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URBAN LAND AND INFRASTRUCTURE

Project Opportunities for AID in India

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1 INTRODUCTION AND EXECUTIVE SUMMARY

1.1 INTRODUCTION

In 1988, USAID began a four-stage process designed to develop a medium term strategy for its activities in the urban and shelter sector in India. The process is being conducted jointly by AID's Mission in India and its Regional Housing and Urban Development Office for Asia.

The first stage entailed a review of India's present urban circumstances: the extent of urbanization, the nature of current urban problems, and the policy and institutional environments (Lee, 1988). The second stage analyzed urban trends and their implications, suggested a framework for the strategy, and identified a list of possible urban project opportunities consistent with the framework (Kingsley, Telgarsky, and Walter, 1989a and 1989b).

This document reports the findings of the third stage: a more detailed examination of project themes in urban land management and infrastructure selected for further investigation by AID/India based on its review of suggestions from the second stage. The fourth stage will utilize all previous work to develop the strategy.

The remainder of this section contains a brief review of the major findings and conclusions of the second stage, and then, the executive summary of this report. Section 2 analyzes the nature of India's current urban land management and infrastructure problems and Section 3 offers the outlines of a strategy the GOI might pursue to address them. Section 4 then describes a Housing Guaranty (HG) funded project AID could develop to contribute to that strategy. Section 5 suggests a program of technical assistance and training to support the project and broader urban policy reforms. Finally, Section 6 contains a suggested work plan for design and feasibility testing in project development.

1.2 MAJOR FINDINGS AND CONCLUSIONS OF STAGE TWO

In 1988, about 210 million people (26% of India's total population) lived in cities and towns and urban growth is accelerating. The 1971-81 annual urban growth rate was 3.9%, up from 3.3% over 1961-71. Research suggests that the pace of future urbanization will be primarily determined by the pace and nature of national economic development. The most rapid economic growth would occur with accelerated structural change (a growing proportion of employment in higher productivity sectors such as manufacturing and services which are most often forced by spatial economies to locate in cities) and this would also imply the most rapid urban growth. Even if economic performance in these sectors is comparatively weak, however, cities will still grow rapidly. Under the most optimistic assumptions about rural development, agriculture will not be able to absorb a large portion of the burgeoning labor force.

Urban Growth Prospects. Depending on economic circumstances, India's urban population is likely to grow to a level in the range of 435-485 million by 2010; 460 million (41% of the nation's total 2010 population) would seem a reasonable figure for planning purposes. That level would imply that 70% of India's total 1981-2010 population growth will occur in urban areas (compared with 30% over 1951-81). Cities and towns will have to accommodate on average 10.4 million new inhabitants per year over 1981-2010, about twice the average of the 1970s.

Constraints and Their Implications. At present, a host of constraints prevent India from addressing this challenge effectively. The generation of a vast number of higher-paying employment opportunities is the most pressing need, yet a complex and onerous regulatory environment stifles the private initiative required to achieve that goal. Ill-conceived laws and regulations also constrain the output of the private land and housing markets. Government land and housing programs have been slow and inefficient and their output has been small in relation to the need. State and local governments have also fallen far behind in the provision of roads, water supply, and other urban services. This is due in part to their failure to generate sufficient funding through sensible tax and cost recovery policies and, in part, to inadequate institutional capacity.

The net result is that the physical quality of India's cities is sharply deteriorating. While the impact of this deterioration on the quality of urban life is well recognized, no less important is the fact that it raises costs for businesses in cities, making their products less competitive and making it more difficult for them to expand employment. The most severe burdens implied by these outcomes fall on the poor who face limited opportunities to earn the income needed for survival and are forced to live in squalid (most often illegally developed) residential environments.

Unless present constraints are alleviated, a much larger urban growth increment in the years to come will imply more serious urban deterioration. Yet recent studies indicate that if the political will to remove these constraints does develop it should be possible to vastly improve the economies and physical conditions of cities within the resource limitations that can be expected at this stage of national development.

New GOI Policy Directions. India's new National Housing Policy and the

recently completed report of the National Commission on Urbanization (NCU) suggest recognition by the GOI that bold policy changes are called for consistent with the conclusions drawn above. These documents recommend major reforms of the existing system to eliminate constraints (not just more money for the urban sector under the old system). They recognize a leading role for the people in urban development (households, the informal sector, cooperatives, NGOs, and small and large firms). In housing and urban economic development, they propose that government should become more of an enabler and facilitator (rather than the provider). In government land and infrastructure delivery they recommend strong measures to enhance capacity, efficiency, and cost recovery.

Framework for an AID Strategy. Given the understanding that urban areas will play an increasingly dominant role in India's overall national development and the recent shifts in GOI policy directions, this would appear an ideal time for AID to strengthen its own involvement in the urban sector. The stage two report suggested that it should be possible for AID/India to make an important contribution consistent with its recently adopted Country Development Strategy Statement (CDSS) and its own tight budget limitations primarily by: (1) supporting the application of systems/information technologies to improve efficiency in urban resource management and institutional development; and (2) utilizing the HG program for related capital projects.

The report recommended that AID/India's new urban strategy should have three components: (1) integrating urban concerns throughout the Mission's program based on the explicit recognition of urban development as a contributor to economic development (not just a social program); (2) supporting themes of the National Housing Policy and NCU report in policy dialogues and sponsoring relevant research and dissemination to bolster that agenda; and (3) supporting specific new urban project initiatives.

AID has already achieved a comparative advantage in the field of housing finance and the report endorsed a continuation of that specialty through the current HG-003 project with the National Housing Bank (NHB). However, it suggested that project was not sufficient in itself to address the broader needs of urban development. It noted that other initiatives (for example, in urban economic development, land, and infrastructure) are now being seen as higher priorities in addressing those needs. It then identified a series of possible new project opportunities that AID might pursue in line with these conclusions.

After review of the stage two report, the Mission selected three project themes for further investigation in stage three: (1) promoting more effective urban land delivery and management; (2) promoting more effective urban infrastructure provision; and (3) enhancing the private sector roles in these fields through new forms of public-private partnerships.

1.3 INDIA'S URBAN LAND/INFRASTRUCTURE PROBLEMS

India has taken an important step toward expanding the supply of decent urban housing by its efforts to create a more efficient and decentralized housing finance system.

Those efforts could well be frustrated, however, because not enough serviced land is being created to take advantage of the additional financing that can be made available.

The Constraints on Private Land Development. Due to the Urban Land (Ceiling and Regulation) Act of 1976 (ULCRA) much of the remaining developable land in India's cities is legally entangled and thus not available for private development. Even at the fringe and in other areas not covered by the Act, private development is frustrated by: (1) inflexible and costly site development and building standards; (2) tortuously slow and uncertain government reviews of development applications; (3) cumbersome procedures and heavy duties and fees entailed in processing land title changes; (4) governments tying up (through notification) much of the more attractive developable land--much more than they are likely to be able to acquire for a long period of time; (5) the likelihood that government will be unable to provide the requisite infrastructure for a new private development, at least not in a timely manner; and (6) rent control laws. There are a few recent examples of balanced land developments by private firms working in cooperation with government, but not enough to constitute a trend.

The Inadequacies of Government Land Development. While government agencies have traditionally assumed the role of primary urban land developer in India, their output has been small in relation to the need. Reasons include: (1) archaic laws that mandate complicated and long-delayed agency land acquisition; (2) the lack of adequate cost recovery which implies heavy subsidies and thus limits the yield from available funds; (3) costly site development and infrastructure standards (which have the same effect); (4) inefficient (and non-aggressive) project management; and (5) the fact that most development agencies have focused on house building and have not given enough attention to the provision of serviced sites.

The Costs of Illegal Land Development. All new urban dwellers have to reside somewhere. Because rental markets are constrained and formal public and private sector land delivery is so limited, many are forced to occupy land illegally. The poor build rudimentary shelters. Middle-income groups in "unauthorized settlements" can afford more substantial structures. Because of their illegality, neither are provided with water or other public services or are able to borrow for construction or home improvements from formal lenders. Government has changed from a policy of attempting to bulldoze such settlements to one of ultimately regularizing them. Nonetheless, compared to properly planned land development, the costs of illegal settlement are extremely high in social terms (e.g., health and other implications of long tenure in squalid and unserviced living environments) as well as economic terms (e.g., increased cost of installing infrastructure after an area has been built up).

1.4 AN URBAN LAND/INFRASTRUCTURE STRATEGY

Longer Term Strategy. The ultimate solution to these problems is to create effectively functioning land markets with positive incentives for responsible private development and a curtailed but much more efficient facilitating role for government. This will require: (1) the rationalization (or eradication) of unreasonable laws, regulations, and standards; (2) appropriate cost recovery and other fiscal measures; and (3) new

incentive structures for government activity supported by efficient information, processing, and management systems. It will, however, take a considerable period of time to design, motivate, and implement these reforms and to lessen the present deep-seated political mistrust of private sector activity in the land market.

Interim Strategy. Urban India cannot wait for these reforms. A substantial increase in the supply of serviced land is necessary in the short term to both meet basic needs and reduce inflationary pressures. The GOI could bring this about in the interim by:

1. Markedly improving the efficiency of public land development (insisting on market rate financing, cost recovery to eliminate net project subsidies, efficient site planning, reasonable standards, and disciplined project management).

2. Promoting public-private sector partnerships in the development of serviced land projects with these same characteristics. Each sector would play to its own strengths--government setting guidelines and granting exemptions from unreasonable regulations and the private sector having both responsibility and authority to manage project implementation.

3. Creating a new financing entity, mobilizing additional resources, and implementing other supportive measures to expand output through both of the above mechanisms.

New AID Project Activities. To support these themes, it is proposed that AID initiate two new project activities.

1. A $50 million HG Project in Urban Land and Infrastructure Development. There are good reasons for AID to adhere to its policy of working through national (rather than state or local) institutions in housing and urban development. Although the form is not yet finalized (see discussion in Section 1.5), the GOI appears committed to establishing a new national entity to finance urban land and infrastructure development in the near term. HG funds would flow through this entity to support land/infrastructure development projects with emphasis given to the public-private partnership approach noted above.

2. A $5 million DA Project in Related Technical Assistance and Training. This project would have three components: (1) a broad program of research and dissemination (working through major national urban policy research institutes) to further more effective urban policy implementation at the state and local level; (2) a related program focused specifically on the practical application of land information systems technologies to the development of cadastres and the streamlining of land titling, property taxation, and related processing systems; and (3) the application of systems techniques to establish effective operations of the new financing entity (and the management of projects by its borrowers as applicable).

This approach has several advantages. First, by expanding the supply of serviced urban land, it addresses what is becoming widely recognized as India's primary urban

development constraint at present. Second, by focusing on public-private partnerships, it employs what is likely at this point to be the most effective means of expanding legitimate private sector participation in urban land markets. Third, by promoting compact and orderly urban expansion with decent services, it is probably the most important step AID could take to lessen environmental degradation in urban areas. Fourth, it is an area well suited to the application of up-to-date resource management technologies (an important theme of AID/India's CDSS). And fifth, other than housing itself, residential land and infrastructure development are the only activities that are legally supportable under the HG program.

1.5 A HOUSING GUARANTY PROJECT TO SUPPORT LAND AND INFRASTRUCTURE DEVELOPMENT

Selection of the Financing Entity. In discussions in task forces preparing the Eighth Five Year plan there is apparently a consensus on creating a new program to finance urban land and infrastructure development. Decisions have not been made about institutional arrangements, however. Options include: (1) an expansion of the NHB or a new similarly structured sister institution; (2) an entity under the Ministry of Urban Development (probably the Housing and Urban Development Corporation--HUDCO); or (3) some combination of the above (e.g., NHB financing serviced land for new housing with HUDCO financing infrastructure improvements in existing built-up areas). The selection of the institutional arrangement may well be clear by June 1989 but, at the latest, it is likely to be resolved by the end of the year. An NHB related approach would probably be preferable from AID's point of view because more disciplined and market oriented interest rate and debt management policies could be expected at the outset. However, we have been told that HUDCO is accepting a much tougher approach in this regard for future programs. A HUDCO program could therefore be acceptable assuming appropriate conditions were agreed to.

Eligible Activities. In the new program, HG funding would support the following types of sub-projects:

1. Land and On-Site Infrastructure: New Development. Loans here would cover the costs of project design, land acquisition, site preparation, and the installation of on-site infrastructure. It is expected that most sub-projects of this type would be located at the fringe of rapidly expanding urban centers but loans could also support the development of large under-utilized land parcels in central cities.

