classified as "improvised". As one might expect, the urban stock is the best and that in the estate sector is the worst.

The next two panels in Table 2.1 focus on sources of drinking water and types of toilet facility. The most common source of water in both urban and rural areas is protected wells. However, in urban areas, four out of every ten dwellings draw their water from taps -- about half of which are communal standpipes. The situation in rural areas is more difficult to discern because of ambiguity of the "protected well" category. If these wells are indeed protected from infiltration of pollutants, then the rural water supply situation is quite good, with 63 percent of units having access to piped water or water from protected wells. On the other hand, over one-third of the units must rely on water from unprotected wells or lower grade sources. Differences between the two sectors are also evident in the toilet facilities. The majority of urban dwellings have flush or water sealed toilets, which are clearly of acceptable quality. In rural areas 20 percent of the units have such facilities, while pit latrines -- which can be of acceptable quality -- service over 40 percent of the dwellings. At the other end of the spectrum, a full 35 percent of rural units have no formal toilet facilities whatsoever, while 16 percent of units in urban areas are in this latter group.

Some further insight into housing patterns is available by examining the relationship between the strength of the materials used in constructing the unit and the type of sanitary facilities and water

supply. Cross tabulations showing these relationships are presented in Table 2.2. The anticipated pattern of units built with permanent materials having the best infrastructure services clearly holds in urban areas. In the rural and estate sectors, however, this pattern is much less evident. As an example, in the estate sector permanent units have the lowest rate of piped water as their water source. These patterns presumably are due to the uneven provision of various infrastructure services.

The tenure distribution of housing units is important because tenure can strongly affect investment decisions. This is especially true in Sri Lanka where strict rent controls in effect since the early 1970s¹ have sharply depressed construction of rental units. The final panel of Table 2.1 presents tenure distribution figures. Owner-occupancy clearly dominates, although it should be noted that owners include those without title to their property as well as those in more secure ownership positions. Nearly 30 percent of the units in urban areas are rented; this is a reduction of about 10 percentage points since 1971, presumably reflecting the imposition of rent controls at mid-decade as well as a complementary law limiting the number of rental units a household can own.

Trends, 1971-1981

While the foregoing gives a general picture of the current housing situation in Sri Lanka, it is equally useful to know whether or

1. For a general description of the housing sector see U.S. AID (1981).

Table 2.2

TOILET FACILITY AND DRINKING WATER SOURCE BY DWELLING QUALITY, 1981
(percentage)

	URBAN			RURAL			ESTATE		
	Permanent	Semi Permanent	Improvised	Permanent	Semi Permanent	Improvised	Permanent	Semi Permanent	Improvised
Type of Toilet									
Water Sealed or Flush	71	23	8	42	6	5	44	24	44
Pit	11	31	19	43	47	15	27	34	20
Bucket type	9	11	8	1	--	--	2	2	--
None	6	30	61	12	45	77	8	34	28
Not reported	3	4	4	2	1	3	18	6	8
Total	100	100	100	100	100	100	100	100	100
Source of Drinking Water									
Piped Water	54	39	37	9	4	4	55	69	70
Within premises	(34)	(8)	(5)	(4)	(1)	(1)	(32)	(27)	(49)
Outside premises	(20)	(31)	(32)	(5)	(3)	(3)	(23)	(42)	(21)
Protected Well	41	46	49	67	53	64	19	15	10
Unprotected Well	2	10	8	18	32	21	3	4	6
Other	1	2	2	4	11	9	4	6	6
Not reported	3	3	3	2	1	3	19	5	8
Total	100	100	100	100	100	100	100	100	100

Source: Census of Population and Housing, Sri Lanka-1981: Housing Tables (Colombo: Department of Census and Statistics, Preliminary Release No. 3, 1982), Tables 19 and 20.

not housing conditions have been improving. To explore this question, data from the 1971 and 1981 Censuses are compared. The basic figures are presented in Table 2.3.

The first important finding suggested by Table 2.3 is that there was a rough parity between growth in the number of dwelling units and growth in the number of households over the period. Population increased at a lower rate than households during the decade, but falling household sizes offset the lower population growth. At the same time, the combination of building larger dwellings and upgrading existing ones led to an overall reduction in occupancy rates over the period from 5.6 to 5.2 persons per unit. In considering the increase in units, one should be aware that the figures include units created through subdivision of units present at the beginning of the period as well as units newly constructed.

An examination of data on dwellings cross-tabulated by vintage from the two censuses indicates that among "permanent" units, subdivisions and the upgrading of "semi-permanent" units more than offset withdrawals from the stock. Given the low mobility rates in Sri Lanka and the extent of upgrading apparent, one can conclude that upgrading is a very important mechanism for households to obtain units rated as permanent. From data in a recent detailed analysis of census data, we have calculated that each year the stock of permanent units is augmented with units originally built of semi-permanent materials by about 0.94 percent in urban areas and about 2.1 percent in rural areas.¹

1. See Gunatilleke (1984).

TABLE 2.3

CHANGES IN HOUSING INDICATORS: 1971-1981

	<u>Total</u>		<u>Urban</u>		<u>Rural</u>		<u>Estate</u>	
	<u>1971</u>	<u>1981</u>	<u>1971</u>	<u>1981</u>	<u>1971</u>	<u>1981</u>	<u>1971</u>	<u>1981</u>
Total households (000) (percentage change '71-'81)	2445 (28)	3125	474 (25)	592	1971 ^a (28)	2533 ^a		
Total and dwellings (000) (percentage change '71-'81)	2217 (27)	2811	421 (21)	509	1797 ^a (28)	2301 ^a		
<u>Percentage distribution of units of building materials^b</u>								
permanent	35	42	63	68	32	37	12	23
semi-permanent	57	52	28	24	61	56	85	76
improvised	8	6	9	8	7	7	3	1
Total	100	100	100	100	100	100	100	100
<u>Percentage distribution of units by source of drinking water</u>								
pipd water on tap	20	17	45	46	5	5	75	66
well	69	73	51	49	82	84	15	20
river, tank, other	9	7	2	1	11	9	7	6
not reported	1	3	2	4	2	2	3	8
Total	100	100	100	100	100	100	100	100
<u>Percentage distribution of units by toilet facilities</u>								
flush toilet	7	5	23	16	2	2	8	8
water sealed	14	22	19	39	10	18	34	25
pit	39	38	18	17	44	43	38	32
bucket type	5	2	19	9	1	c	4	2
none	34	31	19	16	42	35	13	28
not reported	1	2	1	3	1	2	2	8
Total	100	100	100	100	100	100	100	100

a. Separate figures on household size needed to derive the number of households is not available for 1971; figures are for both rural and estate sectors.

b. Definitions of categories appear in Annex Table B.1.

c. Less than 0.5 percent

Source: 1971 and 1981 Censuses

The degree of progress in water supply and toilet facilities offers something of a contrast. Overall, little progress was made as to the source of drinking water. An ambitious investment program is currently underway, however, which will up-grade water service to much of the country in the years ahead.¹ Definite progress was evident in the share of units with flush or water sealed toilets, which rose from 21 to 27 percent over the period, with genuine improvements in both urban and rural areas.

Private Production

While the foregoing gives a good overall picture of housing conditions in Sri Lanka, it is also important to focus on year-to-year dynamics in the public and private production of housing. These trends provide essential background for judging the capacity of the country to produce the number of units needed in the future. Table 2.4 provides the essential information for the 1977-1981 period.²

Two points stand out from these figures. First, there has been a steady acceleration in the number of units built annually of permanent and semi-permanent materials; the level in 1981 was 70 percent greater than that of 1977. This suggests that the residential construction industry has substantial current capacity as well as considerable potential for rapid expansion. Secondly, while government sponsored housing has been important, the private sector has persistently

1. See The World Bank (1984).

2. These figures were compiled in an AID-financed study by PADCO staff using data from the 1981 census and figures on government sponsored housing.

TABLE 2.4

PRIVATE HOUSING PRODUCTION 1977-1981

	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>TOTALS</u>
1. Total Production of Permanent and Semi-Permanent houses	57,414	71,195	88,417	89,566	96,455(a)	403,048
2. Housing Production by GSL Programs	-	2,545	6,186	12,889	8,841	30,461
3. Government Housing Loans	4,239	9,086	5,555	112	-	18,992
4. Total Public Sector Production	4,239	11,631	11,741	13,001	8,841	-
5. Total Private Sector Production	53,175	59,564	76,676	76,665	87,615	353,595

a. Projected for full year from census estimate for first quarter.

Source: PADCO, Meeting Housing Needs in Sri Lanka: A Strategy for the Future, (Washington, D.C.: Report to the Office of Housing, U.S. Agency for International Development, 1982) Table 9, p. 13.

accounted for the lion's share of total building activity. Hence, the surge in housing activity can be thought of as primarily funded by private demand. This degree of private activity is especially impressive in light of substantial impediments to residential development. These include rent controls (although new units are exempt, the spectre of reimposition remains), the very limited volume of mortgage financing available, laws that make site assembly difficult,¹ and substantial red tape in general. Finally, it might be noted that housing investment over the 1977-1981 period appears to have accounted for between five and seven percent of GDP.²

Housing Needs

This section outlines the housing requirements of Sri Lanka over the 1983-2003 period as computed using the National Housing Needs Assessment methodology. These needs estimates are based on a particular logic that is important to grasp from the outset. The methodology computes aggregate needs levels in two basic steps. In the first step the number of dwelling units needed each fifth year over a 20-year planning period is computed. These "needs" correspond to a specific plan, which calls for all households to be living in adequate units by the end of the planning period. The plan provides for (a) new units to serve newly formed households, to replace obsolete and badly deficient units, and to relieve overcrowding, and (b) the upgrading of existing units having correctable deficiencies. For these calculations, the rate

1. See World Bank (1984a).

2. The national income accounts data on residential investment are quite rough and this should be best be considered an order-of-magnitude estimate.

at which housing deficits existing in the base year are corrected is specified by the analyst. For the estimates presented here, deficits are assumed to be eliminated at the rate of five percent per year.

In the second step, the level of housing investment required annually to achieve planned production and upgrades is calculated. Also, the amount of investment anticipated from private sources is computed. The "capital gap" between the level of investment needed to execute the planned program and the level of investment forthcoming from private sources can then be determined. This gap essentially constitutes the total subsidy requirement. Note that the Needs Assessment computations are done separately for households in each income quintile in three geographic sectors -- urban, rural, and estate.

The results of these calculations for Sri Lanka are summarized in Table 2.5 for the fifth year of the plan period, 1988. While the number of units that must be newly constructed increases somewhat over the period (from 116,000 in 1988 to 167,000 in 2003), the general patterns evident in 1988 remain the same.

In Sri Lanka as a whole in 1988, about 219,000 units will be required to meet the production levels called for in a plan that provides all new households with units and that eliminates five percent of the deficits existing in 1983. Of the total, a little over half -- or 116,000 units -- are new units, while the balance -- 103,000 -- are units to be upgraded. The large share accounted for by upgrades reflects the large portion of the base year housing stock which is rated as not meeting minimum standards but as upgradable.

The distribution of housing needs over the period between urban and rural areas is based in part on the continuation of a low rate of urbanization in the country. In rural areas, an even larger share of the base year housing stock is upgradable than in urban areas. Moreover, there is a higher incidence of overcrowding in urban areas, a deficit that must be eliminated with the construction of new units. This contributes to the relatively high volume of new construction required in urban areas. Hence, the overall pattern is for a closer balance between upgrades and new construction in rural than in urban areas.

Reaching the goal of adequate housing for all households depends on the ability of households to afford units meeting minimum standards. The Needs Assessment analysis focuses on those households unable to afford housing formally supplied by the private sector. These households are able to afford only the minimum housing or less. Households in this group are defined as "target households," and they may be "assigned" to either of two categories of housing solutions: an upgrade of the household's existing unit or a new "shell unit" on a serviced lot meeting minimum quality standards. The amount a household can afford to pay for housing is determined by the capitalized value of its current housing expenditures. For households not able to afford the shelter solution assigned to them, the model calculates the shortfall between the design cost of the solution and the capital value they can afford.

The second panel of Table 2.5 shows the distribution of households by the type of units they can afford. Nationally, only seven

percent of those households scheduled for new units or upgrades by the plan in this year are unable to afford any of the solutions. On the other hand, 72 percent can afford an upgraded unit, while only about 20 percent can afford the "shell house." This distribution results both from the purchasing power of Sri Lankan households and from the realistic standards embodied in the housing solutions defined. Higher cost solutions would have resulted in fewer households even being able to afford an upgraded unit.

The third panel of Table 2.5 computes the amount of funds that would have to be invested in housing in 1988 to meet the housing needs. Nationally, the target group -- households that cannot afford the highest of the three solutions -- invests about Rs. 4.4 billion in 1983 prices of its own funds, and needs another Rs. 1.1 billion in subsidies to be able to afford the types of units assigned by the model. We calculate that in 1988 about Rs. 6 billion is invested in total; this contrasts sharply with total mortgage lending outside of government programs of perhaps Rs. 150 million in 1983.