2. Land and On-Site Infrastructure: Land Readjustment. India has experience with Town Planning Schemes which are a modified form of the land readjustment approach. In this approach funds are not required for acquisition. A government agency prepares a site plan to provide infrastructure and convert rural fringe land to urban use. Land owners agree to participate and receive back developed land as compensation. The parcels they receive back are smaller than their original holdings (because land for roads and other public uses has been taken out) but much more valuable because of the development.

3. Off-Site Infrastructure. Water and sewage treatment plants, trunk mains, and other off-site works are partially eligible for HG funding. Such projects would not be favored under this program, however, since they are less directly related to central HG objectives. They could be permitted only where special circumstances give them a very high priority.

Activity Development Guidelines. Sub-projects supported would have to conform to several requirements:

1. Balanced Development Projects. It has been proven more effective to provide sites for low income households as a part of large mixed-income developments rather than in separate free standing projects. Thus sub-projects would require mixed financing--HG funds supporting the costs of development for below-median income households and loans from other sources to cover the development of higher income residential and non-residential plots.

2. Efficient Site Planning and Development Standards. Project standards would prevent wasteful use of land (e.g., excess allocations for roads and public open space), promote efficient arrangements that reduce road and pipe lengths per plot, require a mix of plot sizes with densities much higher than typical Indian planning standards, and require "appropriate" (affordable, normally low-tech) infrastructure technologies.

3. Cost Recovery and Project Management. Candidate sub-projects would have to demonstrate financial feasibility, including a well thought out program of cost recovery. Proposals would have to stipulate reasonably short development periods and be accompanied by management and monitoring plans to demonstrate how time targets would be achieved.

4. Location. GOI agencies are now planning to give priority in urban development assistance to a limited number of middle-sized growth centers. These centers (drawn from overlapping lists proposed by the NCU and the Ministry of Industries) were selected on the basis of economic growth potential, thus they form a much more sensible set of spatial priorities than previous GOI allocations to yet smaller towns and backward areas. There appears to be a strong political reaction against giving priority to the largest metropolitan areas, particularly for projects where the private sector is involved. While setting spatial criteria for the allocation of program funds along these lines is not essential to effective operations, the growth center approach is not a bad way to do it and doing so may be a political necessity. Additional market analysis should be required, however, to demonstrate the development feasibility of any particular site chosen in any of these centers.

Eligible Participants. The following types of entities would be eligible for participation in the program:

1. Public Development Agencies Sponsoring Guided Urban Development (GUD) Programs. In the GUD approach (designed under the World Bank's most recent Tamil Nadu project), government agencies develop broad guidelines for projects

and private entities contract to implement the project. The agencies facilitate project development by obtaining exemptions from laws and regulations that would be detrimental to project objectives and by using their compulsory acquisition powers as may be appropriate.

2. Joint (Public-Private) Sector Corporations. Joint sector corporations have operated successfully in India's production industries for some time and HUDCO is now openly advocating that a role for them in land development be formally endorsed by GOI. They are somewhat less attractive than the GUD arrangement noted above (since the potential for heavier political and bureaucratic influence exists within the corporate structure). However, they remain an attractive vehicle compared to typical public agency project implementation.

3. Municipal Bodies and Other Public Development Agencies. While the program would give priority to the types of development entities noted above, it should not preclude support for effective public development agencies that operate on the same principles regarding site planning, pricing, cost recovery, and competent project management.

4. State Land/Infrastructure Development Funds. Several of India's most urbanized states either have set up their own financing intermediaries for land development and infrastructure or are likely to do so in the next few years. National program funding could also be used to support such state level entities as long as they agree to apply the same priorities and criteria in their lending within the state.

Project Term and Scope. A five-year implementation period is proposed as being long enough to allow a program of this type to be properly developed. Depending on assumptions about project composition, a $50 million HG loan should be able to provide serviced sites for about 100,000 to 180,000 below-median income households. Since balanced-project requirements would require matching funds for the development of residential plots for higher income families in the same projects, it is likely that the program as a whole would accommodate roughly 170,000 to 300,000 households.

1.6 THE TECHNICAL ASSISTANCE AND TRAINING PROGRAM

Urban Research and Development, Dissemination, Training and Application (URDDTA). The NCU report is a reflection that many national urban sector leaders have come to realize that a very different (more market oriented, efficient, and self financing) set of policies will be required to address India's urban challenge. These ideas have not yet been accepted at the state and local levels, let alone been put into application. Two institutes under the Ministry of Urban Development have both conducted innovative research and dissemination programs consistent with these new ideas: the National Institute of Urban Affairs (NIUA) and the Human Settlements Management Institute (HSMI). However, their scope is limited and they have not yet developed agendas that are sufficiently coherent and forceful to respond to the present need. In the URDDTA program, AID would support one or both of these institutes in more ambitious programs. Support would be given for US and Indian consultant assistance, publications, computers

and other technology, and related expenses. Activities would include:

1. Research and Development. One branch of the research program would focus on the economic impacts of current policies (e.g., regulations) and their alternatives. Another would lead toward the development of information and systems technologies (or adaptation of US prototypes to fit Indian circumstances). Outputs of this work would include applications software packages that could support, for example, capital budgeting, project management, infrastructure maintenance, and water billing systems.

2. Dissemination. This would include much broader dissemination of publications on the results of the R&D program above and other urban policy success stories (from India and other countries). It would also include an expanded program of seminars and conferences.

3. Training and Applications. This would entail one or both of the national institutes working with selected state and local agencies to help them install new systems prepared under the R&D component along with other forms of training.

Land Information Systems Technology. This would be a free-standing project that could be initiated on a prototype basis in one or more cities while the URDDTA program is being developed. Major technical advances of late have permitted substantial reductions in the cost of computer based geographic information systems. A few rudimentary systems of this kind exist in India at academic institutes but efforts have not been made to show how they can be applied to facilitate the workings of government agencies dealing with land records. The approach taken here would be pragmatic and incremental. It might start by simply automating the existing cadastral records of one or a few municipalities and showing how the computer system can be used to improve record quality and process required property tax and/or land titling transactions. The initial data base would then be linked to other information files to permit broader applications.

Supporting HG Project Implementation. The main use of TA and training in this area would be to establish effective internal operations of the new financing entity for urban land and infrastructure (i.e., a program similar to that AID plans to initiate with NHB). TA on more effective techniques in project implementation and financial management might also be made available to public sector borrowers as appropriate.

1.7 WORK PLAN FOR PROJECT DEVELOPMENT AND FEASIBILITY TESTING

Development of the HG Program. It is proposed that the HG program be developed in the following sequence:

1. Study of the opportunities for public-private sector partnerships in urban land and infrastructure development. This analysis would evaluate the profitability of various types of development projects under the legal and procedural environments that

exist in various states. It would also assess the interest of both current public agencies and private entities in these states. This work would assist in designing project models for the larger program and adaptations appropriate in different locations. It is basic to program design so it should be undertaken even before the PID stage.

2. Preliminary Negotiations with GOI and PID Preparation. Preliminary negotiations should take place to test GOI willingness to proceed with the approach as soon as GOI choices on institutional arrangements are fairly clear. The PID would be prepared soon thereafter. It would include a clearer statement of the project description based on the results of the steps above and preliminary statements on the outlook for features to be examined in more depth during PP preparation.

3. Project Paper Development. This would entail: (1) an evaluation of the structure, procedures, and financial plan of the new financing entity chosen to operate the program and of other national level institutions involved, and the design of conditions to be placed on their performance under the HG program; (2) an evaluation of capacity of potential borrowers and the likely pace of demand growth for the program; (3) the design of project development guidelines for each eligible project type based on cost and financial analyses; (3) an examination of the legal aspects of program design; (4) the design of project development guidelines and other conditions to be placed on borrowers (based on cost/affordability analyses of physical design and financial options in different locations); (5) analysis of the viability of financing off-site infrastructures from local revenues as an eligible project activity; and (6) economic and social impacts analyses; and (7) the plan and schedule for program implementation and funds flows.

The first step in this process (study of public-private partnerships) should be initiated as soon as possible--requiring a 20-week work period at a cost of about $89,000 (8.0 person-months). PID and PP development would probably require four to six elapsed months after GOI institutional choices are fairly clear and initial negotiations have been complete--assume a total cost of $95,000 (5.2 person-months).

Development of the Technical Assistance and Training Program. The first step here would be to explore the possibilities for this type of program with MUD senior staff along with NIUA and HSMI leadership and prepare a revised and more complete project concept paper. The next step would be to initiate a 15-week project design process in which AID consultants would work jointly with selected NIUA/HSMI staff. This would yield a design for the Land Information System Project as well as the broader URDDTA program. The process would require one expatriate resident adviser in Delhi throughout the design period, short term missions from senior urban policy advisors at the start of that period, and a final review seminar involving them at the end of it. The cost is estimated at $120,000 (6.0 person months).

2
INDIA'S URBAN LAND PROBLEM

Among national officials interviewed during this mission there appeared wide agreement that India's new housing policy was on the right track; most important, that government agencies should phase out house building activities and leave that job to family/private initiatives, supported by the new decentralized housing finance system being created under the NHB. There was optimism, based on--among other things--the recent successes of the Housing Development Finance Corporation (HDFC), that funds needed to solve a large part of the nation's housing problem could be mobilized.

This being said, there was also a consensus that the most critical problem in urban development now was the inadequate delivery of building sites served by water and other basic infrastructure (essentially the same conclusion reached by AID/India in the review at the end of the second stage in its own strategy formulation process). They felt that unless this problem was addressed, the lack of enough legally produced serviced sites could severely constrain the output of the new housing finance system.

In 1971, developed urban land in India accounted for roughly 11,200 square kilometers. This represented only about 0.3% of the nation's total land area, but it offered 10.3 hectares per thousand urban population, well above the 8.3 hectares per thousand the UN reports as the average in the world's developing regions (see discussion of these issues in the second stage report, Kingsley *et al*, 1989a). There are no survey data to support reliable estimates of how the ratio has changed since then but it is clear that the extent of urban land development has not kept pace with accelerating urban population growth. One obvious indicator is that housing investment fell from levels of 30% of total investment in the early 1950s to less than 10% during the 1978-82 period (World Bank, 1987).

The problem is not that the amount of urban land per capita is growing smaller. More efficient site planning should produce that result (indeed, the World Bank, 1986, suggests that land allocations of about 4.0 hectares per thousand would be appropriate to

accommodate future urban growth through the rest of this century). The problem is that the limited amount of serviced land developed legally is not affordable to the bulk of the new urban population and that urban expansion is occurring in a spatially fragmented and disorderly manner that significantly raises its ultimate costs. Serious constraints hold back and disorient supply by the formal sector--both private and public. Our review of those constraints below is based largely on an urban land management study by the World Bank (1986--the source for factual statements below where other sources are not cited).

2.1 CONSTRAINTS ON PRIVATE SECTOR LAND DELIVERY

It is generally accepted that private sector incentives to produce serviced land for housing have eroded substantially over the past three decades. There are a host of barriers.

The Urban Land (Ceiling and Regulation) Act of 1976 (ULCRA)

The ULCRA is probably the most formidable barrier. This Act was designed to curtail the concentration of urban land ownership and reduce land price speculation. To do so, it imposed a ceiling on the amount of vacant land an individual or firm could hold inside cities above 200,000 population (the ceilings range from 2,000 square meters in cities in the 200,000-300,000 population range to 500 square meters in India's four largest metropolitan areas). Persons with holdings in excess of the ceilings had to file statements on what they owned and the excess was then to be turned over to the state government for compensation considerably below market value (even below the rates specified for other forms of compulsory public land acquisition).

Procedures under the Act were cumbersome. Many owners have appealed compensation awards in lengthy court proceedings. This has resulted in effectively freezing much of the land declared as surplus so that neither public nor private entities can develop it (ten years after the passage of the Act, physical possession had been obtained of only 2.3% of the declared excess). Some exemptions are permitted under the Act (allowing the development of housing for the Economically Weaker Section and other recognized public purposes) but few have been applied for.

Site Planning and Development Standards

As noted above, India had 10.3 hectares of developed urban land per thousand urban inhabitants in 1971. Yet urban Master Plans adopted by the early 1980s on average called for about twice that amount. Those ambitious visions have been translated down into development standards that often prohibit efficient site planning and thereby mandate costly solutions which, without subsidy, are unaffordable to all but the highest income groups (for example, Section 4.4 describes regulations in Uttar Pradesh yielding plots affordable only to the wealthiest 5% of all households). The principal problems have been standards requiring: (1) excessive minimum plot sizes; (2) excessive road widths; and (3) excessive public open space. Together, such standards imply not only higher land and site preparation costs but more road construction and water/sewer pipe per household served. Large public open spaces have been a particular problem since they are often

underutilized yet require substantial ongoing public outlays for maintenance. Regulations also often preclude mixtures of income groups and non-residential uses in new developments even though such mixtures could enhance financial feasibility as well as social values.

Slow and Demanding Government Reviews of Development Applications

Private developers may be deterred as much by the risk and uncertainty associated with obtaining official development and building approvals as they are by unrealistic standards. Based on a study of private activity in Ahmedabad, Wadhva (1986) states: "The time consumed for getting No Objection Certificates, according to the developers we interviewed, can range from two to five years and, for getting the final sanction, from ten to twelve months. During the initial periods of submission of plan, the developer has to go to the office of the Competent Authority almost every day."

Cumbersome Procedures for Registering and Transferring Land Titles

Compared with many developing countries, India up until recently had reasonably well maintained records on the ownership of land. These systems are now deteriorating. The ULCRA and high stamp duties (25% of value including interest) and capital gains taxes have provided strong disincentives to registering private land sales in the formal sector. Of course, the vast illegal settlement of land by the informal sector also goes unrecorded. Faulty records and cumbersome processing procedures imply that in many states it takes a very long time for prospective private developer to legally acquire land.

Government Domination of Urban Land

GOI policies established in the late 1950s called for a much expanded direct role for government in large scale urban land acquisition and development. Many cities initiated ambitious land development programs but they typically failed to achieve their targets, most importantly because laws governing compulsory government land acquisition make the process extremely slow and difficult. In process, however, public agencies have tied up a considerable amount of land outside of the areas covered by ULCRA that might otherwise have been attractive for private development. (The nature of these problems is discussed more fully in Section 2.2 below.) Also, with few exceptions, land serviced by the private sector is expected to be developed with housing by the private sector and public land servicing is expected to be followed by public housing. So long as this pattern is followed, constraints on private housing will necessarily also inhibit private land development. In addition to the barriers their actions have created in new development areas, governments have also tied up large tracts of underutilized land near the centers of major cities. This occurs primarily by their retaining large areas for such uses as military cantonments and enforcing "sick industries" laws which prevent closing industrial installations that are no longer economically viable (see discussion in Lee, 1988).

Government's Inability to Provide Infrastructure

Another disincentive to private involvement in land development is the doubt that government will be able to provide required water supply and other infrastructure

linkages. As India's urban growth has accelerated, infrastructure providing agencies have fallen behind. It is estimated that over one quarter of the urban population does not have access to piped water supply, three quarters do not have access to water-borne sanitation, and one third has no electricity.

Rent Controls

The fact that rents are controlled at levels far below market in India's cities reduces private incentives to invest in rental housing. Owners and tenants can get around legal restrictions through payment of key money and other techniques, but such techniques create unnecessary societal costs, among them an erosion of public confidence in law. Recent liberalization of rent control provisions in Delhi go only part way to eliminating this effect, but nonetheless provide a hopeful sign that some improvements are possible in this area. (For a review of conditions in India's rental housing markets, see Wadhva, forthcoming).

2.2 THE INADEQUACIES OF GOVERNMENT LAND DEVELOPMENT

Government agencies have been able to provide much less serviced urban land than was hoped for when the policies of the late 1950s called for a major expansion of these activities. The most notable embodiment of these policies was the program of the Delhi Development Authority (DDA). DDA planned to acquire virtually all uncommitted vacant land in the Delhi corporate area, develop it, and allow it to be occupied on a leasehold basis only (thereby precluding any role for the private sector in land transactions). Many other cities began similar programs, but none quite so ambitious. By 1982, two decades after its plan had been formulated, the DDA had "notified" 30,000 hectares (formal notice of the Authority's intention to acquire which prevents development by others in the interim) but only 66% of that total had been acquired and only 19% had actually been developed for residential use. Local authorities in other cities have been able to develop even smaller fractions of the land needed to meet urban growth requirements. Major reasons are as follows:

Failures in Government Land Acquisition

As noted above, one of the major causes of the failure of these programs to meet their targets has been problems with the law governing compulsory public land acquisition--the Land Acquisition Act of 1894. The procedures under the Act have been complicated and have led to long delays. A most important provision has been that government could not take possession of the land until compensation was fixed, and that is often the most time consuming part of the process. This provision can be now be avoided if a case of "urgency" is demonstrated and while a there is a trend toward a more liberal definition of that term it still cannot be used to take possession of land for the purposes of a private company. Standards for determining compensation have been such that lengthy appeals in the courts are prevalent. Amendments to the Act in 1984 addressed some of its most restrictive features and promise a more expedited process in the future. However, given the continuing tendency of the courts to be cautious in relation to the interests of landowners and the fact that the agency plans are inherently subject to political pressures,

it is unlikely that public land acquisition for broad development purposes will ever be a frictionless process.

The Standards Issue

Government low-income projects generally employ much less costly site planning standards than are required of the private sector. However, those standards are often unreasonably rigid, prohibiting mixed use and mixed income development that could greatly assist in supporting project feasibility (see further discussion of such potentials in Section 4.4).

Inadequate Cost Recovery and Revenue Generation

Public land development in India has been heavily subsidized. Probably most notable is the interest rate subsidy obtainable through HUDCO financing. HUDCO employs a sliding interest scale ranging from 4-5% for the lowest income levels to 14% to the highest. The average lending rate, however, has been far below market (for example, it was 8% in 1982 and HUDCO required an external subsidy of Rs.70 million in that year--that rate has increased since 1982 but remains well below market). In addition, user charges are insufficient to cover the full costs of water supply and other services and local property tax systems have not been developed to generate anywhere near the revenue that would be possible given the present level of India's urban economic development (see further discussion of these issues in Lee, 1988 and Kingsley *et al*, 1989a). Given the limitations on government subsidy budgets, this obviously implies a constraint on the volume of land and infrastructure government agencies can provide.

Ineffective Project Management

There is considerable variation in the effectiveness of government agencies in the land development process. Overall, however, government projects have not been well (or aggressively) managed. In part, this is due to the lack of incentives inherent in public bureaucracies (low rates of pay and insulation from the penalties for inefficiencies and slow delivery that private developers would face). In part, it has been due to the lack of adequate training and systems support (e.g., few agencies employ modern scheduling techniques and accrual-based financial management systems utilizing sound cost accounting).

Overemphasis on House Building

The public authorities assigned to develop land are typically staffed with architects and engineers who see their major assignment as building housing. Land development is just a step toward that end. Simply providing serviced sites (leaving house building up to the occupants) does not offer the same professional gratification to people trained in this way. Yet considering the comparative simplicity of the task, an agency of any given size could obviously provide for a much larger number of families if it concentrated solely on land and infrastructure provision.

2.3 THE COSTS OF ILLEGAL LAND DEVELOPMENT

In India's cities, rental housing is limited and, as we have shown, the lawful production of serviced sites by the formal sector (private and public) has been seriously curtailed. Yet urban population growth has been accelerating and all urban households have to reside somewhere. The only option for many of them has been to occupy land illegally.

The clearest evidence is the growth of slums (including squatter settlements built entirely illegally on government land or with connivance of the landlord). India's total urban slum population was estimated at between 32 and 40 million in 1981 (20%-26% of the total population). The National Building Organisation estimated that slums housed 32% of the total population in Delhi in 1988, 38% in Bombay, and 42% in Calcutta (see discussion in Lee, 1988.) It is generally accepted that slum populations are growing faster than non-slum populations in India's cities.

Illegal (or quasi-legal) development is not limited to the lowest income groups. Higher income families are served, for example, by "unauthorized colonies". In these cases, a colonizer buys land zoned for agricultural use and then subdivides and sells it for house construction without obtaining planning permission. The initial lots are sold at lower prices to get the settlement established. This contributes an air of sufficient permanence to permit him to sell remaining plots at much higher prices. As with the slums, no water supply or other public services are provided initially. Later on, political pressures applied during pre-election periods often lead to "regularization"--legal recognition after the fact which then permits the provision of services. The number of unauthorized colonies in Delhi increased from 110 in 1962 to over 500 in 1980.

These forms of urban expansion exhibit substantial energy and creativity. However, compared to a situation in which all urban land/infrastructure needs were met initially in well planned legal developments, they bear substantial disadvantages. First, there are the social costs associated with large populations living in squalid unserviced living environments for long periods of time (including the health hazards, particularly for children). Second, there are economic costs as well. One obvious example is that it costs more to install infrastructure after a settlement has been built up (especially if it is built up in a haphazard manner). More broadly, illegal settlements are located where the colonizers believe they can get away with it--locations often far from ideal considering the functional efficiency of the urban area as a whole. Fragmented growth in this manner often leads to wasting scarce land resources, increased aggregate commutation, and higher costs for infrastructure provision.

Finally, it is clear these informal approaches in total are still not producing enough (or the right mix of) building plots to make up for the deficiencies in formal production methods reviewed earlier. One indication is that land prices in most urban centers are increasing more rapidly than inflation in the rest of the economy--an inevitable result when too much demand chases too little supply. The World Bank study (1986) notes that development at the urban fringe naturally creates a notable jump in land prices (in India, from Rs.10 to Rs.15 per square meter for agricultural land to from Rs.50 to Rs.100 per square meter for land that is considered urbanized--one time increases probably in the

300%-700% range). But prices in the already built-up areas grow much more gradually. Averaging out over the urban area as a whole, increases in land prices should be proportional to the nominal increase in the city's urban product. Yet in parts of Bombay, land price increases of up to 1,000% were registered between 1966 and 1981 compared to a cost of living increase of 280%. Even with the activities of the DDA, in some areas in Delhi land values have increased by up to 10 times in 10 to 12 years.

3
AN URBAN LAND/INFRASTRUCTURE STRATEGY

What is an appropriate policy response to the problems identified in Section 2? In this section we first suggest the outlines of a strategy the GOI might adopt to address them, looking first at longer term reforms and then at the goals of shorter term action programs. The section closes with a discussion of how AID/India might best support such a strategy.

3.1 STRATEGY OVER THE LONGER TERM

While the policy vision of the 1950s suggested that it should be government's job to provide serviced land for urban expansion, it is now clear that government has been consistently unable to accomplish that mission. Yet under assumptions implied by the vision, a policy environment has been created that reduces the incentives for a positive and responsible role by the private sector. In spite of the ideology, the majority of new urban families do in fact gain access to land through private channels, but the policy environment implies that most of them must do so illegally, with disastrous social and economic implications.

Internal improvements would allow government land development agencies to perform more effectively, but many of the problems evidenced so often over the past three decades are inherent in public sector involvement in activities of this kind. Government agencies can never be expected to serve as the primary urban land providers. A strong case can be made that, over the long term, the only way India's urban land development requirements can be met is through the establishment of an effectively functioning land market in which: (1) private entities (ranging from individual families to firms) compete for land and play the lead role in its development; and (2) the public sector concentrates more on facilitating the operation of the land market and the provision of major infrastructure networks.

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The 1988 NCU report calls for the "...development of a large market which facilitates the availability of land from private sources... [public] acquisition should be restricted to land for the poor, for use by the government, and for the laying of physical infrastructure. All other land should be allowed to come into the market through individual or cooperative enterprise. For this purpose, the planning prescriptions would have to be permissive rather than restrictive...". To bring about such a fundamental change, reforms would be required in three areas.

Reforms of the Legal/Regulatory Environment

The most important steps would be legal and regulatory changes to eliminate current barriers and provide incentives for responsible private development. Key elements to be addressed are the ULCRA, rent control laws, and site development and building standards. There appears little support for outright repeal of such laws and regulations, but momentum seems to be building for important liberalization. The NCU (1988), for example, called for significant modifications to the ULCRA, town planning standards, legal constraints preventing rapid public land acquisition, and laws that now prevent the reuse of underutilized center city lands. Delhi's rent control laws have been modified to exempt some classes of properties and similar changes are being considered in other cities.