Another important comparison is between the Rs. 1.1 billion in subsidies and the government's current efforts in the sector. In 1983, Government allocated Rs. 874 million to the sector (exclusive of funds provided to the State Mortgage Investment Bank for on-lending at near-market interest rates), or about 80 percent of the funds needed to close the investment gap, according to these computations. The expenditures in 1983, however, were largely payments for expensive apartment blocks that had been constructed in previous years, and that served very few households. Since then, however, Government has reoriented its housing

activities in a way that is consistent with the solutions used in the housing needs calculations.

The estimates from the housing needs analysis provide a framework within which the planner can consider different options. Executing the plan embodied in these calculations can, of course, be extremely difficult. One of the key requirements is to mobilize the necessary amount of housing finance. The figures presented above indicate that only about three to five percent of private housing investment has been supported with formal mortgage financing. To realize the kind of investment levels implied by the needs calculations would require a massive improvement in mobilizing finance for the housing sector and dispersing it efficiently.

Recent Housing Policy

Following its election to power in 1977, the present Government devoted considerable public resources to the housing sector, principally in the form of a variety of programs designed to assist lower income households obtain adequate housing. The largest of these programs provided modest self-help units in rural and urban areas. In addition, a small slum and shanty upgrading program operated almost exclusively in greater Colombo. Even with their modest design standards, these programs were characterized by deep subsidies and low production levels compared with the magnitude of the problems they were addressing.¹

1. For a more detailed discussion of these programs and of recent events in the housing sector, see the 1985 AID Project Memorandum on the Housing Guaranty program in Sri Lanka.

In 1982, Government announced a massive initiative to improve the country's housing -- the Million Houses Program. Under this program, a million units were to be constructed or upgraded over a decade through both public and private action. Government-assisted projects were to be designed to improve units only to the minimum quality standards, to require households to contribute a major share of the resources invested, and to concentrate on dramatically improving cost recovery performance.

In 1984, the Rural Housing Sub-Program was firmly launched, with production reaching about 44,000 units. The program provides individuals with small loans (\$120-300), the size depending on the improvement option selected -- new construction, rehabilitation, or provision of latrines or wells. Loan terms are for 5 to 15 years at 3 to 6 percent, depending on the size of the loan (larger loans carry higher rates). These are highly subsidized loans (market rate loans are at 17 percent), and they are available only to lower income households -- those with incomes under \$480 per year.

The urban segment of the Million Houses Program is now being organized. It envisions a sharp shift toward the development of sites-and-services projects where high volume results can be achieved. Slum upgrading will continue, but the emphasis will be on development of new units. Costs of new units are expected to be in the \$1,000 range.

Government is moving as well to foster greater production in the private sector, principally by expanding and strengthening the housing finance sector. The State Mortgage and Investment Bank, a parastatal, has been considerably overhauled with its operational

efficiency clearly improved, and its loan volume has quadrupled in the past four years to 3,000 loans in 1984. Government is also encouraging the creation of private housing finance institutions and is even considering development of a secondary mortgage purchase facility.

In short, Government has definitely made housing a priority sector. It hopes to use the sector both to improve the living standard of the people in all parts of the county and to help drive the economy.

3. ASSESSING FUNDS MOBILIZATION: POSSIBILITIES AND CONSEQUENCES

The housing needs assessment model identifies the costs of providing a country with minimally adequate housing over an extended period of time. It provides an answer to the question of how much investment is needed if (1) there are no major bottlenecks in the economic delivery system, (2) the programs used do not have major effects on the incentives of households involved other than to induce them to upgrade their housing, and (3) the economy functions as anticipated. This kind of information is useful to policymakers because it gives a financial scale or resource dimension to the issue of how much it will cost to solve a nation's housing problems.

The model estimates aggregate resource requirements by capitalizing the flows of housing services that households require to meet minimum standards; most cost is borne by the households themselves, but in some instances government provides assistance. This calculation assumes a specific time period and interest rate, and yields the value of units households could afford (possibly with help) if they were to purchase these accumulated flows in a stock. In other words, how much would the asset cost if the household were to buy it rather than rent it. This methodology essentially assumes that sufficient financing is available to capitalize existing flows of housing investment.

The housing finance strategy methodology will make this analysis more usefully "realistic" by broadening the range of factors that can be expected to affect the fulfillment of housing needs. Most

importantly, it will examine intensely the possibilities for mobilizing the resources necessary to meet the housing needs. In addition, it can show how financial reforms rather than government expenditures can affect the housing sector, as well as the rest of the economy. Furthermore, it can help to identify the risks involved with different strategies. In other words, the new Methodology permits analysis of the housing sector implications of non-housing policies and bottlenecks, a topic on which the Sri Lanka Ministry of Local Government and Housing Construction requested AID assistance in October 1984 (See Annex 2 of the 1985 Project Memorandum).

In this chapter we first describe the set of tasks that an analyst would have to undertake in doing a full examination of the possibilities for mobilizing the financial resources necessary for meeting a country's housing needs. The next three sections then illustrate selected parts of this general program for Sri Lanka. We concentrate on the linkage between formal housing finance and the overall financial system because this is the element with which the Office of Housing has comparatively little experience in the past.

Tasks in Analyzing Resource Mobilization

We have found it useful conceptually to organize into five parts or steps the work likely to be involved in applying the part of the Housing Finance Strategy Methodology dealing with attracting the necessary financial resources into the housing sector. These steps are outlined sequentially in the following paragraphs.

The crucial first step is to place housing finance in the context of the national economy and overall financial markets. One must

begin with an appreciation of the degree and type of intrusion of government into the operation of these markets and form some idea of the impact of this intrusion in causing deviations in credit pricing and allocations away from what would be a more market-determined situation.

An initial group of questions to ask concerns the maturity of the financial system overall. Various short-hand indicators (some discussed in the next section) are available which compute the ratio of financial assets in the financial system to GDP; higher ratios typically mean the formal financial system is more mature. Another good indicator of the effectiveness of the formal financial system is the extent and vibrancy of informal financial arrangements. The more lively are informal arrangements, the poorer the operation of the formal sector, especially for transactions involving households and small businesses.

A number of indicators of government intervention in the sector are available. Are there formal credit allocations to favored sectors? If so, how are these accomplished, i.e., does government make direct allocations of funds it has borrowed or does it create reserve requirements and other regulations causing private banks to allocate funds to these sectors at specified rates, thereby raising interest rates to other borrowers? Have controls and regulations caused interest rates to be below what would have been competitive levels? Such financial repression is common where countries have large budgetary deficits to finance: lowering interest rates reduces the cost to Government of servicing its debt.

Combined these types of information will establish the financial market context within which any plans for channelling

additional resources to housing must be formulated. In a number of cases the analyst may observe that financial system-wide reforms would make increasing housing's share much easier. In some circumstances it will be worth pursuing such broad changes. In other cases, changes will have to be formulated within the existing system. Even here, however, the objective is to generate the additional resources for the housing sector in ways that are consistent with improved efficiency of the overall financial system.

The second step focuses more directly on the housing sector and asks how the additional resources can be generated. The full array of sources of funds must be considered. The obvious source is formal housing finance, especially private formal finance. Its prominence arises both from the fact that it consists of a set of formal institutions which can be manipulated directly through government policies and because in general having more of housing finance channelled through such institutions will be more economically efficient than operating through the informal sector or through governmental programs. Generally the issues involved here will have to do with regulatory changes needed to make such institutions more competitive in attracting funds from depositors; in some cases this will also mean being able to tap new sources of funds through individual institutions selling debt instruments in the market or government helping to organize a secondary market operation. Reforms may additionally require changes in the type of mortgage instruments being used to protect financial institutions from excessive interest rate risk, especially in countries with a recent history of volatile interest rates.

Government appropriations is another important source of funds. The objective is to use these funds to accomplish housing improvement for lower income households who cannot afford adequate housing on their own. A clear objective is for government to limit its direct activity to this group, while doing other things that facilitate private institutions meeting other demands. The amount of budgetary support necessary will be very sensitive to the building standards selected and the size of the population that cannot afford units of this standard without assistance. The analyses done with the housing needs model and with the simulation model described in Chapter 4 should both be instrumental in identifying the size of the appropriate role for government.

The third source of resources is household savings. In some ways it makes sense to consider savings together with informal finance, since the two sources are together the way in which households assemble downpayments or "household contributions" for formal loans or participation in some government programs. The real question here is how to raise the share of the household's assets and borrowing power going into housing: how to make the housing opportunity sufficiently attractive. From a host of studies we know that providing secure title to the land on which a unit is located and installing certain infrastructure services can cause households to mobilize quite substantial amounts of funds from these sources for further improving their homes.¹ The particular experiences in the country need to be

1. For a review of this experience, see Turner and Struyk (1985), Annex B.

catalogued and possibilities for increasing such opportunities considered.

Finally, the informal sector deserves separate attention. Generally one will have to start by attempting to determine its importance in the housing sector. Often one finds that transfers within the extended family are a major financing component but that borrowing from informal money lenders is limited. In some countries informal lease/buy arrangements for land purchase are a crucial element in housing development, and ways to expand and strengthen these may deserve consideration. The rule is for informal arrangements to differ sharply among regions of the world, and even countries within a region. This diversity -- and the lack of documentation of many practices -- limits the general points that can be made. One broad observation does seem warranted: as use of formal housing financing becomes more widespread, informal arrangements decline in significance. This should not be taken to suggest, however, that expanding informal sources, and even moving them toward more formal arrangements, not be fully considered as part of this analysis.

The third step in the process is to organize the various possibilities for resources mobilization developed in the previous step into a small number of "packages," each of which is sufficient to generate the annual resources needed to meet the housing needs estimates. These packages should specify some targets for the level of resources mobilized from each source. They might differ in their mix of funds from different sources. Likewise, the initiatives required to mobilize the resources from a given area (e.g., formal finance) might be

quite different among packages. So, for example, in terms of the "housing opportunities" provided to moderate and lower income households, an infrastructure upgrading program and a sites-and-services approach might both be evaluated. The point is to define a few -- three or four -- such packages for further analysis.

This additional analysis of the alternative packages is carried out in the fourth step. The effectiveness of each package is evaluated on two quite different grounds. The first is the amount and rate of improvement produced in the country's housing situation over a several year period. It is exactly the analysis of this issue that is addressed by the simulation model presented in the next chapter. So we reserve further consideration of this element until that point.

The second ground on which the packages are evaluated is the impact on the balance of the economy. One area to be included here concerns the effects on middle-term economic growth of shifting a greater share of a nation's resources into the housing sector. This is, of course, an extremely difficult question to answer. And the quality of response that can be developed will depend on the availability of the relevant macroeconomic models, or at least rate of return analyses for different sectors along with some forecast of likely demand for their products over the next five to ten years. An element definitely to be considered is the effect of such a shift in resources on the country's balance of payments. While housing is typically a relatively low user of imported materials (especially for lower cost housing), there is considerable variation among countries.

Another area to be included in this analysis is the impact of reforms in the housing finance sector on the savings rate and on the efficiency with which capital markets operate. Improved efficiency could result, for example, from policies that caused the housing finance system to be more fully integrated with the rest of the financial sector. At least as important as such efficiency gains, however, are increases in the savings rate itself. Raising this rate obviously means more funds available for investment purposes, which in turn means that a smaller share of a country's financial resources would be needed to meet the housing objectives than would be the case if savings were unresponsive to the changes in the financial system. There is reason to be optimistic about the effects on savings rates, given the fact that in many countries the range of savings opportunities available to most households is very limited and real interest rates available in the formal sector are often negative.

In any event, the objective of the analysis in the fourth step is to evaluate a range of options for generating the necessary resources from several quite distinct perspectives. By including the broader economic and financial perspective among these, it will be possible to discuss the full implications of proposals to increase housing investment with officials in the ministry of finance as well as housing officials. The end product of this step is the selection of a preferred "package" of resources.

The final step in the process is to map out in greater detail the institutional changes that will be required to implement the program that has been developed. Clearly, much of this work will have already

been done on a preliminary basis in the course of earlier parts of the analysis. Here one goes somewhat beyond this, so that there are a set of concrete steps defined for each source of financing.

The process just outlined is both ambitious and complex. The degree to which it is executed in any country will depend on the circumstances present. Especially critical will be the degree of cooperation received from local officials in evaluating the current financial system and in analyzing the possibilities and consequences of changes to it. In addition, the depth of the analysis accomplished will be sensitive to the total amount of time available for considering these questions and the complexity of the situation in the host country. For example, where government has been highly intrusive in financial markets, thus weaving a complicated web of regulations and controls, it will take more time to determine what is possible and how to improve the position of housing within the present arrangements.

We now turn to a selective discussion of what is involved in some aspects of the overall program just outlined, using Sri Lanka as our case in point. Appropriately, we begin with housing finance in the national economic environment.

Housing Finance in the National Economic Environment

General. Because housing is a very long-lived good, households must typically use savings to finance the construction and purchase of a home. In developed economies, this need for financing has been a major factor in the development of the financial services industry. Because households want to buy houses, they make deposits with depository institutions, thus converting their savings into financial assets. The

development of these intermediaries in turn has helped foster the development of commercial lending and insurance industries. This source of demand for funds not only creates an accompanying increase in the supply of such funds, it also yields scale economies to the development of the financial services industry allowing it to expand services at lower costs.¹

• On the other hand, in many countries the potential demand for funds for housing has pitted the household borrower against the borrowing needs of central governments and industrialists seeking preferential treatment. For example, in Sri Lanka, although the National Savings Bank can invest heavily (up to 40 percent of its portfolio) in mortgages, it holds almost only government paper. This "captive audience" for the supply of securities issued by the government clearly reduces the government's borrowing costs. However, as shown below, this reduction in government costs is not accomplished without costs to the economy.