Appropriate Cost Recovery and Revenue Generation

Self-financing urban land and infrastructure development appears feasible assuming efficient site planning and the use of low-cost infrastructure technologies. Current approaches must be modified to eliminate (or at least substantially reduce) subsidies and significantly expand user charges and property tax revenues. These themes are also being stressed more frequently now in national policy debates and have been endorsed by the NCU and others.

A More Efficient Government Role

This requires the application of modern systems and management techniques to expedite: (1) reviews of private development applications; (2) processing of land title transactions; (3) land acquisition; and (4) land and infrastructure project implementation. Such improvements are unlikely, however, without broader changes in the practices and pay scales of public agencies to provide stronger inducements for recruiting and retaining qualified personnel and stronger incentives to motivate good performance. Again, these themes have been supported by the NCU and they are receiving more recognition from other groups.

3.2 STRATEGY IN THE SHORT TERM

The fact that there is momentum in all of these directions represents a notable step for India. Yet it is clear that it will take a considerable period of time to design, motivate, and implement all of the changes that are implied. At present, there remains a deep-seated mistrust of private initiative in the land market. It is likely to be a political

necessity to move gradually--incrementally expanding the private role and demonstrating responsible behavior and positive results continually along the way.

This sort of timetable, however, implies a very serious problem in the short term. Urban populations are accelerating and the current land delivery system is falling farther and farther behind. Unless some steps are taken to substantially expand delivery soon the environment could become explosive. An interim strategy for the GOI might include:

1. Markedly improving the efficiency of public land development. This would entail quick action on legal barriers that slow down agency acquisition/development processes and a concerted effort to improve internal managerial efficiency. It would also require serious commitment to a new financial discipline: cost recovery to eliminate net project subsidies and efficient site planning and infrastructure standards.

2. Promoting public-private partnerships in the development of efficient serviced land projects. Such partnerships could be a vehicle for introducing a responsible private involvement while minimizing the risk of political repercussions. At the same time, they could substantially expand delivery capacity. In these partnerships, public agencies would set guidelines, grant exemptions from unreasonable regulations, and take whatever steps appear to be needed to ensure against unreasonable financial gain by their private partners (recognizing of course that a reasonable profit will be essential to secure their participation). The private entities would then be given considerable leeway in project design and implementation.

3. Take steps to mobilize additional resources for land and infrastructure development in the short term. At present, with such a strong reliance on GOI Plan funds, the public land and infrastructure development system would soon bump up against financial constraints even if it did increase its technical delivery capacity. Such constraints could be alleviated by the creation of a new financing entity that would loan for these purposes and be empowered to mobilize additional financing from a variety of sources. (This initiative would be consistent with NCU recommendations to create new national banks for these purposes).

3.3 A ROLE FOR AID/INDIA

The second stage report recommended AIDs use of two funding sources for new initiatives in the urban sector: (1) Housing Guaranty (HG) loans for capital support; and (2) the Mission's Development Assistance (DA) budget for related technical assistance and training. Accordingly, it would seem appropriate for AID to support the strategic directions outlined above in the following way:

A New Housing Guaranty Program

In its previous use of HG funds, AID has chosen to channel them through national financing entities. It has recognized that most actual public sector urban development investment occurs directly through state agencies. However, unlike the World Bank funding, HG resources are not bountiful enough to make a significant impact in relation to

needs in even one major state let alone several. In dealing with a national institution, however, AID has been able to exert influence on the policy environment affecting all urban areas even though its share of total funding has been comparatively small. Continuing this approach, it would seem appropriate to develop a new HG project to support the activities of the new national entity suggested to finance land and infrastructure development.

The sub-projects supported under the loan would be efficient and financially disciplined urban land and on-site infrastructure developments. Special emphasis would be given to promoting the expanded use of public-private partnerships as the responsible development entities.

Technical Assistance and Training

Where the HG program would support a mechanism for significantly expanding the delivery of serviced urban land--the key element of the short term strategy--the DA funded technical assistance and training program would focus more on the aims of the long term strategy. It could include:

(1) A broad program of research and development, dissemination, training and applications implemented through national urban policy institutes. This would be designed to assist state and local institutions in capacity development and in the adoption of new policy orientations suggested in the 1988 National Housing Policy statement and NCU report (ideas that seem to be catching on in Delhi but are not yet much accepted by sub-national agencies).

(2) A related program focussed specifically on the practical application of land information systems technologies. Ultimately, these technologies could have an important impact on reforms in land titling and property tax administration, but a practical action program needs to be designed to bring them down from the conceptual level.

(3) The application of systems and other techniques to establish effective operations of the new national financing entity. This component could also offer management systems assistance to the development agencies that would ultimately implement HG sub-projects.

4 HOUSING GUARANTY PROGRAM SUPPORT FOR LAND AND INFRASTRUCTURE DEVELOPMENT

This Section describes the proposed HG program to support land and infrastructure development. It begins by reviewing the various institutional arrangements being considered by GOI to create a new financing entity in this field. It then reviews the conditions AID might place on a loan to this new entity to assure its integrity and operating efficiency (based on lessons learned from successes and failures in the operation of such intermediaries in other countries). This is followed by suggestions as to the key operating features of the program: the types of projects to be funded, project development guidelines, and the characteristics of eligible development entities. Finally, a reasonable term and magnitude for the loan are discussed and estimates are made of the number of households a loan of that magnitude is likely to support.

4.1 THE FINANCING ENTITY: INSTITUTIONAL OPTIONS

The NCU report (1988) stated: "The Commission is of the view that institutions should be created for funding urban development. These could be a Metropolitan Cities Development Bank, a National Housing Bank, and an Urban Infrastructure Development Bank. The Commission recommends that the paid up capital of each should be Rs.10 billion. This amount should come out of Plan funds...".

The NHB has already been established and, while the forms may be different from those suggested by the NCU, interviews conducted during this mission indicate that the GOI is committed to setting up a new entity to finance land development and infrastructure in the near term. It appears that three options are being considered at present:

An Urban Infrastructure Development Finance Corporation

In interviews, we were told that a paper recommending this entity (the UIDFC) has been submitted to the Task Forces responsible for preparing the Eighth Five Year Plan.

This would be a new institution set up under the umbrella of the Reserve Bank of India--in effect, a sister institution to the NHB. The paper recommends that the UIDFC lend for land and on-site infrastructure development only. Its conclusion is that local revenue bases in urban India are not likely to be strong enough to support the capital costs of off-site infrastructure (water and sewage treatment plants, trunk mains, major roads, etc.) for some time to come and financing for such infrastructure should continue to be provided from Plan funds. (Although it may be correct, this conclusion is not self evident--this issue should be analyzed during project preparation stage for the HG loan.)

We were told that the paper recommends funding of Rs.16.5 billion ($1.09 billion) over the first five years: 6% from the RBI, 18% from the GOI (including funds from international donors); 30% from bonds, 30% from domestic loans, and the remaining 15% from deposits from state and municipal authorities. The paper argues that a main advantage of this approach is that an institution under the RBI is in a much better position to enforce financial discipline than an entity under the Ministry of Urban Development: i.e., HUDCO, which has a tradition of lending at below market rates and, the paper argues, would find it more difficult to take tough measures to minimize debt service arrearages. To attain financial feasibility the paper recognizes that most of the direct beneficiaries of UIDFC funded projects would probably be moderate and middle income households rather than low income groups.

Ministry of Urban Development (HUDCO)

Even given the arguments above, an entity to lend for land and infrastructure under the Ministry of Urban Development is likely to have strong support. Ministry staff told us their approach would be to first establish a window at HUDCO for this purpose and then later transfer it to a separate entity under the Ministry. HUDCO has traditionally been the vehicle through which funds have been channeled to states and local development authorities for housing and urban development projects. Its management now agrees that the function of initiating and servicing home mortgages should rest with the system being created under the NHB. If HUDCO does not inherit the job of lending for land and infrastructure, it has little else to do. We were told by the NHB that HUDCO is moving toward a more disciplined lending policy: i.e., more hard loans that would ensure full cost recovery.

It is likely to be argued that HUDCO already has the administrative apparatus to meet these needs and that a new institution on the RBI side is not necessary. HUDCO's resources at the end of March, 1988, totaled Rs.10.2 billion ($674 million): 21% in equity and general reserves, 40% in debentures, 27% in loans from the GIC, LIC, and GOI, and the remaining 12% in other borrowings (HUDCO, 1988).

A Mixed Alternative

NHB is in the process of designing guidelines for a new program in which it will lend to development authorities for land and on-site infrastructure. Its managers told us they doubt that a new UIDFC will be created (though a similar institution was recommended in the Seventh Plan, the GOI ultimately did not implement it presumably because it wanted to avoid a proliferation of entities operating in this field). They suggest that the

most likely outcome is that NHB will lend for land and on-site infrastructure projects where new housing is involved and HUDCO will lend for infrastructure improvements in existing built-up areas.

Implications for AID

A disciplined program of lending to states, development authorities, and municipalities for these purposes will be difficult to achieve given India's soft loan tradition in this field. For this reason, the UIDFC approach (a fresh institution under the RBI) would seem the best option on the surface. If it was adopted, organizational theory would suggest it should take over lending for land and on-site infrastructure from NHB (the borrowers on this side are quite different from NHB borrowers on the housing side). Still, it is likely that a sound program of HG lending could be developed under any of these three options if appropriate precautions are taken. Clearly, a program with HUDCO would require definite evidence of a new policy and new measures and capacity to enforce it.

In these circumstances, it seems reasonable for AID to wait until the directions of GOI's institutional choices are clearer before introducing the idea of a new HG loan. The subject is under active discussion in the Eighth Plan Task Forces at this time, and the choice could be evident by June 1989. At worst, the position should be clear by December.

4.2 CONDITIONS TO ENCOURAGE SOUND FINANCIAL PERFORMANCE

It is critical to program success that the program be operated on a true cost recovery basis: i.e., that borrower repayments cover the actual costs of loan operations. Land and infrastructure projects must produce a yield for the financing entity that allows it to pay off its own indebtedness or pay an adequate return on equity investment. This is fundamental not only to program development--so that project activity does not become dependent upon government financial subsidy--but to the continued strengthening of India's capital markets. There are three basic conditions for sound financial performance.

(1) The economic soundness of the individual projects. Unless the projects themselves produce an adequate rate of return, it is unrealistic for the financial intermediary to expect full return on its financing.

(2) The security offered by the borrower in the event of financial difficulty, and the legal/institutional possibilities of foreclosing upon this security in practice.

(3) The mode of operation of the program, so that it establishes an expectation of prompt and full payment of amounts due from the first day of operation.

Each land and infrastructure development project proposal should be accompanied by market analysis and pro-forma statements, indicating the magnitude and timing of expected financial flows. These will be examined by the financial intermediary, which

should set minimum standards for rates of return on the projects it will finance. Equally important as pro-forma analyses, however, should be the requirement that the borrower, whether public sector, private sector, or joint sector entity, have a significant amount of its own equity at risk in the project. This provides both the best assurance that the developer believes the project is economically sound and protection for the institutional lender, since its financing loan will be senior to developer equity in the event of financial difficulty.

Loan security may well be adjusted to the creditworthiness (i.e., loan repayment history) of the borrower. Where the borrower has a good credit record, and there is significant developer equity in a project, no security outside the land itself may be required. In this case, it will be important to adjust the timing of loans, so that they are made only when all legal requirements for land acquisition and transfer have been completed, and after development approvals have been arranged. Otherwise, the economic value of the land will be low, and the developer may find it advantageous simply to default if implementation problems arise. Some of the potential borrowers under the program (e.g., public authorities and local governments) may have poor debt repayment records. In these cases, additional loan security should be sought. One device that has worked successfully in other countries is for the financing entity and public sector borrower to enter into a voluntary contract, wherein certain predictable grants from higher level authorities are set aside in an escrow account to serve as a guarantee for the infrastructure and land development loan. If the public sector borrower remains current in its repayments, the escrow amounts are released to it; if the borrower falls behind in payments, the escrow amounts are used to cover the lender's shortfall.

The value of any loan security depends upon the practical difficulties of the lender's foreclosing upon it. AID has recently supported a study of directions to be pursued in amending laws governing mortgage foreclosures in India at the request of the Ministry of Urban Development (Madway, 1989) and sentiment appears to be moving toward a tougher stance on this issue. In the meantime, HDFC has implemented methods to compensate for the present difficulty of foreclosure. Realistic analysis of trends and options in this area should be given priority in the project design phase as one determinant of the new intermediary's lending policies.