Table 3.1, from a recent World Bank study of 38 developing economies, gives some empirical content to this charge. It shows the strikingly strong correlation between the real growth of domestic credit to the private sector and economic growth. If one reads down columns (2), (3) and (4) it is clear that the higher the share of the private sector in domestic credit the higher is the growth rate. This kind of correlation is not a coincidence. By allowing the private sector to

1. Muth (1983) provides an interesting discussion of the supply of funds effect. He shows that if savings is only slightly responsive to increases in return, then the homeownership tax subsidy in the U.S. almost increased the supply of savings by as much as the subsidy to homeownership increased the demand for the asset.

TABLE 3.1

CREDIT AND GROWTH

(1) Types of Countries	(2) Ave. Annual Growth of GNP Per Head	(3) Share of Private Sector in Domestic Credit		(4) Private Domestic Credit (% of GNP)		(5) External Public Debt (% of GNP)	
		1962	1982	1962	1982	1970	1982
High Growth	4.5%	65%	85%	13%	41%	14%	22%
Medium Growth	2.3%	92	65	13	28	22	46
Low Growth	0.9	89	31	13	16	29	47
Negative Growth	-0.9	68	26	8	13	22	51

Source: IMF International Financial Statistics Yearbook, 1984 and Supplement on Output Statistics, No. 8, 1984; World Bank, World Development Report, 1984.

compete in the capital markets, governments in high growth economies allow the capital markets to finance future-oriented investment projects (that sometimes fail) rather than cushioning sectors of the economy from past dislocations.

Less strongly correlated, but nevertheless a significant trend, is the relationship between economic growth and the growth in the share of GNP attributed to public debt. As the public sector debt increases (column (5)), the average growth level achieved declines.

This kind of focus is of interest for an analysis of Sri Lanka because Sri Lanka seems to fit the pattern of the countries doing well. That Sri Lanka has had a high growth rate of 5.0 percent and a relatively high share of the private sector credit in domestic credit of about 65 percent (World Bank Report 1984, p. 10) suggests that Sri

Lankan policy makes it well-placed to continue its rapid growth. However, this measure should be considered with a good deal of caution. The 1985 Booze-Allen Report prepared for AID indicated that the HG funds, for example, have not been considered as public funds, thus tending to overstate the private role. In addition, there is virtually no equity market in Sri Lanka. Consequently, there is probably greater reliance by investors on debt instruments in Sri Lanka than elsewhere. Moreover, inflation-correlated interest rates have rarely yielded a positive return to savers.

The point is that a good deal of caution is warranted, even though the simple measure of the amount of private sector credit in domestic credit is a very useful summary statistic for determining whether the government is serious about letting prices allocate credit in the financial system. Aggregation may tend to present Sri Lanka's private sector development in a more favorable light than is warranted by its regulatory structure. If so, Sri Lanka's recent high growth levels may be due more to fortuitous circumstances (e.g., higher tea prices and declining oil prices) than to pursuit of an enabling financial environment. Without a detailed capital budgeting perspective with comparable analytical definitions, it is simply impossible to assess the favorableness to development of the regulatory environment.¹ However, with that said, the measure does provide a conceptually simple way to think in terms of what share of resources are in fact allocated by prices.

1. An examination of budget concepts does not suggest that such analysis is very difficult, it is simply very important to have terms straight.

Financial Markets. The Government of Sri Lanka pursues this kind of de facto housing policy through its maintenance of a financial policy that targets resources to those sectors of the economy it deems deserving. Some manifestations of this kind of policy are:

- o negative inflation-corrected rates of return on deposits;
- o high and varying liquidity reserve ratios on financial institutions;
- o the lack of formal contractual forms, such as indexed mortgage interest rates, to deal with the adverse consequences of high and volatile interest rates;
- o the existence of a large number of non-private depository institutions that collect household savings at seemingly high administrative costs;
- o however difficult to measure exactly, the presence and vibrance of an informal financial sector; and
- o the use of an administrative mechanism to allocate financial resources at preferential rates to worthy sectors of the economy.

Until recently, all of these conditions appear to have been present in Sri Lanka (see Gardner, 1982). Hence, prior to the establishment of the new economic policy regime and AID involvement, it was not surprising to find the absence of a formal sector institution that intermediated between borrowers and savers for mortgage credit. It was also not surprising to observe that the Sri Lankan savings rate was relatively low, e.g., half the Indian rate. It seems likely that the same factors that helped direct savings away from the housing sector also discouraged saving itself. If so, the "side effects" of the regulatory policy may well have affected overall economic growth. The new (since 1977) policy environment has emphasized the role of the housing sector as one of those that would "lead" economic growth. However, ability to stimulate

this sector has been restricted by the aforementioned constraints on the existing financial system.

Measuring the Consequences of Financial Reform

The existence of impediments to the efficient functioning of a financial system can lead to the creation of substitute methods of financing, particularly for long-lived goods like housing. Intra-family loans, mutual savings systems, and employment-related financing schemes are all means by which households avoid the implicit taxes imposed on them by government regulations, and bring savers and borrowers together in financial transactions that fulfill the needs of both parties.

Some of these informal financing schemes can be quite efficient in their existing context. However, the fact that these systems do not co-exist with specialized economically self-sufficient financial intermediaries in developed economies suggests that: (a) formal financial institutions can, in the right environment, provide these services more efficiently and hence at lower cost; and (b) in places where such schemes do exist they are abetted either by the regulatory environment, the level of financial development, or both.

It follows that policies designed to give households more opportunities to place their savings in financial assets at market interest rates can lower the overall transaction costs of financing and, as we discuss below, reduce the "excess burdens" on the economy of the regulatory system. This is precisely the focus of the policy strategy that calls for Sri Lanka's State Mortgage and Investment Bank -- the major source of mortgage funds -- to diversify its borrowers so that it does not rely exclusively on Government, and for the establishment of

the deposit-taking Housing Development Finance Corporation (HDFC). Such policies increase the net return to savers which in turn stimulates more savings and more use of financial assets rather than real assets such as gold and land. Such shifts in savings patterns not only reduce transaction costs and increase savings, they very often make housing more affordable by reducing the demand for land.

One of the most vivid ways to compare the potential gains of various regulatory reforms is to compare the costs to the government and the economy of fulfilling housing needs with and without accompanying financial reforms. For instance, consider two ways of financing the construction of 3000 new housing units with mortgage credit of approximately 60,000,000 rupees: (1) Government borrows and lends to the SMIB through, for example, the government's National Savings Bank buying SMIB debentures, for on-lending to lower income households; and (2) the SMIB borrows directly in the credit markets to finance mortgage investments, or the Government implicitly charges the SMIB a fee that corresponds to a price for SMIB's competing with Government for funds.

GSL as lender to SMIB. Although the SMIB presently obtains funds from the government at 16 percent and lends at an average rate of 17 percent, it will be more elucidating if we deal with its possible financing arrangements with the Government. In 1984, the Government's cost of funds was 14 percent (World Bank Report 1984, p. 98). If we assume that another 1.5 percent is required to cover the costs of loan delinquencies and servicing, then Government could on-lend these funds to borrowers at a 15.5 percent interest rate without incurring any

explicit budgetary costs.¹ There is, of course, the implicit opportunity cost associated with the government's making the funds available to one sector rather to another. But more importantly, Government has had an obvious stake in keeping interest rates low to minimize the cost of financing its own large credit needs.

The fact that there are no budget any outlays associated with the SMIB's loans does not imply, however, that there are no economic costs involved. In order to determine if costs -- or an implicit subsidy -- are present we need to calculate the effective market interest rate for the transaction, and then compare this rate with the rate obtainable through our hypothetical loan transaction if it were offered by a private lender. But, observing either the effective rate in a credit market in which rates are set by Government or the rate that would have been charged for this loan by a private firm is impossible because of the extent of government intrusion in financial markets. Fortunately, an estimate of the implied market rate can be constructed fairly easily, and then through assumptions about supply and demand elasticities, an estimate of the rate that would have been charged in the market can also be computed.

The implied market rate will equal the expected inflation rate plus the servicing costs unique to the mortgage transaction plus the real rate of interest.² If we assume that (1) the servicing and delinquency costs are identical regardless of who makes the loan, i.e.,

1. As is discussed below this example is hypothetical. In fact GSL charges SMIB more for its funds than the minimum rate we discuss. The rationale for the particular example chosen will be clarified below.

2. See Buckley and Struyk (1985) for a more complete discussion of this concept.

1.5 percent, (2) the real rate of interest is equal to 5 percent, and (3) the expected inflation rate is equal to 13.5 percent, the rate that occurred over the past 8 years (since the enactment of the new policy regime),¹ then we are left with an effective rate of 20 percent. This measure of the effective rate receives indirect support by corresponding to the rate that Government allows commercial banks to charge for non-priority transactions.

The difference between the effective interest rate (20%) and the rate Government actually charges (15.5%) measures the amount of subsidy that would occur if the supply of credit were unconstrained by Government. However, this is not the case; Government controls quantity as well as price. Accordingly, to determine the size of the subsidy we need to know what the price would have been at the level of credit supplied. To do this we assume (1) that the Government simply tries to lend at the lowest possible budget costs, and (2) that Government attempts to maximize the amount of income transfers possible through the program.² These assumptions allow a fairly traditional deadweight

1. World Bank (1984), p. 2.

2. The former assumption implies that GSL will operate on the cost minimizing marginal cost MC curve; the latter assumption implies that GSL attempts to make the amount of income it can transfer as large as possible. This requires that it equate marginal revenue, MR, to marginal costs. We initially assume for simplicity that the amount of credit supplied is set by following such a decision rule. Of course, this is not the case, but by considering it we can show the amount of efficiency gains relative to the worst possible case. It was to implement some non-arbitrary decision rule, such as $MC=MR$, as to how much credit should be supplied that we selected our hypothetical example.

economic loss analysis to be done which provides a measure of the waste involved in these arrangements.¹

The regulatory subsidy implicit in this borrowing arrangement is on the order of 40 percent, i.e., the difference between the hypothetical minimum no-loss rate that could be charged by Government, 15.5 percent, and the 25.5 percent rate that private lenders would charge at the level of credit supplied. This subsidy represents the transfer of funds from the financial asset holders who financed this program to the program recipients. The additional indirect economic costs are equal to another 15 percent.² In other words, our ostensibly costless program has economic costs equal to 55 percent of the program size. Forty percentage points of these costs are borne by the holders of debt instruments who have been receiving a negative rate of return on their savings. The other 15 percentage points of loss represent a loss to the economy as a result of the intervention.

Because lower income households are likely to have fewer portfolio options, it is possible that they will bear a significant

1. See most standard text on microeconomics for a discussion of this notion. Simply put, the notion provides a measure of how much resources are lost completely due to the government intervention. Such losses are characterized as being "deadweight" because they are foregone by the economy and not transferred from one individual to another.

2. The formula for computing this excess burden is

$$0.5T [1/(1/SE - 1/|DE|)] = \text{Excess burden}$$

where T is the tax rate assumed to be 0.4;

SE is the supply elasticity assumed to be equal to be .4;

DE is the demand elasticity assumed to be -1.0.

Since the credit has to be rationed, this understates the amount of deadweight loss.

share of the costs that are redistributed.¹ Hence, although this program directs credit to lower income households it most likely does this by lowering the return to savings of this same income group. Whether or not the program changes the distribution of income is not at all obvious. However, what is clear is that overall income is reduced for the economy. The indirect costs mentioned above are resources that are simply lost to the society.

SMIB as a direct borrower. Now consider the second approach -- either SMIB borrows directly in the credit markets to finance the loans (the approach recently permitted by Government), or Government charges SMIB a fee for its funds which is effectively the same thing.

Again, due to the structure of the credit market controls, our example is hypothetical. Nevertheless, the implications of our calculations are straightforward. Suppose, to compete with Government, SMIB borrows at 2.5 percent above the Government borrowing rate, i.e., 16.5 percent, and on lends at a rate of 18 percent.² This would provide a positive, although still depressed, return on assets at a mortgage rate that is affordable according to the 1982 AID Study.³ It would also

1. For example, in Gardner's AID Study (1982) p. 14, he indicates that one lender believes that without GLS intervention deposit rates would fall; this is despite the fact that they are already negative. The same situation occurs in Jamaica where the government pursues an interest rate floor policy that according to the Bank of Jamaica is designed to prevent the exploitation of lower income savers.

2. In fact, as noted, SMIB receives its funds at 16 percent and on-lends at 17 percent.

3. These rates more closely approximate the interest rate policy pursued by GSL before permitting SMIB to borrow directly. Consequently the movement to market rates will add efficiency gains to those already achieved through GSL's already charging SMIB a rate above that which will maximize the amount of income the program redistributes. In effect, then, the hypothetical gains here have already been achieved through AID's insistence on greater cost recovery. This assumes that interest rates are determined by a movement along the marginal cost curve.

reduce the implicit subsidy to borrowers to about 30 percent and the indirect losses to the economy would fall to about 7 percent. The overall economic costs of the program are almost cut in half, and deadweight losses fall by almost 5 million rupees out of a base of 60 million rupees.

It is clear that the direct effect of increasing interest rates increases Sri Lankan housing needs, because households would be able to support smaller loan principals with a given monthly payment.¹ In fact, our hypothetical interest rate increase causes the cost of credit to increase by 16 percent -- from 15.5 to 18 percent. However, the higher interest rates also produce efficiency gains that are equal to half the increase in mortgage costs. For example, if the latter approach permanently replaced a government credit allocation system at the lowest possible rates, the present value of the savings of deadweight losses eliminated can be calculated by a perpetuity that discounts the Rs. 5 million annual savings at the government's real discount rate. If this rate is 5 percent, as we assumed earlier, the present value of total savings equals Rs. 100 million. Hence, a significant portion of the increase in housing resource needs could be offset or "paid for" by the reform.

The "winners" from this kind of reform will tend to be the general population who will receive small gains from the greater economic efficiency. Other winners will be additional households who

1. The indirect effects of a program of this size on interest rates generally would be zero if the program were put into effect in isolation. The amounts discussed are equal to less than 2 tenths of 1 percent of total savings.

will be able to obtain mortgages from the increased pool of funds generated. The losers will be those households who have to pay higher interest rates for housing who formerly would have obtained cheaper loans. Thus, since our example is very similar to the policies recently enabled by legislation in Sri Lanka (but not yet implemented), one can argue that current policies will indeed reduce housing needs at a greater rate for a given level of government expenditures.

Resource Mobilization -- Further Possibilities for Formal Finance

While the expansion of SMIB mortgage lending by permitting it to compete for saving in the market is an important step, the low savings rate and after inflation yield on financial assets suggest that additional reforms in the financial sector are needed, to mobilize adequate funds for the housing sector. Two possibilities are discussed in this section: development of a secondary mortgage facility and development of better ways of allocating the interest rate risk of long term loans.

Secondary mortgage market. To examine the kinds of specific reforms that would be helpful to a secondary market facility, it is important to consider first the functions of such a facility. In effect, it can accomplish two ends: (1) widen the range and source of savings supply that can be used for mortgage credit, and thereby allow the housing sector to compete for savings beyond those offered to the deposit market; and (2) permit more specialization and investment in particular attributes of mortgage credit. Investors can, as a result, invest in those parts of the mortgage asset that they find attractive

without buying the whole loan, and its accompanying management and institutional concerns.'

To accomplish these ends, a secondary market institution must be able to access the credit markets on an equal footing with government borrowing. Otherwise, the creation of a new institution will not somehow magically add resources to the sector. Such an institution is, in effect, an instrument that permits households to compete with funds demanders other than depositors. If it is not allowed to compete, it adds no benefits, and as the previous section showed, the institution as well as the economy, bears a regulatory tax through the deadweight losses of credit allocations.

In summary, an issue in the development of Sri Lankan housing finance policy is one that is a frequently debated issue on the appropriate form of intervention in a developing country's housing finance system: What is the likelihood of establishing a successful secondary mortgage market and what factors can the analyzers examine to make a judgement as to the likelihood of success? On the one hand, there are those who cite the U.S. experience with a secondary market as an example of how things might work. On the other hand, however, in the U.K. and Canada the housing finance systems function effectively without such institutions. Furthermore, in many developing countries, for example, Jamaica and the Philippines, these institutions have failed to serve their intended purposes fully, even though in the Jamaican case U.S. secondary market experts helped set up the facility.

The success of such institutions and indeed the success of mobilizing savings beyond those available to depository institutions

depends first upon the need for such funds, and secondly on the ability to access them. Often, the housing sector gets very little of the funds mobilized through existing deposits. If this is the case, it may be more effective to induce existing intermediaries to increase their mortgage lending rather than attempt to set up competing institutions that suffer from the same competitive disadvantages in the credit markets vis-a-vis government borrowing.

As was the case with attempting to use simple summary statistics that can quantitatively describe a country's overall financial environment, great care should be exercised in determining the competitiveness of a secondary market facility, but some of the more important considerations are:

- o the share of deposits going to mortgage credit,
- o the profitability of public depository institutions,
- o the amount by which non-bank financial reserve requirements exceed those necessary for fiduciary responsibilities.
- o the type of risk exposure to which the institution is subject.

If the required reserves at depository institutions are far in excess of those necessary for fiduciary soundness -- a ratio which, for example, ranges from 4 to 8 percent in developed economies -- it is likely that those reserves are being used to favor financial instruments that will compete with those of the secondary market facility. If deposits are being collected by unprofitable government backed depository institutions, then a secondary market facility will face subsidized competition for resources. Conversely, if a large share of household sector savings are already going into mortgage credit, a secondary market facility will probably help households but not

housing; funds will be used for other purchases rather than housing as they have been in the U.S. Finally, a secondary market facility does not need to take on a great deal of risk -- interest rate, exchange, or credit risk -- to perform its functions. To take such risks probably is to implicitly subsidize mortgages or lenders. A private sector mortgage finance system does not need regulatory advantages. But similarly, it simply cannot compete in a strongly disadvantaged environment. In the next section we consider how this kind of risk subsidy can be detected and summarized succinctly.

Affordability and risk. The USAID study of Sri Lanka (Gardner, 1982) spent a good deal of time discussing the efficacy of alternative mortgage instruments in reducing mortgage payment burdens, and in fact it appears that Sri Lanka has begun experiments with a number of such loan instruments. It is clear that many such instruments can lower monthly payment burdens. However, there are at least two questions related to this gain: (1) Are subsidies necessary to induce lenders to make such loans available at affordable rates in the existing regulatory environment? In other words, do the existing regulatory taxes on non-government debt reduce the return on mortgages by so much that the only loans that are commercially viable are not affordable? (2) What is the risk exposure implied by the various possible alternative mortgage instruments? For example, depending upon the rate of graduation, a graduated payment mortgage increases the lender's (in the Sri Lankan case government's) interest rate risk exposure. This is neither bad or good, but it is the trade-off that is being made in order to increase affordability. Analysis done within the Housing Finance Strategy Methodology should be able to provide simple summary statistics on changes in risk exposure against the amount of expenditures needed to fulfill housing needs.

For example, our earlier example showed how Sri Lanka market rate loans at 18 percent could reduce the economic costs of the transaction by a significant amount. The initial payments on this loan could be reduced without reducing yield if a provision were added that indexed monthly payments increase, for example, by half the increase in the minimum wage rate, unless the mortgagor could show that his or her wage has not kept pace with the minimum wage. If wage increases followed the pattern of the past 8 years this loan could be issued at an initial rate of 9 percent and produce roughly the same effective yield as an 18 percent loan. Furthermore, even with the indexation, household mortgage payment burdens would have fallen from 25 to 14 percent of incomes if such indexation had been structured 8 years ago.

The risk of such a contract form is, of course, that real wages may not continue to increase as they have in the past. If they do not, someone bears the risk. Simple comparisons of how much it might cost Government if a certain scenario occurred against how much does that risk reduce the need for government expenditures can be easily computed. Such calculations provide a measure of the possible gains from risk assumption and so afford a better basis for decision making. Again, however, the type of measurement made should be tailored to the situation at hand.

The idea here is to construct simple summary statistics of the amount of maturity imbalance and default risk exposure of the portfolios of households and lenders that are associated with different financing forms. For example, Laughlin Currie, an early director of the World Bank, shares the Sri Lankan Government's view that the housing sector can be a leading sector for development. He argues that a major obstacle to such development is the cash-flow problems for households imposed by fixed-rate mortgages. Hence,

such risk-taking would seem to be consistent with the policy thrust of the Sri Lankan Government. On the other hand, trying to shift all or much of this risk to households with fully indexed mortgage instruments may well create the kinds of problem that lie at the center of serious financial problems in Brazil and which can be related to less serious financial problems in Canada and the U.K. The need for balance is clearly important.

A secondary idea, that seems particularly relevant to the Sri Lankan case, is to show that alternative mortgage instruments cannot solve the financial viability problems posed by regulations that restrict access to credit. In short, they can only be productive if prerequisite conditions are met. Otherwise, they simply become creative ways to obscure the scale of subsidy involved in a financial transaction.

Summary

As we said in the introduction to this chapter, the Housing Needs Assessment makes three simplifying assumptions:

- (1) there are no major bottlenecks in the economic delivery system,
- (2) the programs used do not have major effects on the incentives of households involved other than to induce them to upgrade their housing, and
- (3) the economy functions as anticipated.

In Sri Lanka, and in many other developing countries, these assumptions are perforce heroic. Extending the analysis to consider housing finance issues is an important way to relax these assumptions so that the true costs and benefits of various policies can be made more explicit. This type of analysis is particularly important in an economy like Sri Lanka with its policy of regulatory bottlenecks that both affect the costs of various policies and

significantly affect the savings and portfolio incentives of households. The AID dialogue with the Government of Sri Lanka also gives a good deal of weight to the importance of this kind of analysis, as evidenced by the attention given to de facto housing policy in the recent project paper. The Methodological approach outlined here affords an effective means of examining and quantifying the effects of this de facto policy.

A premise of our Methodology is the assumption that in response to higher risk-adjusted real interest rates on financial assets, households either increase their savings or shift savings habits. Accordingly, if policies can be implemented that (1) eliminate restrictions that artificially lower interest rates; (2) allow risks to be shifted to those with a comparative advantage in such risk-bearing; and (3) permit households to compete for funds so that they can finance the assets they prefer, such as housing, then it is very likely that the pool of savings available will increase.

This increase in savings, together with the reduction in transaction costs associated with improving the financial system, represent new resources that are available to the economy. These resources can also be used for the housing sector, or to offset some combination of the higher costs of government borrowing, the reduction in the demand for other capital, or the needs for government spending to offset the higher charges. Identifying those sectors of the economy that will lose as a result of a more efficient financial system is not possible without greater specificity about institutions and the proposed changes in them. Nevertheless, the concept is very much like tax reform. One cannot expect sectors of the economy to give up the inefficiencies that help them for the general public good. Hence, even

policies that are truly self-financing in the larger economy-wide sense will not be agreeable to all sectors of the economy. Extending the housing needs assessment model to consider mobilization will not resolve these issues. However, it can serve to bring them more clearly into focus by identifying (1) the costs of various regulations on both the housing sector and the economy generally, and (2) the risks involved with various strategies that are designed to stimulate the housing sector.

4. DEPLOYING THE RESOURCES

The last chapter worked through many issues raised by the task of mobilizing the resources necessary to carry out a general program for improving a nation's housing, while at the same time strengthening the operation of financial markets generally. The task at hand now is to determine how best to deploy these resources. "Best" in this context focuses primarily on the ability of competing deployment strategies to raise the quality of housing occupied by lower income households above the minimum standard defined by a country's policy makers.

The deployment strategies that are feasible will depend to a certain degree on the sources from which funds are mobilized, as well as on their comparative effectiveness. For example, funds raised through the formal finance system are less likely to be made available for government programs, although this could happen if government sold debt instruments to these institutions or otherwise reduced their liquidity and devoted the funds to its housing programs.¹ On the other side of the coin, government appropriations for the housing sector are less likely to be on-lent to banks than to support housing development more directly, although there are important exceptions. As noted earlier, the Sri Lankan Government has supported the SMIB (a state bank) with appropriations, and it provides some support to a private institution. Several countries use government appropriations to operate secondary

1. Depending on the interest rates paid, this could destroy the incentive for these institutions to raise additional funds.

facilities that purchase mortgages from private banks and savings associations, with the latter continuing to service the loans.

Even with their exceptions, these examples indicate the importance of considering the way in which funds are mobilized as well as the volume available to the housing sector in designing a strategy for employing the funds. The combination of the constraints imposed by funding sources and the alternatives for using the funds suggest that deciding on a superior deployment strategy will definitely be an iterative process, and that the possibilities explored may differ considerably among countries. Because of the substantial number of possibilities to be explored and the complexity of the effects to be taken into account (e.g., the extent of improvement in dwelling and infrastructure quality by income group), development of a simulation model to explore the alternatives was undertaken as part of this project.

The balance of this chapter consists of four sections. The first outlines generic types of housing initiatives that could be undertaken using the resources available to raise a country's housing quality. The second section provides an overview of the structure and capabilities of the simulation model used in the analysis of the alternatives -- the Housing Quality Model. The third section illustrates the use of the model for the urban areas of Sri Lanka, using it in the analysis of three different housing policies separately, and in a case in which interest rates are raised as part of a strategy to

attract more funds into the housing sector.¹ The final section outlines additional types of analyses that would be undertaken as part of a full implementation of the Housing Finance Strategy Methodology to a country.

Defining the Alternatives

There appear to be four broad ways in which either financial resources can be directly introduced into the housing sector or the demand for these resources by households in the sector can be stimulated: expansion of formal housing finance, provision of infrastructure, improving tenure security, and sites-and-services or direct construction projects. It should be clear that these approaches can be combined in a variety of ways. For example, households wishing to purchase units at a sites-and-services project could arrange their financing independently, including obtaining a loan from a formal housing finance institution. While it is possible to think of housing finance as simply an input into the production process (like land, labor, and materials), and not as a separate type of program, we have found it expositionally more effective and more consistent with the actual structure of formal housing finance in developing countries to treat it as a separate "intervention".