There might also be an examination at the PID stage of the advisability (and legality) of having the fiscal intermediary become, in effect, an equity partner in some of its land and infrastructure development projects, by assuming land ownership in return for financing. This would represent a variant of land readjustment schemes (see Section 4.3). The financial intermediary and developer would agree to a percentage of the land that would be turned over to the intermediary in return for its financing. The intermediary would then obtain its financial return by selling the land on the market once infrastructure had been installed and housing construction was underway. The advantages of this approach are that loan "repayment" is made up-front, eliminating the risks and administrative burdens of loan collection over a long lifetime. If the intermediary's land ownership is calculated properly, the scheme also should offer a greater financial return than a pure loan. Among the approach's disadvantages, are the greater risks assumed by the intermediary, the timing of cash returns (which may not coincide with the intermediary's own repayment obligations), and the need for the intermediary to establish land marketing

competence.

Finally, the financial viability of the entire program will depend upon the terms and conditions on which the intermediary can provide financing to developers relative to commercial banks and other conventional lenders. The program design presumes that there are constraints on the lending side that prevent existing intermediaries from satisfying developer demand for funds, once program guidelines have been established. A critical part of project preparation should be an examination of the alternative capital financing possibilities that exist, and clarification of just what constraints in capital flows the proposed program should be designed to overcome (see Section 6.1).

4.3 ELIGIBLE ACTIVITIES

While a number of variants and mixtures could be appropriate, three basic types of sub-projects are proposed.

Land and On-Site Infrastructure: New Development

This is considered the predominant type of sub-project that would be eligible for support under the new HG. Loans would cover the costs of project design, land acquisition, site preparation, and the installation of on-site infrastructure. The approach would be generally modeled after the sites and services approach now being implemented in many states. As discussed in Section 2, government agencies have had considerable difficulty in implementing projects of this type in the past. The major problem has been long delays in compulsory land acquisition under the Land Acquisition Act of 1894, but the projects have often been beset as well by difficulties caused by slow and inefficient installation of infrastructure and the lack of adequate cost recovery.

These problems have been overcome in recent projects implemented by the private sector. An interview with the Chairman of one of the largest and most responsible private land development firms (Ansal Properties) indicated that they have been able to acquire the land for large residential projects in a period ranging from 6 to 18 months. One example is the 202 hectare Palam Vihar community (across the Haryana border in outer Delhi) which will eventually accommodate about 5,000 households. They recognize that legal impediments make private land assembly at this scale much more difficult in some Indian states but they have had similar successes in projects at the fringes of Bhopal and Bangalore.

It is expected that most such sub-projects under the HG would be located at the fringe of rapidly expanding cities, but the program could also support the development of large underutilized parcels in central cities. The NCU report (1988) condemned the wasteful use of prime urban lands, for example, through the allocation of large central tracts for military cantonments and the "sick industries" laws which prevent re-use of inner city industrial estates even when the industries are no longer in operation. A large number of lower income households must locate near employment opportunities in the city center (they cannot afford the commuting costs implied by sites at the fringe no matter how attractive the terms). Projects that permit more intensive reuse of such

valuable properties can indeed generate substantial profits for the developer and, for that reason, they have been politically suspect in India. It should be possible, however, to structure such ventures in a way that the public will recognize that sizeable additions to the low income housing stock are their primary outputs and so that the developer is compensated reasonably for the service he has performed.

Land and On-Site Infrastructure: Land Readjustment

Land readjustment is a method of developing fringe land without large outlays for land acquisition. In such schemes, government agencies prepare site plans indicating the replotting of rural fringe properties for urban use and the location of road and infrastructure networks. Land owners who participate in effect contribute their land, but receive back proportional amounts of developed land as compensation. The parcels they receive back are smaller than their original holdings (because land for roads and other public uses has been taken out) but much more valuable because of the development.

In India, Maharashtra and Gujarat have implemented "Town Planning" schemes that are similar to the land readjustment approach but, because of critical differences, they have been much less successful. Table 4.1 shows comparisons from an analysis by Vaidya (1988). Not indicated on the table is that the Town Planning schemes have often been applied to install infrastructure in semi-developed areas whereas the land readjustment projects have solely involved the conversion of agricultural land to urban use. That

Table 4.1
Comparison of Town Planning and Land Readjustment Schemes

	Maharashtra	Gujarat	Taiwan	Japan	Korea
Number of schemes	34	1	21	1	18
Average area (hectares)	152	167	73	167	373
Percent of land:					
Returned to owners	84	67	64	n/a	60
Sold by agency	0	0	5	17	10
Percent surplus or deficit to agency	-61	-51	0	0	+63
Average years to plan and implement	20	n/a	4	7	n/a
Percent of scheme implemented by:					
Government agency	100	100	n/a	58	93
Private bodies	0	0	n/a	42	7

Source: Vaidya, 1988.

is one part of the problem. More important may be that the India's Town Planning schemes have relied on cash contributions from the original land owners as a part of cost recovery and this reduces their incentive to participate. In land readjustment, the development agencies retain additional lands themselves for later resale so that cash from the owners is not required.

Another important difference is that the laws governing the Town Planning approach require lengthy planning and negotiating periods. Analysis by the World Bank (1986) shows that the time taken for development could be easily and significantly reduced by eliminating redundant steps. Planning and implementation of the Maharashtra projects has required 20 years on average, whereas projects in other countries have been completed in 3 to 7 years. Finally, and most relevant here, is that the Maharashtra and Gujarat projects have been implemented solely by public agencies. In other countries, private firms, owner's associations, and development corporations have also played an active role.

If India's states established new programs consistent with the land readjustment model outlined above, they should be ideal candidates for support under the new HG. A main advantage over the full development model is that they do not require large resources at the outset for land acquisition. They do capture an appropriate share of the large increment in land value appreciation that occurs when agricultural lands are converted to urban use for public lands and infrastructure improvements and they do so up front. This should be an easier approach than trying to recover the required share of the increase in land values after the fact through betterment taxes.

A more recent attempt to implement a 6.2 hectare land readjustment project in Trichur, Kerala, suggests the approach can work effectively in India. Unlike the projects in other Indian states, this scheme entailed full cooperation with the owners and full cost recovery. The first draft scheme was published in March 1983 and by September 1985 the final scheme had been approved and revised titles registered. (Acharya, 1987.)

Off-Site Infrastructure

Off-site infrastructure includes headworks (water production facilities and water and sewage treatment plants) and the major arteries of distribution and collection networks (trunk water and sewer mains). Such facilities are partially supportable under HG programs (HG funds can be used to cover that portion of the total cost that is shown by analysis to directly benefit below-median income households). The linkage between such works and shelter improvements for low income groups, however, is much less direct and visible than it is in the types of projects discussed above. Therefore, the provision of off-site infrastructure should probably not be considered as an important theme in the proposed program. Whether such projects should be supported at all under the HG should be a subject of study during the project design phase.

4.4 ACTIVITY DEVELOPMENT GUIDELINES

In the proposed HG, the national financing intermediary and AID would have to

reach agreement on guidelines as to acceptable sub-project characteristics. These guidelines should, at minimum, cover four basic topics:

Balanced Development

The purpose of any HG program is to improve living conditions for below-median income households. For a number of reasons, however, land/infrastructure development projects that provide sites only for such households have serious disadvantages. Balanced projects entail a mix of higher and lower income developments with some land provided for non-residential use (sometimes termed a "composite housing concept" in India). They offer much sounder financial prospects since the opportunity to sell serviced land at a profit to wealthier households and businesses reduces pressures on the lower income component (and may create the opportunity for cross-subsidy). For this reason participation in balanced projects is obviously much more attractive to private entrepreneurs. Also, many studies have shown that employment opportunities are seen as much more important than shelter conditions by most of India's urban poor. Locations within balanced communities offer them a range of such opportunities whereas locations in isolated settlements make access to jobs much more difficult for them. More broadly, expanding housing opportunities (without subsidy) for middle income groups should also be seen as a high priority of urban policy, since if this is not done, those groups will surely appropriate plots intended for the poor as has so often occurred in the past.

In mixed-income projects recently developed with government involvement or cooperation, 30% to 40% of all plots are set aside from the Economically Weaker Section (EWS) and the Lower Income Group (LIG). The HG target group also includes households with somewhat higher incomes ranging up to the median. In sub-projects supported under the new HG, it might make sense to require that no more or less than say 60% of the plots be designed for occupancy by below-median income households. This is a rough estimate, however, and more careful thought should be given in the project design phase to the development of criteria to achieve the most cost-effective mix.

Since HG funds can only be used to benefit below-median income households, the expectation of mixed-income sub-projects would require mixed funding. Other financing would be required as a part of the project plan to cover costs related to the development of higher income and non-residential plots and their proportionate shares of roads and public open space and facilities.

Efficient Site Planning and Development Standards

Section 2 documented the way in which India's traditional town planning standards have wasted land and resulted in unaffordable development. A number of more recent studies have shown that attractive residential environments can be created at much higher densities. Analysis in 1988 NCU report, for example, argues forcefully that high-density low-rise development is the most cost effective building form for urban India today. It estimates that the construction of seven storey flats currently costs Rs.2,000 per square meter of floor area: twice the unit cost for single-storey *pucca* houses and five times the cost for *kutcha* construction (sun baked bricks with country tile roofs). High-density low-rise not only permits a family to acquire a larger home for a given amount of available

Table 4.2
Comparison of Site Standards and Affordability
(Bertaud Uttar Pradesh Case Study)

	1960 Regulations	1982 Regulations Private	1982 Regulations Public	Alternatives 1	Alternatives 2
Land use (hectares/1,000 persons)					
Residential	3.56	2.08	0.50	0.76	0.79
Other marketable	0.24	0.25	0.13	0.17	0.16
Non-marketable	2.19	1.09	0.56	0.58	0.44
Total	6.00	3.42	1.19	1.51	1.39
Land use (percent)					
Residential	59.4	60.7	42.1	50.2	56.7
Commercial	0.7	1.7	3.0	3.3	3.3
Schools	3.4	5.7	8.1	8.1	8.1
Circulation	26.6	21.9	24.0	24.7	24.9
Open space	10.0	10.0	22.8	13.7	7.0
Total	100.0	100.0	100.0	100.0	100.0
Residential plot size (square meters)					
Smallest	167	100	25	32	32
Average	178	104	25	38	40
Land development cost (Rs/square meter)					
Gross	98	107	89	91	92
Net	155	157	166	148	135
Sales price for smallest plot (Rs'000)	25.80	15.70	5.25	4.96	3.89
Income required for purchase (Rs/month)	2,500	1,800	400	400	325

Source: Bertaud et al, 1988.

funds, it also matches predominant family tastes in urban India which value even a small plot of land over high-rise living by a wide margin.

The benefits that can be gained from efficient site planning are illustrated in a study of comparative development standards for the Kanpoor area in Uttar Pradesh by Bertaud *et al* (1988). As shown on Table 4.2, 1960 regulations required excessive land--6.0 hectares per thousand residents. The size of the smallest plot was 167 square meters. Today a plot of that size would be affordable only to households in the high income group (top 5%).

Recognizing the problems with these standards, regulations were proposed in 1982

that brought the average plot size down to 104 square meters for private developments and only 25 square meters for public sector projects. Under this scheme, Bertaud *et al* estimate that still only about the top 13% of the income distribution could afford the smallest plot in the private sector scheme but 78% could afford the 25 square meter plot.

The Bertaud team then examined the public sector project to find ways it could be improved. They saw that standards required an unreasonably large amount of land for roads and public open space (34 square meters for every 25 square meter plot). In their revised designs (Alternatives 1 and 2) they made several changes. First, they provided more efficient layouts to reduce the length of roadways required to give access to each plot and also reduced right of way widths for minor access ways. Second, they cut back on large parcels for publicly owned open space (parcels which when provided are seldom adequately maintained). Instead they provided smaller open areas at the ends of residential access loops (more useable and more likely to be maintained by the neighborhood) and recognized that the large open areas and playing fields provided at the school site could also be used for broader community use when school was not in session.