Below these four ways of effecting the supply and demand of housing finance are reviewed in turn. Then some general observations on how to judge their relative efficacy are provided.

1. Analyses for rural areas could also have been undertaken. This did not seem advisable at this time, however, since frequent changes were being made to the algorithm during the initial policy analyses.

Expansion of formal housing finance. This type of policy can take many forms. Funds can be made available by making private housing finance institutions more competitive in attracting funds, establishing a secondary purchase facility or market, or by other government action, possibly involving its funding public banks. More importantly for the present analysis, the volume of loans issued can be increased without any meaningful change in terms, or a lending program more targetted to households in marginal housing conditions can be established.

Provision of infrastructure to areas lacking adequate services -- particularly water and sanitation -- has been shown to have the double effect of directly upgrading some services and stimulating additional investment in affected dwellings.¹ A considerable range of program design exists. Some programs have been grant programs under which the new services are provided exclusive of charges; more typical is one in which some of the capital costs are paid for at the time of installation and the balance is paid over time through service fees. In some cases, loan programs (possibly for unit improvements as well for the households' share of the capital expenses) are part of infrastructure programs.

Provision of secure tenure to homeowners lacking clear title to their properties has also been documented to stimulate investment in housing. Financing for purchase of the lots could come from earmarked

1. A review of the effects of these various approaches on the quality of housing obtained by direct beneficiaries is presented in Annex B of the paper describing the Housing Quality Model in greater detail.

pools of funds from government or private institutions. Such loans could also incorporate additional funds for improvements to the units.

Sites and services and/or direct construction projects. This category encompasses all programs in which the government or private developers sell sites offering adequate infrastructure accompanied by differing degrees of structure. Like the previous two types of policy, sites and services or direct construction programs are often accompanied by an earmarked pool of housing finance.

In thinking about which of these programmatic approaches to employ there are at least three sets of factors that should be considered. The first is the impact of the program, per dollar spent, on the quality of housing occupied by the target group, i.e. those living in inadequate housing. Such impacts in turn depend on several conditions. One is the extent to which the resources do in fact reach the intended beneficiaries. Many programs nominally serve a target group but in fact are designed and administered in ways that cause this good intention to be realized only to a limited extent. The analyst must ask realistically what the extent of leakage will be. Another condition determining the extent of impact is the amount of housing investment the program will induce households to undertake from their own resources as well as from resources offered by the program. Both immediate additional investment at the time of infrastructure upgrading, for example, and investment occurring more incrementally over an extended period should be considered. Finally, the cost per dwelling or household assisted by the program is crucial, not only because of the effects on efficiency but because it determines the number of units that

can be improved out of any given tranche of resources. In this regard, one is interested in both the total resource cost per unit of undertaking the program and the net cost or subsidy to the government, if any.

The second factor to consider in judging the effectiveness of a deployment program is the match between the sources of funds and the institution that would administer a particular program. Examples were provided earlier of mismatches. An additional example that seems especially relevant here would be of the difficulties of inducing private institutions to make small loans in support of infrastructure improvements in low income areas where properties do not have clear titles. While there is often some way to reduce the awkwardness of such mismatches (in the case at hand, through government insurance on the loans perhaps), these often impose complex institutional arrangements that may not be worth it. For this reason, it is valuable to keep the link between sources and uses of funds in mind in designing both mobilization and deployment schemes.

Administrative feasibility is the final factor affecting a program's overall utility. Feasibility has two distinct dimensions. The first is the cost per unit of carrying out the requirements of the program. Examples of excessive cost come quickly to mind, as when the administrative cost of a small loan program can make loans very unattractive if borrowers must pay the full administrative cost. The second dimension is administrative capacity. Capacity may be tested by a single complex program; multiple complex programs might effectively paralyze an agency. An honest look at administrative capability may

call for two programs being phased in sequentially over several years. Alternatively it may argue for a mix between public and private administration, especially for loan programs.

The Housing Quality Model, to which we turn directly, deals explicitly with the efficiency with which different programs and combinations of programs succeed in improving the housing of households in the target group. It also sheds some light on the degree of mismatch between funding sources and uses. On the other hand, it has little to say about administrative issues per se, beyond requiring the analyst to explicitly describe the mechanics of each program.

The Housing Quality Model -- An Overview¹

The Housing Quality Model projects year-to-year changes in the housing conditions of developing countries under alternative policy scenarios. There are two important features of this model that need to be established at the outset. First, the Housing Quality Model can best be understood as a record-keeping or accounting model, rather than as a behavioral model; most behavioral assumptions must be explicitly supplied by model users when they assemble the required data inputs. Second, this is primarily a demand-side model, focusing on the capacity of households to achieve improvements in their housing circumstances, either independently or through participation in publicly sponsored assistance programs. Supply constraints are reflected in the cost of various housing options and in interest rate trends, but the Housing

1. For a complete description of the model, see Turner and Struyk (1985).

Quality Model does not attempt to represent supply behavior endogenously or to simulate a market clearing process.

The Housing Quality Model classifies households according to income, tenure, and housing condition. Users specify the initial distribution of households within the classification matrix, and the model then simulates year-to-year shifts by households between cells in the matrix. Table 4.1 illustrates this fundamental classification scheme for households in three income deciles, using 1983 data for Sri Lanka's urban housing sector. Within each income decile, households are assigned to one of four possible tenure categories:

- o Secure owners -- possessing clear title to their properties;
- o Squatters -- owners lacking title or secure tenure;
- o Unit renters;
- o Room renters.

In Sri Lanka, virtually all owners have clear title or are quite certain of their rights to remain on their property. Therefore, no households are assigned to the "squatter" category.

Within each tenure category, households are distributed across six possible dwelling statuses, defined on the basis of structural adequacy and infrastructure acceptability. In Sri Lanka, structures are defined as (1) permanent -- and therefore presumably adequate; (2) semi-permanent -- not fully adequate, but upgradable; or (3) improvised -- inadequate and not upgradable. Infrastructure is defined simply as either acceptable or unacceptable, on the basis of drinking water and toilet facilities.

TABLE 4.1

**THE HOUSEHOLD CLASSIFICATION MATRIX:
URBAN SRI LANKA, 1983**

	<u>Secure Owners</u>	<u>Squatters</u>	<u>Unit Renters</u>	<u>Room Renters</u>	<u>Total</u>
<u>Income Decile 1 (low):</u> 60462 households					
Permanent Structures-					
Acceptable Infrast.	5.043%	0	3.089%	6.473%	14.605%
Unacceptable Infrast.	25.175	0			
Semi-Perm. Structures-					
Acceptable Infrast.	0.597	0	0.366	0.766	1.729
Unacceptable Infrast.	10.213	0	7.897	4.501	22.611
Improvised Structures-					
Acceptable Infrast.	0.067	0	0.041	0.086	0.194
Unacceptable Infrast.	3.317	0	2.545	1.563	7.425
Total	44.412	0	33.946	21.640	100.000
<u>Income Decile 2:</u> 60462 households					
Permanent Structures-					
Acceptable Infrast.	5.367%	0	1.494%	3.896%	10.757%
Unacceptable Infrast.	23.656	0	18.177	15.007	56.840
Semi-Perm Structures-					
Acceptable Infrast.	0.635	0	0.177	0.461	1.273
Unacceptable Infrast.	9.747	0	7.018	6.301	23.066
Improvised Structures-					
Acceptable Infrast.	0.072	0	0.020	0.052	0.144
Unacceptable Infrast.	3.179	0	2.233	2.065	7.477
Total	42.657	0	29.559	27.782	100.000
<u>Income Decile 10 (high):</u> 60462 households					
Permanent Structures-					
Acceptable Infrast.	54.289%	0	6.053%	0	60.342%
Unacceptable Infrast.	7.687	0	0.009	0	7.696
Semi-Perm Structures-					
Acceptable Infrast.	6.427	0	0.717	0	7.144
Unacceptable Infrast.	15.745	0	1.452	0	17.197
Improvised Structures-					
Acceptable Infrast.	0.725	0	0.081	0	0.806
Unacceptable Infrast.	6.216	0	0.598	0	6.814
Total	91.088	0	8.910	0	100.000

Starting with this initial distribution of households, the Housing Quality Model records year-to-year shifts by households from one cell to another, and computes the resource requirements generated by these tenure and dwelling status transitions. The transitions of primary interest to model users stem from publicly-sponsored housing assistance initiatives, but significant changes in the distribution of households also occur in the absence of government interventions. Therefore, the Housing Quality Model begins by simulating a set of "natural" or "no government" transitions, and then simulates additional transitions brought about by publicly-sponsored programs.

There are three sets of transitions that the Housing Quality Model simulates each year, even in the absence of government interventions. These include (1) the addition of net new households; (2) improvements in the existing stock of housing units -- from semi-permanent to permanent structures, and from unacceptable to acceptable infrastructure; and (3) replacements of units lost due to depreciation. The Model's treatment of each of these "natural" transitions is now discussed in turn.

Each year, the distribution of households is altered by in- and out-migration from the sector, by deaths, and by new household formations. Model users must specify the net increase or decrease in each income decile, and the tenure distribution of newcomers to each decile. To illustrate, for urban Sri Lanka, each decile is assumed to increase by 1315 households annually between 1983 and 1988.¹ Due to the

1. Note that the Model is capable of simulating net reductions in the population of any or all cells in the household classification matrix, as well as net household growth.

constraints imposed by a strict system of rent controls, none of these net newcomers is assumed to become a unit renter. Instead we identify them all as either owners or room renters.

Given this information about net newcomers to the housing sector, the Housing Quality Model distributes newcomers across dwelling statuses, based on the initial household distribution. The model then updates the count of households in each cell, and computes the aggregate level of resources that must be generated to house these newcomers. In other words, the Model calculates the total level of resources needed to build new housing units to accommodate each year's net newcomers.

After accounting for net newcomers, the Housing Quality Model adjusts the household classification matrix and computes resource requirements for transitions by existing dwelling units from one status to another. To illustrate, in urban Sri Lanka exogenous estimates indicate that the stock of permanent structures with acceptable infrastructure is augmented by about one percent annually by means of upgrades from the existing stock.¹ This implies that a small number of dwelling units shift between statuses each year. Given a user's estimates of these transition rates, the Housing Quality Model adjusts its counts for each cell in the household classification matrix, and computes the aggregate level of resources necessary to finance these upgrades.

The last set of "natural" transitions simulated by the Housing Quality Model consists of replacements for dwellings that drop out of

1. Again, the Model can accommodate net downward transitions as well as the low level of upgrading observed in Sri Lanka's urban housing sector.

the housing stock due to depreciation. A fraction of the dwelling units in each status must be replaced each year with newly constructed units. This set of calculations does not affect the distribution of households within the classification matrix, but it does increase the level of new construction and require additional resources.

Once the Housing Quality Model completes its processing of newcomers, transitions, and replacements, it sums up the implied levels of new construction for each dwelling status, and the aggregate level of financial resources consumed. Finally, total resource requirements are allocated between formal financing and savings/informal financing, based on the user's estimate of the total volume of formal loans available and its distribution among income deciles. For example, in urban Sri Lanka we estimated that Rs. 95 million in formal loans are made annually, but only to owner-occupant households in the top three income deciles. Therefore, Rs. 95 million of the resources required by these high income households are allocated to savings/informal financing.

Now the Housing Quality Model goes on to simulate the impacts of any publicly-sponsored housing assistance programs specified by the user. Three types of policy are currently programmed into the Model, and a user can specify any number of programs of each type for each simulation year. The three types of policy simulated are (1) expanded availability of formal finance; (2) infrastructure improvements; and (3) sites and services or direct construction programs. Each of these is now discussed in turn.

The Housing Quality Model can simulate a wide variety of policies that expand the availability of formal finance. Since the user

specifies both the loan terms and the expected allocation of loans, simulations can explore the relative impacts of policies that simply expand the volume of loans available, as well as targetted loan programs and subsidized interest rate loans. (Note that savings and informal financing are grouped together in this analysis because we know so little about the operation of the informal housing finance sector in Sri Lanka. The simulation model could easily be modified to accommodate separate treatment of the two sources.)

Based on the user's specification of loan terms and expected allocation, the Housing Quality Model performs the following four-step process for each participating income/tenure/dwelling status group:

- o Calculate the maximum loan households can afford to borrow, given income available for housing investment and loan terms.
- o Determine the total house value households can afford, given the loan amount, savings/informal financing, and equity from a current dwelling.
- o Shift participating households into the highest tenure/dwelling status category they can afford.
- o Increment cumulative totals for formal financing, savings/informal financing, and public subsidies, if any.

When the Model has completed these calculations it can report the number of participants by income class, changes in the distribution of households across tenure and dwelling status categories, new housing production levels by dwelling status, and changes in the allocation of housing resources between formal financing, savings/informal financing, and government spending.

The second type of policy simulated by the Housing Quality Model consists of programs to improve infrastructure -- particularly water and sanitary facilities. These programs can be accompanied by

earmarked loans, but need not be. Again, the Model offers users the opportunity to specify a wide range of programs, varying the required household contribution, subsidy levels, loan terms, and the expected allocation of assistance.

The Model assumes that, by definition, all participating households shift to "acceptable infrastructure" cells. In addition, however, some participants may be able to afford to upgrade their dwelling units at the same time, or over the next several years. Therefore, the Housing Quality Model shifts participating households into the appropriate dwelling status category, and schedules some participants for further upgrades in subsequent years. Finally, the model increments cumulative totals for investment levels, formal financing, savings/informal financing, and government subsidies.