They also understood that the act of site design by definition makes some parcels more valuable than others (e.g., parcels along larger roads and near key intersections). With the savings they had achieved by reducing streets and open space they were able to provide larger plots in these higher value zones for sale to higher income groups at a profit. They were also able to increase the size of the smallest plots (to 32 square meters). As a result, even though the smallest plot size had been increased (by 28%) the design efficiencies in Alternative 2 permitted a reduction in the sales price of that plot (by 19%).

While illustrating the benefits of efficient site planning, this analysis deals with what is predominantly a low income settlement and contains densities that are too high to serve as a model for the sub-project guidelines under the proposed HG; i.e. for balanced communities. Guidelines which we understand are under discussion between NHB and HUDCO still aim for much more compact land use than traditional town planning standards. Specifications might be something like the following

- At least 75% of the plots less than 60 square meters.
- No plot in excess of 200 square meters.
- Minimum of 50% of the net residential area in plots of less than 60 square meters.
- Minimum of 50% of the project area in residential use.
- Maximum of 30% of the area devoted to non-marketable public uses (roads and open space).
- Maximum of 20% of the area devoted to business, educational, and institutional uses.

Proposed guidelines for the Tamil Nadu Guided Urban Development Scheme (World Bank, 1988) express standards a different way, stipulating that a minimum of 60 low income plots be provided per hectare of gross project area (25% of these are to be at 30 square meters, 45% at 40 square meters, and 30% at 60 square meters). These requirements imply an average low income plot of 43.5 square meters and therefore that

26% of the gross project area will be devoted to that use. If 30% was devoted to roads and open space, that would leave 44% for higher income housing and non-residential uses.

Guidelines for the proposed HG project should also require the use of affordable infrastructure technologies. More analysis of that issue as well as more detailed analysis of space standards should be undertaken during the project design phase.

Cost Recovery and Project Management Expectations

Development agencies that borrow from the national financing intermediary would be required to submit proposals that demonstrate the sub-project's financial feasibility. These would include multi-year pro forma analyses that show cost recovery expectations and market and affordability studies demonstrating that the proposed sale prices are realistic (see discussion in Section 4.2 above). They would also have to submit plans for project management including schedules for detailed project design and implementation (the timing on the financial pro formas would of course have to be consistent with these schedules). There would also have to be some demonstration of the agency's plans for, and capacity to, monitor performance and take corrective actions necessary to keep the development on track. More detailed specifications of guidelines in these areas would also be considered during the HG project design phase.

Locational Priorities

In the past, India has established a number of new towns and supported major industrial investments in remote or backward areas. This policy has generally failed to stimulate economic progress in these areas. Often the infrastructure provided (at substantial cost) has remained underutilized. In contrast, the 1988 NCU report recommends that priority for future urban development assistance be granted to urban centers that have the highest economic growth potential; i.e., those where investments will contribute most to national development. Using several criteria to reflect this principle, they selected 329 cities and towns as "Generators of Economic Momentum". The Ministry of Industries has also selected a list of growth centers for priority support with generally the same principle in mind. The lists are largely overlapping.

In discussions during this mission, both NHB and HUDCO staff indicated that they will reorient their own priorities in relation to these lists. NHB managers also noted that in their loans for land and infrastructure, they would give priority to middle-sized cities rather than India's largest metropolitan areas. The mid-sized cities are actually growing at a more rapid rate and there is political resistance to favoring the metropolises, particularly when private actors are involved in the development process.

No single list of cities (selected by applying fairly simple criteria to the crude data that are available) is likely to prove a reliable guide to the most efficient locations for investment. Prioritizing sub-project applications for the HG program should entail use of better market analysis to indicate the comparative feasibility of the sites in question. Nonetheless, the NCU list should not be a bad framework for the selection process and its use may be politically necessary at this point.

4.5 ELIGIBLE DEVELOPMENT ENTITIES

As emphasized in Section 1, an important goal of the HG program would be to expand a responsible role for the private sector in land development. This means that public-private sector partnerships would be favored as development entities. Two forms are discussed below: partnerships under a Guided Urban Development concept and Joint (Public-Private) Sector Corporations. Still, because of the image of heavy speculative profits gained by disreputable private firms in the past, there is strong political resistance to a much expanded private role at present. The introduction of more active private involvement will have to move cautiously. In these circumstances, it is recommended that qualified public agencies also be permitted to borrow under this program.

An important question is whether private entities will in fact be willing to participate jointly with government in ventures of the type proposed. This question should be examined carefully at the outset of the project design phase but interviews during this mission indicated that private interest in real estate is high and growing. Some large and reputable firms (such as Ansal Properties, as discussed earlier) have already developed projects in this sort of partnership arrangement. We understand that a number of major manufacturing corporations have become interested in establishing real estate subsidiaries to do the same. We were told that several have already applied for real estate licenses. The demonstration effect of more successful projects should stimulate additional interest and acceptance. We judge that the prospect of sufficient private sector interest is promising enough at this point to justify proceeding to the design stage.

Partnerships Under a Guided Urban Development Approach

The World Bank's new Tamil Nadu Urban Project (1988) allocates $7.9 million to the support of Guided Urban Development (GUD). The guidelines for the approach say that GUD was formulated primarily to overcome land acquisition difficulties faced by government agencies. Under GUD, a public development agency formulates guidelines and standards for sites and services type developments. It then creates a list of responsible private developers and selects from that list to assign implementation responsibilities for specific projects. The developer would be responsible for land assembly and service provision using low cost engineering and site planning standards and would guarantee to set aside a specified number of plots for low income households. Site planning could be done either by the agency or by the developer subject to review by the agency. Land owners willing to participate would have the option of giving the developer power of attorney to implement what would be in effect a land readjustment scheme. After development, the public agency would purchase the low income plots at prearranged prices and the developers could dispose of the remaining lands at prices they set themselves. The public agency would grant development permissions exempting the project from normal town planning standards and would seek case-by-case exemptions from the ULCRA as might be required. GUD sub-projects of this type should be given priority under the HG program.

Joint (Public-Private) Sector Corporations

A second model that should be favored under the HG program would be joint

sector corporations. Joint sector industrial entities have functioned successfully in India for some time. HUDCO (1988) has proposed that similar corporations be established for land and infrastructure development. In line with the industry model, a public agency would hold 26% of the equity, the private entrepreneur would hold 25%, and the remaining 49% would be offered to the public. Public agency partners could include national institutions (like HUDCO, LIC, or GIC) as well as state industry corporations or development authorities. The original HUDCO proposal was to set up "New Town Corporations" along these lines, but clearly the arrangement could be applied to incremental additions of serviced land to existing cities. The HUDCO proposal states:

> Public authorities participating in the management will ensure required fiscal discipline in the matter of purchase of land and selling of housing and commercial space... they will also internally incorporate social objectives on a rational basis without the need for external controls with their attendant problems.... They will protect the entrepreneur against harsh controls and unjustified criticism. The entrepreneur who will have full control over management, will ensure timely execution of works, avoid cost overruns and establish coordinated development of internal and external services.

In fact the initial feasibility analysis of the idea (JPS Associates, 1989) does examine a new town model (actually a new city with a population of 255,000). The HG program should focus on joint-sector development of much smaller additions to existing cities and altogether avoid free-standing new towns of this type. Because it is impossible to reliably assess the future pattern of demand so far ahead, plans for large new towns almost always turn out to be either infeasible or wasteful.

From AID's point of view the joint-sector model might be somewhat less attractive than the GUD approach since with less than a controlling interest the entrepreneur might find it harder to resist political influence brought to bear on the corporation. Still, this model also seems worthy of HG support.

Support for Public Development Agencies

As noted above, even though public-private partnerships would be favored under the new HG program, we judge that effective public development agencies and municipalities should not be excluded. The need for serviced land is immense, the demand and delivery capacity of public-private partnerships is uncertain, and a number of India's public agencies are effective. To participate, however, sub-projects proposed by such agencies would have to meet the same standards as other approved sub-projects with regard to site planning, pricing, cost recovery, and diligent project management.

State Land/Infrastructure Development Funds and Other State Agencies

Assuming that their administrative apparatus and political environments appear adequate to support HG program objectives, the national financing intermediary should also be allowed to lend to state agencies for on-lending to qualified development entities. However, the state agencies would have to adhere to the same appraisal standards and sub-project development guidelines used at the national level.

Several of India's most urbanized states are likely to set up their own financing intermediaries specializing in support for land and infrastructure development. Such funds already exist (under World Bank sponsorship) in metropolitan Calcutta and Tamil Nadu (discussed in Davey, 1988). The onlending of HG resources to these funds should also be permitted.

4.6 PROGRAM TERM AND SCOPE

It is suggested that the HG loan for this program be in the amount of $50 million to be disbursed over a 5 year operating period. These are the same specifications accepted for HG-003 with the NHB (see USAID 1988b) and there are similar reasons for selecting them. While urban India's needs for serviced sites are vast, there remain uncertainties as to the magnitude of demand for a program with the specifications suggested above. A $50 million loan should be sufficient to have an important impact without running the risks of exceeding probable demand. A five year operating period is considered a minimum to permit effective mobilization and development to steady-state conditions.

How many serviced sites could a program of this size deliver? This question can be answered much more effectively once the market and cost studies suggested for project development are complete (see Section 6) but some rough estimates can be made now based on available data on costs and affordability.

Cost Analysis

As noted earlier, the 1986 World Bank study suggested that the value of rural land at the urban fringe then ranged from Rs.10 to Rs.15 per square meter. More recent evidence suggests that those prices are now too low to be used in costing out the proposed program. The NCU (1988) estimates that Rs.20 per square meter is the lowest acquisition cost to be expected at the fringes of mid-sized cities. A reasonable range for our purposes is likely to be from Rs.25 to Rs. 40 per square meter. Recent analyses indicate that the costs of site preparation and the installation of basic infrastructure may range from Rs.65 (JPS Associates, 1989) to about Rs.110 per square meter (analysis of Ganapathy site in World Bank, 1988).

If we assume site planning guidelines suggested earlier (30% of the site devoted to roads and open space leaving 70% marketable) these figures translate into costs per marketable square meter as follows: Rs.35 to Rs.57 for land acquisition and Rs.93 to Rs.157 for site development. These ranges have been applied to indicate development costs of plots of various sizes in Table 4.3.

For example, applying the lower figures in these ranges, the full cost of developing a 50 square meter plot would be Rs.6,430 (Rs.1,790 for land plus Rs.4,650 for site development). Since a plot of this size is likely to be allocable to a moderate income household, we would expect that it might be sold at cost. (The developer would make his profits from the sales of larger plots--i.e., the actual sales prices of the plots of 100 square meters or more would be above those shown on the table). Assuming a 70% loan/value

Table 4.3
Plot Cost Analysis
(Rs'000s/plot)

	Plot Size (square meters)				
	30	50	100	250	400
Low Cost Option					
Land	1.07	1.79	3.57	8.93	14.28
Site development	2.79	4.65	9.29	23.23	37.16
Total	3.86	6.43	12.86	32.15	51.44
Loan					
Land development	2.70	4.50	9.00	22.51	36.01
Land readjustment	1.95	3.25	6.50	16.26	26.01
High Cost Option					
Land	1.71	2.86	5.71	14.28	22.84
Site development	4.71	7.86	15.71	39.28	62.84
Total	6.43	10.71	21.42	53.55	85.68
Loan					
Land development	4.50	7.50	14.99	37.48	59.98
Land readjustment	3.30	5.50	11.00	27.49	43.99

Note: Loan amounts assume plots sold at cost.

ratio for the 50 square meter plot under these circumstances, a household would need a loan of Rs.4,500 to acquire it (that amount would go down to Rs.3,250 in a land readjustment scheme where no outlay to cover original land acquisition is included). If the higher costs are used, the total cost for the same plot would be Rs.10,710 and a loan of Rs.7,500 would be required.