The last policy the Housing Quality Model can simulate are sites and services or direct construction programs. In policies of this type, participants are assumed to move to new dwelling units, but the Model user can specify whether these are completely finished dwellings, shell units, or simply serviced sites. Moreover, the user specifies the required household contribution, subsidy levels, and earmarked loan terms, if any. As in the infrastructure policy, some participants may be able to afford to upgrade shell units or serviced sites immediately, or within the next several years. Therefore, the Model allows each participating income/tenure/dwelling status group to shift to the best dwelling status category it can afford, and schedules some participants for further shifts in subsequent solution years.

Analyzing Policies

In this section we illustrate the use of the Housing Quality Model for a range of policy analyses. In particular, three sets of simulations about developments in urban housing in Sri Lanka for the 1983-1993 period are presented. The first is the "no government" or base case, in which we study the development of housing over the decade in the absence of any government interventions to improve housing conditions. Mortgage lending by the parastatal SMIB does continue in the base case scenario.

The second set of simulations presented introduce greater government activity in housing finance. In the first of these simulations, the mortgage lending program of the SMIB is doubled, with the loans targetted to moderate income households who are able to purchase at least sites-and-services type units. The second part of this pair of simulations increases the mortgage interest rate on all loans made by the SMIB. This increase is caused by the SMIB entering financial markets to raise the funds it lends and having to pay rates competitive with government borrowing rates to secure funds. The results of these simulations suggest the kind of adjustments in housing investment that may be necessary to accommodate short-term reform in the housing finance system.

The final set of simulations introduce two traditional government programs to assist lower income households obtain adequate housing. The base case SMIB lending program also continues in these scenarios, but the low income initiative is dropped. The first program provides for the development of sites-and-services projects similar to

those being planned as part of the Million Houses Program. The second offers the improvement of infrastructure services to units not possessing adequate services at the start of the period. This simulation roughly models the very extensive initiatives that the Government of Sri Lanka has undertaken in recent years to improve infrastructure services in general, not just as part of slum upgrading projects. Consistent with evidence from other countries, it is assumed that improvement of infrastructure services induces households to invest in upgrading their dwelling units to some extent as well.

The "no government" or base case. A base case is designed to provide a frame of reference for policy simulations. In reality it is very difficult to approximate a true "no government" case because governments have typically been active in a country in a variety of ways, and this almost precludes isolating what would happen without its actions. As outlined below, for Sri Lanka we believe we have been able to develop a serviceable if not perfect baseline.

In the base case, as well as the policy cases, many of the inputs come from the Housing Needs Assessment done for Sri Lanka for the 1983-2003 period. These include demographic developments over the period, the broad sweep of macro-economic developments, the rate at which dwelling units are removed from the housing stock, the cost of new housing at different quality levels, and the share of income devoted to housing investment by households in different income groups.

Several additional data inputs have been developed for operation of the Housing Quality Model. Among them are a more detailed distribution of households in each income decile among the six housing

quality and four tenure group categories outlined in the last section.¹ Also defined have been the annual transition rates for units being upgraded and thus shifting between one housing quality category and another. These rates were computed using data from the 1971 and 1981 censuses; they indicate the rates at which units built of semi-permanent materials are improved to permanent materials or obtain sufficient infrastructure services for them to meet the minimum infrastructure standards.² These rates appear to be fairly reasonable for the "no government" case even though they are based on total upgrading figures, since government housing upgrading programs were small during this period and the major water and sanitary investment programs were just getting underway.

With these data as inputs, the Housing Quality Model (HQM) for the base case simulates the future development of urban housing in Sri Lanka. More specifically, each year it adds new households to urban areas and allocates them to housing units ranging from high quality owner-occupied units to rented rooms in improvised structures. Units are assumed to leave the active housing stock at the same rate as they have historically, and these units are replaced with units of similar quality.

1. These computations are detailed in Annex A of the accompanying paper describing the Housing Quality Model.

2. The specific standards are also described in Annex A of the paper. Note that some differences between the standards used here and those in the Housing Needs Assessment have been introduced because of lack of comparability between the data sources used in developing the input data for the two models. In particular, we had to employ data from the 1980/1981 Socio-economic Survey for this work because it included income information, while the needs assessment relied on census data which contained more information on housing quality.

The base case also explicitly incorporates the improvement of units, both in the materials from which they are constructed and in their quality of infrastructure services; such upgrading, if sufficient, moves them from one housing quality category to another. Finally, the base case includes mortgage lending by the SMIB for some 3,000 units a year, consistent with its activity level in 1983.

Housing investment is computed as the sum of that for new construction and upgrades. Construction is undertaken to meet the demands of new households and to replace units withdrawn from the housing stock. Investments are generally computed as the capitalized value of the income going to housing investment. Investments in upgraded units are computed as the difference between the value of the "entry level" or minimum cost unit in the original quality category and the larger of the cost of the entry level unit or the value of the unit the household can afford based on its capitalized income subject to an upper limit.¹

If past trends continue and the economy behaves as forecast, what would have happened to housing conditions in urban Sri Lanka for the decade ending in 1993? Table 4.2 summarizes the shifts in the quality of housing occupied over the period. The six columns of the tables display the housing quality categories distinguished by the

1. Entry level costs are defined in Annex A to the report describing the HQM. The upper limit is three times the entry cost. This limit operates only in the lower housing quality categories where it has the effect of restricting investments by higher income households assigned to such units to reasonable levels. Note again that the distribution of households in each income decile among housing quality levels is based largely on data from the 1980/81 Socio-economic Survey.

TABLE 4.2
 PERCENTAGE DISTRIBUTION OF HOUSEHOLDS BY DWELLING QUALITY:
 BASE CASE

<u>Income Decile^a</u>	<u>Perm/ Pass^b</u>	<u>Perm/ Fail</u>	<u>Housing Quality Classes</u>			
			<u>Semi-perm/ Pass</u>	<u>Semi-perm/ Fail</u>	<u>Improvised/ Pass</u>	<u>Improvised/ Fail</u>
2nd - 1984 ^c	11	57	1	23	d	7
1993	15	58	1	18	d	7
4th - 1984	18	50	2	22	d	7
1993	21	52	2	18	d	7
6th - 1984	27	41	3	21	d	7
1993	29	43	3	17	d	7
8th - 1984	34	35	4	20	d	7
1993	35	37	3	16	d	7
10th - 1984	60	8	7	17	1	7
1993	62	11	6	14	1	7
<u>All Households</u>						
<u>% Distribution</u>						
1984	28	40	3	20	d	7
1993	30	42	3	17	d	7
<u>No. of Units (000s)</u>						
1984	176.2	247.2	20.4	126.9	2.3	44.7
1993	223.0	309.4	22.7	126.8	2.8	53.5

a. 1st decile is the lowest income decile.

b. Standards are as follows:

Units

- permanent is a unit with roof, walls, and floor made of permanent materials
- semi-permanent is a unit with at least one of the roof, walls, or floor constructed of permanent materials
- improvised as a unit - not constructed of any permanent materials; such units are classified as not upgradable

Infrastructure

- pass - units has both water and sanitation services meeting the standard
- fail - unit does not have water and sanitation service consistent with the standard

c. Rows add to 100 percent.

d. Less than 0.5 percent.

HQM. The rows display the percentage distribution for households in several income deciles across the quality categories for the first year of the simulation period (1984) and for 1993. The final part of the table presents this information for all households, and includes counts in addition to percentage distributions.

Looking at the figures for 1984 first, we see that only 28 percent of households in urban areas occupied units that were both built of permanent materials and fully met our infrastructure services standard. Another 40 percent lived in permanent-material units but failed the infrastructure services standard. Comparing the housing situation of households in different income deciles in 1984 shows the expected pattern of higher income households living in fully acceptable units with considerably greater frequency than their lower income counterparts. Such differences are quite pronounced for the higher quality housing categories; among improvised units, on the other hand, there is almost no variance, probably owing to assumptions that had to be made in developing the data on the housing quality distributions.¹

Turning now to changes over the period in the housing quality distribution, a couple of points stand out. A continuation of the housing investment patterns of the past will produce little improvement in the overall housing quality distribution. The percentage of units in

1. As detailed in Annex 3 of the paper on the HQM, we were able to determine the pass/fail rates for infrastructure for each income-tenure group. We were not able to construct similar information for structural quality. Hence, we had to use the average relationship for all households between passing (or failing) the infrastructure standard and the type of materials out of which the unit was constructed. It is the use of the average relationship applied to each income-tenure group that leads to the high rate of improvised units among even higher income households.

the built-of-permanent-materials and passing-infrastructure category rises by only two percentage points -- to 30 percent. In this regard it is important to stress that net new households are distributed evenly across the income deciles and those in each decile are assigned to the same distribution of housing qualities as the households already in this group.¹ Similarly, replacement units are assumed to be drawn from throughout the quality distribution and replacement units literally replace those withdrawn. In light of these factors, it is only the upgrading of dwellings that is producing the changes in housing quality observed.

Still, the amount of high quality housing produced over the period should not be discounted. The net increase in the number of units with acceptable structures and infrastructure services ("category 1 units") is about 50,000; and there is an even larger increase in the number of units built of permanent materials but lacking fully acceptable infrastructure services. In contrast, there is very little increase in the number of units built of semi-permanent materials, which reflects the upgrading of such units to the higher category over the period. At the lower end of scale, there is an increase of about 9,000 among improvised units.

The number of dwellings constructed each year, excluding rented rooms, ranges from about 15,500 in 1984 to 16,600 in 1993. This figure is quite consistent with the production of privately constructed new

1. This treatment is justified because we are dealing with net household formations (i.e., "births" minus "deaths") and no significant change in the country's income distribution is foreseen for the years ahead. Note that these assumptions can easily be changed in the model.

units in urban areas in the late 1970s, as indicated by deducting government sponsored newly built housing from the counts of all construction shown in the 1981 census.¹

To construct this volume of housing and to carry out the upgrading of housing included,² about Rs. 575 million would be required in 1984 (in 1983) prices), rising to Rs. 803 million at the end of the period. Of this about Rs. 95 million is provided in mortgage loans by the SMIB to households in the highest three income deciles. It is difficult to judge the reasonableness of this figure because of the

1. The census shows a figure of about 20,000 units per year being constructed in all quality categories. About 4,000 units were being produced nationally under government auspices, the majority in urban areas. The gap between these two figures and the 15,500 figure calculated by the model stems from the fact that the model does not include counts of units constructed which are not needed for new households or as replacement units. The units excluded might be thought of as going to increase housing consumption of the households developing them; the number of such units that is a net increase in new construction, however, depends on the extent to which the units they free up are used as substitutes for units that would have otherwise been constructed. It would probably be the case that some of the units so constructed would go to relieve overcrowding, relief that would not have happened otherwise. Our guess is that a substantial share of the higher quality units are built for "increased consumption" purposes, but that most of these do in fact substitute for other construction through a filtering process. Once the adjustment is made for some new construction being used to decrease crowding slightly, the new construction predicted by the model and that observed historically appear to match quite well. It is worth noting that the amount of crowding can be readily adjusted in the model by reducing the number of new households who are room renters. Hence, the level of new construction can be adjusted to meet an exogenously specified control total.

2. The investment in upgrades included in these computations is that for units that actually move into another quality category. This means that upgrading not causing such a shift is excluded. It is not evident, however, that this produces much of a downward bias in the investment estimate since all of the investment in upgrading for each unit to move between classes is included, even though for a number of upgraded units the final investment required for it to shift between dwelling categories will be small.

problem of finding a good benchmark. The national income accounts data on housing investment are quite weak. The other alternative is the investment indicated by the housing needs assessment. Comparability is a problem here because in the base case, all housing needs which are being satisfied in the needs assessment calculation are not being met, either in terms of the total number of units produced or in the higher housing quality standards embodied in the needs assessment calculations. Even so, the HQM figure looks sensible when compared with the figure for urban areas in the needs assessment after the latter has been roughly adjusted.

A final item of interest is the distribution of households among tenure groups. Although, as noted in the prior section, the model can handle four tenure groups, only three are employed in these calculations: owners with secure title and squatters have been combined owing to a combination of data problems and the fact that most squatters enjoy considerable protections under Sri Lankan law. Table 4.3 shows the change in the tenure distribution over the period. Owner-occupancy and room rental increase at the expense of rented units. In fact, all of this shift is caused by there being no increase in the number of rented units over the period. This limitation was imposed on the calculations to mirror the stringent rent control and rental property ownership laws in effect. During the 1970s the number of rental units in urban areas actually declined by 14,400. Further declines are less likely but under current law little additional construction can be expected.

TABLE 4.3
TENURE DISTRIBUTION IN THE BASE CASE
(Percentages)

	<u>Owners</u>	<u>Unit Renters</u>	<u>Room Renters</u>
1984	59	28	13
1993	62	24	14

Expanding formal housing finance. As indicated, the base case included about 3,000 SMIB loans a year. The two simulations reported here expand the volume of mortgage lending by the SMIB. In the first simulation, government simply increases the funds allocated to the institution sufficiently to make an additional 3,000 loans. In the second simulation, the volume of loans is held at this new higher level, but interest rates are increased in order for the SMIB to raise its funds in the open market. We discuss the results of first one and then the other of these simulations below.