Affordability Analysis

Table 4.4 makes rough estimates of the housing outlays that could be afforded by below-median income urban households (the HG-003 project paper estimates the median at Rs.2,000 per month; see USAID, 1988b). Affordability is estimated under two different assumptions about loan terms--both fall within the range of experience indicated for NHB's primary lenders in the HG-003 analysis. In all cases it is assumed that households can afford to pay 30% of their monthly income for housing expenses (probably too high for the lowest income group shown) and that all loans involve a 70% loan/value ratio. It is further assumed that households will devote 80% of the total value

Table 4.4
Affordability Analysis

	Monthly Income (Rs.)				
	700	1,000	1,250	1,500	2,000
Affordable monthly housing payment (Rs.)	210	300	375	450	600
Easier Terms - 13.5%, 20 years (Rs'000s)					
Total housing loan	17.18	24.55	30.69	36.82	49.10
Down payment	7.36	10.52	13.15	15.78	21.04
Total value	24.55	35.07	43.84	52.60	70.14
House	19.64	28.05	35.07	42.08	56.11
Developed site	4.91	7.01	8.77	10.52	14.03
Loan for site	3.44	4.91	6.14	7.36	9.82
Tighter Terms - 16.5%, 10 years (Rs'000s)					
Total housing loan	11.96	17.08	21.35	25.62	34.16
Down payment	5.12	7.32	9.15	10.98	14.64
Total value	17.08	24.40	30.50	36.60	39.04
House	13.66	19.52	24.40	29.28	39.04
Developed site	3.42	4.88	6.10	7.32	9.76
Loan for site	2.39	3.42	4.27	5.12	6.83

Note: Assumes: (1) affordable payment = 30% of income; (2) 70% loan/value ratio; (3) house = 80% of total value.

they can acquire under these terms to housing and the remaining 20% to acquire the developed site (roughly the average in the JPS Associates 1989 analysis). Using construction cost estimates by the NCU, 1988 (Rs.1,000 per square meter of floor area for *pucca* construction and approximately Rs.700 for semi-*pucca*) this would imply that a household with a Rs.2,000 monthly income could afford a *pucca* house with 56 square meters of floor space or a semi-*pucca* house of 80 square meters).

Under the "easier terms" shown on the table, households at the Rs.1,000 income level could afford the 50 square meter plot from Table 4.3 under the low cost option but only the 30 square meter plot under the high cost option. Households with Rs.2,000 monthly incomes could afford a 100 square meter plot under the low cost option and about a 75 square meter plot under the high cost option. Assuming the "tighter" loan terms show, the picture is not as bright. For example, the Rs.1,000 income household could only afford a 27 square meters under the low option.

While these estimates are extremely crude, they do indicate that projects of the type discussed in this Section would generally be feasible in the sense that they could provide serviced plots affordable to a broad range of below-median income households under a fairly wide range of unit cost assumptions, given loans at reasonable terms. Varying all of our assumptions within reason would change the specific outcomes but would probably not change that conclusion. Consistent with many other analyses, however, these tables again show that it is extremely difficult to provide housing affordable to families earning less than Rs.700 per month.

Number of Households Served

To estimate a reasonable range for the number households that could be served by the program, we first assume that the plots allocated below-median income households will average 50 square meters. We then consider two alternative scenarios:

(1) That the lowest cost program would offer 20% of its plots under the land readjustment approach and the remainder under full development and that the low cost option on Table 4.3 would be the average. Under this scenario, the average loan would be Rs.4,250.

(2) That the highest cost program would offer 95% of its plots under full development and only 5% under land readjustment and that average costs per plot would be those of the high cost option. In this case the average loan would be Rs.7,400.

Dividing these averages into $50 million (Rs.755 million) we would have a program that would provide serviced sites to about 100,000 to 180,000 below-median income households.

Consistent with the balanced site guidelines discussed earlier, we assume that plots for below-median income households will represent 60% of the total in the program (with plots for those above-median being covered by loans from other sources). In this case, the program as a whole would provide housing sites for a total of 170,000 to 300,000 households.

5
TECHNICAL ASSISTANCE AND TRAINING PROGRAM

Providing from 100,000 to 180,000 serviced plots for below-median income households would be an important accomplishment. It would be hoped, however, that the demonstration effect of the new HG program would offer a yet more important impact. By creating a number of successful examples of expanded private sector involvement in land and infrastructure delivery, the program should help to break down old barriers and thereby contribute to systems changes that could lead to markedly expanded national delivery capacity in the future. We believe that the associated technical assistance and training program could create an equal, or perhaps even greater, impact in this same way.

The completion of the new National Housing Policy and the NCU report indicate a dramatic change in the policy environment. A sizeable number of national leaders have fundamentally altered their beliefs about the most basic premise of housing policy: rejecting the earlier conviction that government should be the provider and accepting the view that it should become an enabler and facilitator instead. A similar change has occurred in many other countries over the past few years--the new premise was strongly endorsed by the United Nations HABITAT Commission in 1988 in its "Global Shelter Strategy for the Year 2000". As long as relevant decision makers hold to the old view, most of the reforms being promoted today by international donors remain impossible. Once that view has changed, those reforms appear a natural outgrowth of the new premise and things can begin to fall into place.

In India today, while an impressive number of people in New Delhi have gone through this transformation of belief, most who frame and implement urban policy at the state and local levels have not. AID's new Urban TA and Training program can provide support for the GOI's initiatives to expedite the transformation at those levels and then to facilitate the reforms and capacity building which are its logical conclusions.

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5.1 URBAN RESEARCH AND DEVELOPMENT, DISSEMINATION, TRAINING AND APPLICATION (URDDTA)

Whatever the direction, two GOI supported institutes play a critical role in shaping the conventional wisdom among state and local policy makers and managers in the urban sector. Both report to the Ministry of Urban Development.

Institutional Base

The first is the National Institute of Urban Affairs (NIUA). Its charter prescribes a mission in urban research and policy analysis. Its recent studies cover a broad range of topics: e.g., the determinants of urban migration, the housing market effects of the ULCRA, the financial condition and performance of municipal governments. The second is the Human Settlements Management Institute (HSMI) which is a unit of HUDCO. HSMI also conducts research (more focused on the physical aspects of urban development) but in addition it has a major responsibilities for disseminating research findings and providing training to the state and local bodies that are a part of HUDCO's network.

These two institutes are seen as the primary vehicles for a new AID TA and Training Program in the urban sector: a program that could bridge their current responsibilities from more basic research to training and field application. Compared to their present agendas, however, it would focus more on the development and practical application of new techniques and information technologies in urban resource management.

Both of these institutes are doing some excellent work, but they have tended to take on assignments incrementally depending on the current interests of their clients and staff members. Although HSMI appears to be moving toward one in land and infrastructure, neither institution has at present what could be called a coherent set of measurable objectives related to its mission as a whole or a comprehensive mid-term strategy for achieving them. Most of their staff members accept the new premise (government as facilitator rather than provider) but they do not appear to have thought through institutionally how its implications might best be furthered in the field. The AID TA and Training program could assist them in designing and implementing more forceful and coherent work programs in this regard. The URDDTA program might have three components.

Research and Development

One branch of this component could focus on policy analysis of current constraints in urban development, particularly those affecting land and infrastructure, and alternative approaches. A valuable part of this could be examination of the economic impacts of the regulatory environment. Laws, regulations, and administrative practices affecting land management vary significantly from state to state--so will the best way to design and implement reforms. This work should therefore concentrate on state based analyses, eventually with the preparation of national summaries that put state differences in context. Another task that could be expanded in this area would be the documentation of policy innovations in one state (clear descriptions of what happened, what worked and what did not, and why) for dissemination to relevant audiences in other states.

A second branch could be the development of practical resource management technologies; for the most part PC software packages that could be applied to a wide variety of public tasks in urban development (some of which are performed badly at present and some of which are rarely performed at all). One promising topic in this regard is the application of land information systems technologies. This merits special priority (it is discussed below as a separate component that could be initiated before the overall URDDTA program was underway). Other applications could include software to support: (1) municipal financial management (particularly capital budgeting); (2) project identification and project cost benefit analysis; (3) efficient site design (incorporating the capacity for rapid cost and affordability analysis of alternatives); (4) project management (financial record keeping and status analysis as well as schedule design and monitoring); (5) infrastructure maintenance and operations; (6) design and implementation of cost recovery programs (including, billing, records maintenance, and management reporting.

US experts have already developed software packages to address most of these tasks. In some cases here, the best approach would be to start with one of those packages and make adaptations as necessary to fit the Indian environment (for example, to adjust for differences in accounting practices). In other cases assistance could be provided to aid the lead institutions in developing new software.

Dissemination

HSMI presently runs creative and useful seminars and training programs for the staffs of state and local housing and urban development agencies. Both NIUA and HSMI make their publications available to these agencies although the distribution lists are limited. The URDDTA program could broaden these activities in four ways.

1. Broaden the client group. Include the staffs of other state and local agencies that have a less direct but no less important impact on urban development; for example, capital budgeting agencies, land titling offices, property tax revenue departments, infrastructure maintenance managers.

2. Devise and conduct new conferences, seminars, and training exercises that address the needs of these new types of clients and that effectively convey results of the new R&D component above to all appropriate audiences.

3. Support broader dissemination of publications. Relevant NIUA and HSMI publications would be published and distributed free of charge to much broader mailing lists. More funding could permit professional writers and editors to distill some of the more academic studies into more accessible prose. Also capability would be provided to sort through the growing literature on successful urban policy innovations from other countries and to purchase and distribute the most useful publications.

Training and Applications

What would be the best way to further the use of the new techniques developed in the R&D component? Seminars and training sessions are helpful but it is all too likely that the attendees will not have the resources to really change their way of doing things

when they get back home, even if they want to do so. A more promising approach could be for NIUA/HSMI to establish professional "installation teams". When, for example, a municipality wants to develop a better capital budgeting capability, the installation team could be sent in with the new computers and software to be left behind when they depart. They would do much more than just "install" however. Their responsibilities would include: (1) getting to know the political as well as the procedural environment within the agency; (2) using that knowledge to devise a workable approach to gaining support from the new users; (3) designing and implementing site-specific exercises applying the innovation to the actual agency work at hand (in this case, developing a capital budget); (4) staying with the group long enough to provide follow up assistance; and in some cases (5) working with the agency sponsors of the innovation to eliminate records and tools involved in the old ways of doing things so that the new one remains the only one available.

5.2 APPLYING LAND INFORMATION SYSTEMS TECHNOLOGY

The first recommendation of the NCU concerning land was that "A comprehensive data base on urban lands must be built". Clearly, improvement of land information will be essential to achieving the longer term reforms noted in Section 3 as vital to creating an effectively functioning land market. This component would contribute to that goal.

In the past few years, significant advances have been made in the technology of land information. On one hand there have been improvements in aerial photography and satellite based remote-sensing to provide better data on land characteristics and use, along with automated interpretation to reduce the costs of data base preparation. On the other hand, remarkable improvements in computer technology permit the storage and manipulation of the fairly large geographic data bases on low cost personal computers. Data from aerial interpretation can easily be linked to administrative records to display and interrelate a host of information about a particular location or parcel.

A modern land information system permits information to be displayed both in map and tabular form. As long as the data has been input, the system could immediately display maps at request, for example, showing all parcels with property tax arrearages or without access to water supply, or indicating average daily traffic on street segments. It could almost instantaneously compute and print out the total property values and land areas of all such parcels for a specified zone or for the city as a whole.

A few fairly rudimentary computer based geographic information systems now exist in India, but they are housed in research institutes and have not begun to be applied to improving useable records in line with the NCU's recommendation. Some government officials have been intrigued with the technology but interviews during this mission uncovered no examples of practical applications to date.

In this component it would be important that AID sponsor practical applications (in one or a few mid-size cities to serve as prototypes). Rather than starting with any particular systems technology to be applied, these efforts could start with some real problem faced by a local government and then devise appropriate systems strategies for

dealing with it.

For example, a project might begin simply by automating the existing (probably quite inaccurate) land records of the city and then show how the system could be used to facilitate identifying parcels that were not recorded and correcting errors for the others. Once improved, additional processing software could be added to show how the system could produce annual tax billings and/or produce the forms needed in title registration. In that form, the system could also handle a number of analytic assignments posed by planners and policy makers. As a next step, it would become attractive to automate and link other data files, perhaps, for example, on infrastructure networks (and then start to input the dates and locations of problems and repairs as a basis for a maintenance management system).

Projects like this initiated in different cities might follow quite different incremental paths to automation depending on the nature of the problems and opportunities faced by local officials and their perceptions of comparative priorities.

This component could begin soon after a preliminary mission to identify which cities might be most receptive to the approach at the start. It would involve US advisors to help devise strategic approaches, select appropriate technologies, teach participants and watch over performance. However, much of the day-to-day work could be performed by Indian consultant teams once they were properly trained. Because of its priority, it could be initiated before any longer term agreement on the URDDTA program is worked out. (Characteristics and costs of available land information technologies, along with more detailed discussions of ideas for implementing this component, are presented in Annex B.)