Expanded lending operations. Under this case the SMIB increases the number of mortgages it is making annually by about 3,000, roughly doubling its original loan volume. In contrast with the base case, in which loans were assumed to go to households in the highest three income deciles, the additional loans are targetted to households in the fourth through seventh income deciles (the tenth is the highest income group). The terms of these loans are the same as those in the on-going SMIB program; a 17 percent interest rate on a 15 year loan, with a maximum loan-to-value ratio of 70 percent. There are no restrictions besides income level on the borrowers, i.e., they do not have to be prior homeowners or initially live in inadequate housing. On

the other hand, to receive the loan the unit purchased must meet the minimum standards for both the dwelling and infrastructure services described earlier. This policy embodies standard lending practices in developing countries.

The working assumption is that households are able to mobilize savings and informal financing in an amount equivalent to six months of income. This level is consistent with the amount recorded in some World Bank supported projects.¹ A household uses these funds for the downpayment and to purchase a home costing more than the minimum unit. This is taken to be the Rs.24,000 sites-and-services unit of the type being planned in the urban segment of the Million Houses program.² Note that prior homeowners also have equity from their homes to use as resources in their home purchase.³

The results of pursuing this policy for ten years are summarized in Table 4.4. As one would expect, households in the target income deciles are those realizing the housing improvements. In the table the changes for households in the fourth and sixth deciles are shown; the percentage of households in fully acceptable housing increases from 21 to 26 and 29 to 37 percent, respectively, over the

1. Households who would need less than this amount of savings to make the downpayment on the minimum unit are assumed to mobilize less, down to as little as three months equivalent income. In effect, we have assumed that intrafamily borrowing and other informal financing is either restricted in supply or not demanded for levels beyond this in the typical case. The World Bank studies are reviewed in Annex B of the paper further describing the Housing Quality Model.

2. This figure comes from the 1985 AID Project Memorandum on the Housing Guaranty in Sri Lanka.

3. Owner's equity is equal to the "entry value" of units in the quality class of its initial dwelling.

TABLE 4.4
 PERCENTAGE DISTRIBUTION OF HOUSEHOLDS BY DWELLING QUALITY:
 EXPANDED SHIB PROGRAM^a

<u>Income Decile^a</u>	<u>Perm/ Pass^b</u>	<u>Perm/ Fail</u>	<u>Semi-perm/ Pass</u>	<u>Semi-perm/ Fail</u>	<u>Improvised/ Pass</u>	<u>Improvised/ Fail</u>
2nd: 1984-base	11	57	1	23	b	7
1993-base	15	58	1	18	b	7
-policy	14	58	1	19	b	7
4th: 1984-base	18	50	2	22	b	7
1993-base	21	52	2	18	b	7
-policy	26	48	2	17	b	7
6th: 1984-base	27	41	3	21	b	7
1993-base	29	43	3	17	b	7
-policy	37	38	3	15	b	6
8th: 1984-base	34	35	4	20	b	7
1993-base	35	37	3	16	b	7
-policy	35	37	4	17	b	7
<u>All Households</u>						
<u>% distribution</u>						
1984-base	29	40	3	20	b	7
1993-base	30	42	3	17	b	7
1993-policy	33	40	3	16	b	7
<u>No. of units (000s)</u>						
1984-base	176.2	247.2	20.4	126.9	2.3	44.7
1993-base	226.0	309.2	21.9	124.4	2.8	53.4
1993-policy	246.2	295.0	21.7	120.7	2.8	51.4

Δacceptable - 25k

a. See notes to table 4.2.

b. Less than 0.5 percent.

decade -- quite significant increases. Participant households are drawn from all of the housing quality statuses.

The original "plan" was for the four income deciles to share the available loans equally. However, because some households in the lower income deciles were unable to afford the downpayment, some loans were reallocated to higher income households in the target group.¹ The resulting percentage distribution of loans over the period was actually:

<u>income decile</u>	<u>planned</u>	<u>actual</u>
4	25	19
5	25	19
6	25	25
7	25	37

Thus, despite intentions to the contrary, households in the highest of the target income deciles received the same volume of loans as those in the lowest two decile combined.

Overall, the additional formal financing is associated with about 26,000 more units being fully acceptable by the end of the decade than in the base case (see the last panel of Table 4.4). This increase equals 87 percent of the total number of loans made. The other 13 percent of the loans went to households already living in fully acceptable units, which is possible since the program had no

1. For all households, the ability to afford the downpayment depends on its level of savings and its ability to raise funds in the informal financial market (in this case these two sources are assumed to generate the equivalent of six months income). Homeowners, in addition, have equity in their home upon which they draw, which depends on the quality class of the unit they originally occupy.

restrictions on the tenure or housing conditions of loan applicants. In fact, this degree of targeting is very good, and is consistent with what one might expect in making loans available to households in this income group.

Total housing investment increases substantially over the base case, rising from Rs.574 to 661 million in 1984 and Rs.804 to 911 million in 1993 (in 1983 prices). These are increases of 17 and 15 percent, respectively. It is important to note that incremental formal financing is only Rs.38 and 47 million in these years; thus the majority of investment is being induced from savings and informal financing. Indeed, the ratio of total investment to formal financing is about 2.3 over the period. These calculations also show that about half of the incremental investment results from some 2,400 households who are initially room renters deciding to take out loans and become homeowners, which reduces the number of room renters present in 1993 by only about two percent. As shown in Table 4.5, there is little shift in the distribution of households among tenure groups caused by the policy, although the number of unit renters does fall by about 5,000.

TABLE 4.5

**PERCENTAGE DISTRIBUTION OF HOUSEHOLDS BY TENURE:
EXPANDED SMIB PROGRAM**

	<u>Homeowners</u>	<u>Unit renters</u>	<u>Room renters</u>
1984-base case	59	28	13
1993-base case	62	24	14
-policy	63	24	13

The general picture that emerges from this analysis is that expanding the volume of formal housing finance, while focusing its use on moderate income households, would have important effects on the quality of the housing stock. Because such a program would not involve any government subsidies, it would certainly seem to be worth careful study.

Expanded volume using private funds. This case corresponds to a situation in which Sri Lanka embarks on a course of at least limited financial reform of the type described in Chapter 3. Under the reform, the SMIB generates the funds used to make mortgage loans by attracting deposits and term loans in the open market. It is estimated that it would have to pay about 18.5 percent on liabilities to be competitive with other savings options, under the new, higher interest rate schedule promulgated by the government. Adding 150 basis points for its expenses, the mortgage interest rate charged by the SMIB would be 20 percent, up from the 17 percent used in the last simulation.

This case is the same as that just reviewed, the SMIB is making about 6,000 loans per year of which 3,000 are targetted to households in the fourth through seventh income deciles. Thus, we can use this simulation to estimate the impact on the progress being made in the housing sector of following a program of interest rate reform.

The general effects on the distribution of urban households among housing quality categories at the end of the decade (1993) of the shift to higher interest rates are displayed in Table 4.6. A quick

TABLE 4.6

PERCENTAGE DISTRIBUTION OF HOUSEHOLDS BY DWELLING QUALITY:
EXPANDED SMIB PROGRAM AT 17 AND 20 PERCENT INTEREST RATES^a

<u>Income Decile and Program</u>	<u>Perm/ Pass</u>	<u>Perm/ Fail</u>	<u>Semi-perm/ Pass</u>	<u>Semi-perm/ Fail</u>	<u>Improvised/ Pass</u>	<u>Improvised/ Fail</u>
2nd: 1984	11	57	1	23	c	7
1993-17% ^b	14	58	1	19	c	7
-20%	14	58	1	19	c	7
4th: 1984	18	50	2	22	c	7
1993-17%	26	48	2	17	c	7
-20%	20	52	2	18	c	7
6th: 1984	27	41	3	21	c	7
1993-17%	37	38	3	15	c	6
-20%	37	38	3	15	c	7
8th: 1984	34	35	4	20	c	7
1993-17%	35	37	4	17	c	7
-20%	35	37	4	17	c	7
<u>All Households</u>						
<u>% distribution</u>						
1984	28	40	3	20	c	7
1993-17%	33	40	3	16	c	7
1993-20%	33	40	3	16	c	7
<u>No. of Units (000s)</u>						
1984	176.2	247.2	20.4	126.9	2.3	44.7
1993-17%	246.2	295.0	21.7	120.7	2.8	51.4
1993-20%	245.4	295.6	21.7	120.9	2.8	51.4

a. See notes to table 4.2.

b. Mortgage interest rate charged by SMIB.

c. Less than 0.5 percent.

perusal of the table indicates comparatively little has happened. One does observe that housing improvement was checked for households in the fourth income decile: under the 17 percent loan program, 26 percent obtained fully acceptable housing in 1993, while under the 20 percent program only 20 percent are able to do so. As indicated in the last panel of the table, however, there is little overall difference.

Table 4.7 presents some additional figures that help elucidate what is happening. The higher interest rates mean that fewer households in the fourth income decile can afford to take out a loan on the terms offered. That is to say, these households can make monthly payments only on a loan with a smaller principal at the higher interest rates, and they are unable to raise the additional funds for the downpayment to close the gap. This causes a redistribution of available loans generally in favor of households in the seventh income decile. As shown in the second pair of columns in the table, this results in a reduction of about 4,300 households living in fully acceptable units in the fourth income decile. This number is largely but not completely made up by increases in the comparable numbers for the other income groups. The difference of about 800 households not obtaining fully acceptable units over the period is due to a greater proportion of higher income mortgagors already living in fully acceptable housing at the time they apply for the loan. Thus, the rise in interest rates makes targetting the loans to lower income households more difficult, as one would expect; and it reduces the efficiency of the program in achieving housing improvement.

TABLE 4.7

**COMPARISON OF TARGET GROUP HOUSEHOLDS IN MORTGAGE
LOAN PROGRAMS WITH 17 AND 20 PERCENT INTEREST RATES**

income decile ^a	dist. of loan recipients ^b		Households in acceptable units in 1993 ^c	
	17%	20%	17%	20%
4th	19	5	19,418	15,073
5	19	24	23,062	24,351
6	25	24	27,175	27,084
7	37	47	28,255	30,666

Higher interest rates also cause a broad decline in investment in the housing sector. At 17 percent rates, investment is Rs.661 million in 1984 and Rs.911 million in 1993; it is about 12 percent lower in each year under the 20 percent regime: Rs.583 and 805 million, respectively.

The overall pattern is as expected: higher interest rates slow progress in achieving housing goals, although under the particular case being examined, the specific impact on the total number of households living in fully acceptable units is quite small. Moreover, in assessing these effects one must keep in mind the more general effects on the efficiency with which financial markets and the economy in general operate. Such gains may well make the costs in housing improvement outlined here acceptable, especially if they result in additional funds being available for the sector.

-
- a. Tenth is the highest income group.
b. Cumulative over the ten year period; figures and percentages.
c. Units that meet both dwelling and infrastructure standards.

. **Infrastructure upgrading.**¹ In the last years of the 1970s Sri Lanka initiated a very ambitious program of upgrading its water supply and sanitation infrastructure. External assistance was eventually secured sufficient to improve the water service to over 6 million people -- 40 percent of the total population -- and to upgrade the sanitation services of a considerably smaller number. This program could have very important implications for the quality of the country's housing for several reasons. First, it deals directly with the problem of inadequate infrastructure. This is especially important in urban areas where it is very difficult for households to upgrade such services on their own, in contrast with their ability to improve their dwellings gradually over time. Second, provision of infrastructure services has been observed to induce recipients to upgrade their dwellings. Third, the size of the activity is very large, carrying with it a corresponding possibility for realization of improvement in the housing stock.

Before proceeding we must emphasize that we have had only very rough indicators of the size and cost per unit of the program, all of the figures being taken from a World Bank report.² The information available is for the planned activity country-wide. We do know that performance to date has been less than planned but, in the absence of other information, we have assumed that these represent delays, not cancellations of projects. Hence, we are simulating a 10-year

1. In general, the analyst will only define the general parameters of various housing programs for the simulation model. More detailed analysis will likely be needed prior to advancing a fully specified proposal. A useful guide to conducting such analysis is being prepared by Robert R. Nathan Associates under contract with the Office of Housing and Urban Programs.

2. World Bank (1984a).

implementation period for these projects in which approximately the same number of dwellings receive improved services each year.

Our estimate is that about 21,000 urban dwelling units will receive both improved sanitation and water services each year. Larger numbers -- some 14,000 and 50,000 additional households, respectively -- will receive improved sanitation and water services. We are using the lower value because it seems more realistic that this number will obtain both types of improved service and that production at this level will be achieved. Based on aggregate cost information, our rough estimate is that it will cost about Rs.6,000 per unit (current prices) to provide these services.

Two key factors determining the actual beneficiaries of these incremental services are the magnitude of the up-front costs to be borne by households, and the proposed distribution of services by income class. As to the former, we have assumed that households would be assessed half of the capital cost at the time of installation of the infrastructure, and the rest of the cost would be recovered through user fees.¹ As to income distribution, we have assumed that benefits are widely distributed with the lowest and highest income groups receiving

1. Renters as well as owners are assumed to have to make such payments. For renters this is equivalent to assuming that they would have their rents raised sharply (illegally) to cover such as assessment made to the owner or in fact would pay the fee themselves to get the service. In the low income rental market, where owners have essentially stopped providing all maintenance services and renters have very secure tenure the latter response is particularly likely.

somewhat smaller shares of the improvements than other households.¹ The reasoning behind this is that some very low income households will be occupying areas that government will not want to service either because of problems with the areas, e.g. river banks with very high risk of flooding, or very high cost of providing services to some locations; the highest income households will already have adequate services.

Households are assumed to view the provision of these services as an extraordinary opportunity. Correspondingly, they generate the equivalent of up to nine months income in savings and informal borrowing to pay for the initial cost of the services and for accompanying dwelling improvements. Eventually -- over a five year period -- 60 percent of recipient households not immediately occupying units made exclusively of permanent materials will do so.²

The effects on housing quality of implementing the infrastructure upgrading program are summarized in Table 4.8. A review of the first column of the table reveals that the gains are very substantial for all income groups over the 1984-1993 period. The

1. The distribution initially specified, which is altered in implementation by households' ability to participate, is as follows:

<u>share to income decile</u>	<u>income deciles</u>
0	10th
5	1st, 9th
10	2nd, 7th, 8th
15	3rd - 6th

2. Here again, we have had to "make up" these parameters for illustrative purposes; they badly need to be checked with people in Sri Lanka who are aware of the actual experience to date before the results of the simulations are considered seriously.

TABLE 4.3
PERCENTAGE DISTRIBUTION OF HOUSEHOLDS BY DWELLING QUALITY
INFRASTRUCTURE UPGRADING PROGRAM^a

<u>Income Decile</u>	<u>Perm/ Pass</u>	<u>Perm/ Fail</u>	<u>Semi-perm/ Pass</u>	<u>Semi-perm/ Fail</u>	<u>Improvised/ Pass</u>	<u>Improvised/ Fail</u>
.2nd: 1984-base	11	57	1	23	b	7
1993-base	15	58	1	16	b	7
-policy	37	39	7	9	b	7
4th: 1984-base	18	50	2	22	b	7
1993-base	21	52	2	18	b	7
-policy	63	23	2	4	b	7
6th: 1984-base	27	41	3	21	b	7
1993-base	29	43	3	17	b	7
-policy	72	15	3	3	b	7
8th: 1984-base	34	35	4	20	b	7
1993-base	35	37	3	16	b	7
-policy	63	18	4	7	b	7
<u>All Households</u>						
<u>% distribution</u>						
1984-base	28	40	3	20	b	7
1993-base	30	42	3	17	b	7
1993-policy	57	23	4	8	b	7
<u>No. of Units (000s)</u>						
1984-base	176.2	247.2	20.4	126.9	2.3	44.7
1993-base	226.0	309.2	21.9	124.4	3.8	53.4
1993-policy	421.4	168.7	33.9	57.6	2.8	53.4

a. See notes to table 4.2.

b. Less than 0.5 percent.

percentage of households living in fully acceptable housing in the second income decile rises from 15 percent in the base case to 37 percent under this program; in the eighth income decile it rises from 35 to 63 percent. For all households combined, the overall increase is 27 percentage points -- 30 to 57 percent. In terms of numbers of units, 195,000 units beyond the number in the base case are now rated as fully acceptable. Since 210,000 units received improved infrastructure services over the decade, this implies that only 15,000 units or 7 percent of those serviced would have obtained infrastructure services that met the minimum standards in the absence of this program.

The sources of improved units are worth noting. Under the policy as defined, no improvised units were eligible to receive these infrastructure services; and this is evident in the fact that the number of units in the improvised categories did not change compared with the base case. This feature of the program matches the assumption in the housing needs assessment that improvised units are not economically upgradable.¹ The major source of units reaching the fully acceptable category is the category of units which at the start of the period were constructed from permanent materials but which lacked acceptable infrastructure services. Some 72 percent of all additional units reaching fully acceptable status came from this category.

Although, after receiving infrastructure services, most recipient households then occupied fully satisfactory units -- either because they already lived in units made of permanent materials or

1. The Housing Quality Model can accommodate improvised units receiving these services and being upgraded more generally, if the analyst should want to explore these possibilities.

because they made investments sufficient to reach this status -- some lower income households only end up in units of semi-permanent materials and adequate infrastructure. Among recipient households in the lowest three income deciles, about one-third are in this status just after receiving improved infrastructure. However, over the next five years around 60 percent of these households are able to improve their units so that they are built entirely of permanent materials. Thus, all but about 15 percent of even these lower income households who participate in the program achieve minimally adequate units.

Housing investment rises considerably under this program -- by about 25 percent of the average year. For example, investment increases from Rs.804 million in 1993 under the base case to Rs.1,032 under the infrastructure program. While the cost of the infrastructure itself accounts for the majority of the increase, investment in the dwellings induced by the improvement in infrastructure is also important. Each year it accounts for around 27-28 percent of the total incremental investment.

Thus, consistent with the observations of a number of analysts, it appears that programs which upgrade infrastructure services -- service provision over which households themselves have little control -- are especially effective in improving housing quality. A point to emphasize, however, is that in these simulations households were assumed to be willing to raise a very high level of funds from savings and informal financial sources to be able to participate in the program. Further analysis of this type of policy under differing assumptions about this "level of effort" would seem to be well worth undertaking.

Sites and services. As part of the Million Houses Program the Government of Sri Lanka has decided to initiate a high volume sites-and-services program in urban areas. The program simulated here is patterned on the design of this new program, as described in 1985 Project Memorandum. The cost of a unit is estimated to be Rs.24,000 in current prices. Financing will be available for up to half of the purchase price, with the mortgage carrying a highly subsidized 10 percent interest rate and a 15 year term. Households are assumed to be able to raise up to the equivalent of six months income from savings and informal financing to cover the sizable downpayment of at least Rs.12,000. This program, funded to produce an estimated 10,000 units a year, is targetted to lower income households, i.e., those with incomes falling in the second through sixth income deciles in urban areas. There are no restrictions on participation in terms of tenure or quality of housing occupied before applying for a unit in one of the projects.

The impact on the housing quality distribution of implementing the sites and services program in urban areas is summarized in Table 4.9. There are very substantial increases in the percentages of households in the target income deciles who are living in fully acceptable housing in 1993 compared with the base case. Typically, the increase is on the order of 33 percentage points. For households in the target group the degree of improvement actually exceeds that recorded under the infrastructure upgrading program reviewed in the last section. The vast majority of participants (97 percent) come from housing situations which were less than fully acceptable in terms of the

TABLE 4.9
 PERCENTAGE DISTRIBUTION OF HOUSEHOLDS BY DWELLING QUALITY:
 SITES AND SERVICES PROGRAM^a

<u>Income Decile</u>	<u>Perm/ Pass</u>	<u>Perm/ Fail</u>	<u>Semi-perm/ Pass</u>	<u>Semi-perm/ Fail</u>	<u>Improvised/ Pass</u>	<u>Improvised/ Fail</u>
2nd: 1984-base	11	57	1	23	b	7
1993-base	15	58	1	18	b	7
-policy	38	43	1	12	b	5
4th: 1984-base	18	50	2	22	b	7
1993-base	21	52	2	18	b	7
-policy	45	37	1	11	b	5
6th: 1984-base	27	41	3	21	b	7
1993-base	29	43	3	17	b	7
-policy	33	28	2	10	b	5
8th: 1984-base	34	35	4	20	b	7
1993-base	35	37	3	16	b	7
-policy	35	37	4	17	b	7
<u>All Households</u>						
<u>% distribution</u>						
1984-base	28	40	3	20	b	7
1993-base	30	42	3	17	b	7
1993 policy	42	34	3	14	b	6
<u>No. of Units (000s)</u>						
1984-base	176.2	247.2	20.4	126.9	2.3	44.7
1993-base	226.0	309.2	21.9	124.4	2.8	53.4
1993 policy	313.0	255.2	19.6	101.5	2.8	45.6

a. See notes to table 4.2.

b. Less than 0.5 percent.

standards being employed here. On the other hand, the increase in the number of households in all income groups which occupy fully acceptable units in 1993 is considerably smaller under the sites and services program than under the infrastructure program, since the overall program is smaller and only households in the targetted income groups participate.

. An interesting point regarding the extent of total improvements is that only 9,000 units per year are actually completed, even though the program was "designed" to produce 10,000. In specifying policy simulations in the model each program is given an overall budget and the rest of the program parameters are specified consistent with the budget to produce a particular number of units. Some of these parameters are estimates, however, just as they would be under an actual program. In this case, while the maximum loan-to-value ratio was set at 0.5, we believed that the actual ratio would be about 0.45. In fact, when the program was simulated, participants consistently used the maximum loan amounts; and for this reason it was possible to do fewer units than estimated. The budget could certainly be increased, but this case is handy for illustrating this feature of the model's calculations.

Other results worth noting concern the composition of participants. In particular, all participants are former homeowners. Renters are unable to participate because they lack the equity holdings

in a former unit to use as part of the required downpayment.¹ In many cases such an outcome may be unimportant; some governments may find it undesirable, however, and would want to alter the program's design to permit renters to participate.

As indicated, there were no restrictions on who could participate in the program. Hence, about 7,300 households initially occupying improvised units become occupants of sites and services units. This achieves a reduction of about 14 percent in the number of improvised units in the housing stock in 1993 under the base case.

Total housing investment increases dramatically -- on the order of 42 percent -- with the provision of a sites and services program of this size. In 1993, for example, aggregate investment increases from Rs.804 million in the base case to Rs.1,131 million with the program. Subsidies in the same year -- computed as the discounted present value of the difference between the monthly mortgage payment under a 17 percent market interest rate and the program's 10 percent rate -- is Rs.37 million. Thus, the present value of the subsidies account for only 11 percent of incremental investment, the balance coming from formal loans and additional savings and informal finance mobilized the

1. In these calculations it has been assumed that homeowners and renters in each income group are able to mobilize the same volume of savings and informal financing. It may be the case that renters could mobilize more from these sources relative to homeowners. If this were thought to be the case, it could easily be accommodated by the model.

It may also be worth noting that participation is feasible for a sufficient number of homeowners in each income decile in the target group that the resources do not have to be redistributed to higher income households for all of the units available in the program to be taken up.

participant households. This indicates a very high leveraging ratio for the sites and services program.

Next Steps

The foregoing analyses give some idea of the range of policy interventions whose impacts on the housing quality distribution can be simulated using the Housing Quality Model. They really do, however, only scratch the surface of the range of policy analyses that can be performed with the model. Several types of more complex and sophisticated analyses can and should be undertaken in the context of an actual application of the entire Housing Finance Strategy Methodology to a country.

Four extensions in particular could be undertaken in such a context. First, the impacts of alternative programs designed to fully meet the country's projected housing needs as indicated by the Housing Needs Assessment model calculations should be estimated. As noted at several points, the housing standards, time period covered, economic environment and other factors are defined in the same way for the Housing Quality Model's calculations as they were in the housing needs assessment.

Second, greater realism can be achieved by analyzing various sets of policies together. We could have, for example, implemented the infrastructure upgrading program in combination with the increased lending by SMIB targetted to lower income households. In fact, it will probably be the case that sets of programs will be more efficient in achieving housing objectives than any single program, since individual

programs can best be designed to meet the needs of specific income groups and of households starting in various housing circumstances.

Third, the impacts of individual programs and sets of programs can be compared when implemented with the same budgetary resources. This would provide a stronger basis of comparison for cost efficiency than the more variable programs discussed in this paper. Of course, there are limits to which this can be done, since increasing the volume of mortgage financing, for example, will not entail any cost to the government, although there may be significant opportunity cost for the balance of the economy.

Finally, greater realism can also be achieved by simulating programs that are more variable over time. All of the policy changes simulated for this paper simply involved making a change and sustaining it for the ten-year period. It is much more likely that it would take some years for each of these programs to build up to its steady-state implementation level. Since the speed at which results are achieved is often a key concern of policymakers, the ability of the model to handle different year-by-year program levels and to produce results on an annual basis should be exploited.

When the Housing Quality Model is fully implemented, it will offer analysts the capability to apply a number of effectiveness measures for comparing alternative programs. No single criterion for effectiveness -- or efficiency -- is embodied in the Model. Instead, information provided by the Model allows analysts to construct the measures that are deemed most relevant by a country's policy makers.

At this juncture, we provide some examples of the types of effectiveness measures that can be derived from Housing Quality Model results. These measures focus on three broad issues: (1) how many households are assisted; (2) what is the cost per household; and (3) what share of total costs are borne by Government. For each of these general issues, several potential effectiveness measures are listed. These measures can be computed on a year-by-year basis or for longer periods.

How Many Households are Assisted?

- o Total number of participants.
- o Number (or share) of participants shifting from inadequate to fully adequate housing.
- o Number (or share) of participants from target income classes.
- o Total number of households improve their housing quality to fully adequate.

Cost Per Household

- o Total resource cost per participant.
- o Total resource cost per household shifting from inadequate to fully adequate housing.
- o Government subsidy per participant.
- o Government subsidy per household shifting from inadequate to fully adequate housing.

Government Share of Resource Requirement

- o Ratio of government subsidy to total resource cost.
- o Ratio of savings/informal financing to total resource cost.

In short, a variety of effectiveness measures can be specified and computed.

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