5.3 SUPPORTING HG PROJECT IMPLEMENTATION

TA and training will also be needed to support the proposed HG project described in Section 4. This may be needed in two areas: (1) assisting the establishment and operations of the new national financing entity, and (2) supporting more efficient project design and implementation by the project developers.

1. Assistance to the National Financing Entity. TA and training here would be similar to that AID will provide through its present HG program in housing finance. The nature and extent of the support needed, however, will depend on the skills and prior experience of the institution ultimately chosen to take on this role. If "bankers" are chosen, they are likely to need to learn more about the process of land/infrastructure development. If HUDCO is chosen, it may need more assistance with lending operations. Computer systems packages are likely to be needed in either case.

Topics for TA and training could include assistance with: (1) broader policies and strategies for institution building; (2) financial analysis and underwriting policies and procedures; (3) portfolio management; (4) record keeping and computer system support; (5) monitoring land/infrastructure development project performance.

2. Assistance to Project Developers. Needs here will also vary depending on

the nature of the borrowers. If the program does become dominated by public-private partnerships, it is doubtful that much technical support would be needed by the private implementers (although some exposure to new computer techniques for project management, new building technologies, and such might be appropriate). To the extent that public agencies are responsible for implementing these projects, however, more TA may be appropriate--particularly in project financial management, scheduling and monitoring, and cost recovery design.

6 WORK PLAN FOR PROJECT DEVELOPMENT

We have noted that the timing of GOI's decision about establishing a financing intermediary for land and infrastructure development remains uncertain present. However, it would be advisable for AID to initiate some preparatory activ before that decision is made, and then key the remaining project preparation work to GOI schedule thereafter. This Section suggests an agenda for project development feasibility testing consistent with this assumption.

6.1 DEVELOPING THE HG PROGRAM

The new HG program would be designed, tested, and negotiated in a three s process as follows:

A. The Opportunities for Public-Private Partnerships (OPPP) Stud Urban Land and Infrastructure Development

This topic is fundamental to the future HG program and to AID's broader strategy in India. The study should be initiated as soon as possible. Its substance v make it a valuable investment on its own even if a HG program in this area could n developed. While we have noted that an expanded role for public-private partner seems promising on the surface, more analysis is required to assess the scope c program that could be motivated and the best way to bring it about. The research v involve field-work in probably 5-6 states and a considerable period for analysis in l It would have the following components.

1. Interviews with Current and Potential Private Land Developers. interviews would focus on: the interest of these individuals in participating in the ty project that is proposed; the nature of their current operations (profit expect techniques and standards they use in land assembly, project design, financing

marketing); how they presently obtain their capital and on what terms; guidelines and public sector support they would expect in a partnership arrangement; and views of legal and other barriers that exist and how they could be overcome. Because we know the differences are important they would be asked specifically how their responses to each of these questions would vary when operating in different Indian states.

2. Interviews with Public Officials Responsible for Land and Infrastructure Development. The focus here would be on: the interest public agencies would have in participating in this type of program; suggestions on how greater interest could be motivated; ideas on structural arrangements, project development guidelines, political reception, and approaches to financing and cost recovery. Again specific state by state responses would be sought to each of these inquiries.

3. Project Modeling. In this component, the consultant team would utilize (or adapt) an existing computer model which assesses the cost, financing, and affordability implication of alternative physical designs (probably the Bertaud model). Several alternative land/infrastructure development plans would be specified as prototypes. Their implications would then be tested by varying a number of assumptions all based on lessons learned from the interview programs above. The question is how well each of the schemes would work (levels of efficiency, affordability, profitability, etc.): under a land readjustment versus a land acquisition model; under different structures for public-private partnerships; under different legal/regulatory prescriptions; under different assumptions about equity/loan packages and their terms and conditions. Each set of model runs would be conducted several times to simulate and compare differences in project workability in different states. (The process would be an iterative one--lessons learned in preliminary model analysis might lead to a new round of interactions with the developers and public officials).

4. Synthesis. The team would prepare a series of briefings on the results of this work and a final report.

The OPPP Study would require approximately 4.4 person months of work from a US consultant team (designing the study plan and the survey instruments, monitoring and participating in the surveys, designing adaptations to the model, performing the analysis, and writing the report and presenting briefings). The cost would be $79,200 (average of $18,000 per person month). Indian real estate market experts in each of the subject states would be responsible for conducting most of the interviews, assembling other local data, writing up their findings, and consulting with the US team (assume 15 days each in 5 states or 3.6 person months which at $2,800 per person month implies a cost of $10,000). The assignment in total would cost $89,200 (8 person months of work). The Indian real estate experts might be recruited with the assistance of HSMI. Establishing good working relationships with these individuals in this work could be a helpful step in developing the network required under the URDDTA program.

The study period (period of contract with US consultants) should be approximately 20 weeks distributed roughly as follows: weeks 1-2, design of overall study work program and data collection instruments and interview guidelines; week 3, AID review and approval of designs; weeks 4-5, recruitment of Indian real estate experts; weeks 6-13,

conduct fieldwork and design adaptations to analytic model; weeks 14-17, conduct analysis and prepare draft report; weeks 18-19, AID review of draft report; week 20, make revisions and submit final report.

B. Preliminary Negotiations and PID Development

This would entail two steps: (1) discussions with GOI to assess interest in the HG program under various possible design options (to take place as soon as GOI's choice of institutional directions appears fairly clear); and (2) preparing the PID based on those discussions. Given the work already done in this report and AID/India strategy formulation plus some preliminary information from the OPPP study which should be underway by then, PID preparation should not require much additional cost. Assume 0.5 person month for one US consultant ($10,000) plus work by AID's resident urban advisor and assistance from RHUDO/Asia. It should be possible to complete this work within five weeks elapsed time.

C. Project Paper Development

The preparation of the Project Paper would require completing the following tasks:

(1) Evaluate capacity of the new financing entity and other supporting institutions.

(2) Design conditions to be placed on performance of financing entity and broader policy conditions to be met by GOI.

(3) Evaluate capacity of potential borrowers and estimate demand for the new program (drawn heavily from the OPPP Study).

(4) Design drafts of project guidelines and conditions to be placed on borrowers.

(5) Project and analyze financial flows against fiscal standards and schedule of project outputs.

(6) Analyze the viability of financing off-site infrastructure through local revenue generation (special study to test potential of new entity loaning for this purpose).

(7) Analyze project social, economic, and environmental impacts.

(8) Develop/analyze materials on project's relation to CDSS and role of other donors.

(9) Design Technical Assistance and Training program for the new financing entity and its borrowers. (Excludes broader program--see Section 6.2 below).

(10) Design implementation plan including actors involved, responsibilities of each, and schedule.

It is estimated that this work will require 4.7 person months of service from a US consultant team at a total cost of $80,000. It should be possible to complete the assignment within a 6 week work period in Delhi.

6.2 DEVELOPING THE TECHNICAL ASSISTANCE AND TRAINING PROGRAM

The development of this program would begin with discussions between AID staff and representatives of the Ministry of Urban Development, NIUA, and HSMI on the basic program concept as presented in this report. AID's resident urban advisor in India would then prepare a revised concept paper for the program based on the orientations that emerged from those meetings. After agreement by the parties on that paper, the scope of services would be designed for a US consultant team to work with NIUA and HSMI staff in program design.

The design process itself would require a 15 week period. It would begin with an intensive two-weeks of interaction between NIUA and HSMI leadership and the consultant team (then consisting of two senior and one mid-level urban policy and research advisors). Based on agreements reached during that period, the mid-level advisor would remain in Delhi during weeks 3 through 12 to work with NIUA/HSMI staffs to detail the project themes that had been discussed, consider implementation arrangements, estimate costs, etc. The senior advisors would return in weeks 13-15 to review the more detailed drafts and work with other members of the team to pull together the overall program design.

The effort would require a total of 6.0 person months of work from the US consultants, probably at a cost of $120,000.

Annex A

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Annex B

URBAN LAND INFORMATION SYSTEMS IN INDIA: AN APPROACH TO APPLICATION

B.1 INTRODUCTION

The promotion of a more well-functioning land market and land development process offers many opportunities for improved information processing and analysis. Many land management issues are location-specific, however, and this locational aspect has often made thorough investigation too complex. Fortunately, relatively low-cost technologies utilizing personal computers offer the potential for developing information systems which can easily handle this complexity.

These information systems, described generically as geographic information systems (GIS) or land information systems (LIS), typically consist of two linked data sets. One contains topographic information of physical features (e.g., roads, buildings, plots of land). The geographic information can be provided through a variety of sources: plans, maps, and aerial photographs (where a high degree of detail is required) or through remote sensing images (where only low resolution of features is required, such as in quickly determining broad categories of urban land use). The other data set contains information regarding certain attributes of these features (e.g., traffic volume, land use, land cost). The linkage between these data files thus allows the simultaneous analysis of location and attribute data to produce output which can be organized by its spatial characteristics. GIS offers substantial computational advantages over traditional data management and mapping techniques--maps can be updated and reproduced very quickly and information from the computerized map (lengths, areas, land characteristics) is instantly available for analysis.

As yet, despite apparent interest on the part of the GOI (from discussions with Wayne Myers, Remote Sensing Advisor to AID/India, and Hank Lutchman, consultant to HSMI, and as reflected by the NCU, 1988), the development of such systems in India has been very limited. A few small demonstration GIS systems, developed in conjunction with remote sensing and aerial mapping efforts at various research and educational institutes, have been developed, but none of these is carrying out any practical applications. As a result, AID is well-placed to offer a program which would help establish pragmatic uses for this system technology in the urban context.

B.2 PROGRAM ALTERNATIVES

Such systems have many potential applications relevant to land management: fast and accurate transferring of titles and rights to property; establishing a basis for both land taxation and compensation for public land acquisition; providing easily manipulated data for planning and development control purposes; and storing information on location and history of utility networks. Recent studies have indicated much room for improvement remains in India in all of these areas (see for example, World Bank, 1986). Ideally, a fully integrated GIS at the local level would organize information in all of these areas in

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a fully cross-indexed format.

The present land recordation system consists of a legal cadastre and a fiscal cadastre. The legal cadastre registers land transactions (including leases) with a value of Rs.100 or more. The fiscal cadastre is a record of all holders of lands and the revenue they receive from the land (property taxes in India are based on rental income of land). However, the comprehensiveness and reliability of these systems are showing signs of deterioration for three reasons: (1) rapid growth and illegal subdivision of land in larger cities has outstripped the capacity of the recording system; (2) heavy duties and fees on land transfer has reduced incentives to proceed with formal sales and registration of property--transactions either go unrecorded or are recorded with understated transaction prices; and (3) even when transactions are recorded in the legal cadastre, the legal registrar is not obliged to pass this information on to the fiscal registrar. The World Bank (1986) and a recent symposium on India's urban land policy (see B. Misra in Sharma (1988)) have both stated that this set of systems leads to situations where establishment of ownership rights becomes difficult (and often allows the fraudulent sale of land) and hinders the property tax collection efforts of local authorities. Thus, it would be highly desirable to develop a cadastral system which could be more responsive to change and more effectively link both legal and fiscal information.

Beyond the application to cadastral systems, LIS technology could be applied to other important information needs for effective urban land management. The Planning Commission (1983b) task force on urban development emphasized the need for a land price monitoring system in order to better understand the land market and to guide local authorities in setting property assessments and compensation for public land acquisition. The World Bank (1986) reports that making such information public helped to slow down the rate of increase in urban land prices in Japan.

Land use information in India has only been collected sporadically (in conjunction with the preparation of master plans). Information from subdivision and building permits, land transfers, satellite and aerial photography, and other sources could serve as inputs to maintain an up-to-date picture of the growth and evolution of cities for planning purposes. A World Bank project in Karachi has shown how commercially available satellite images can be used to monitor and evaluate the rapid changes in land use taking place in the city (see Bertaud, 1989).

Finally, GIS offers a suitable framework for storing information about utility networks. With maps and information on operations, maintenance, and consumers, a GIS database can be the platform for planning optimal network expansions, designing efficient maintenance and repair programs, and improving tariff collections.

B.3 PROGRAM CONSTRAINTS

It is clear that development of a full-scale LIS as described above is a large and complex task. In addition, particular conditions in India pose further difficulties for quickly developing such a system. These constraints, amplified below, include: (1) skill levels of personnel; (2) available hardware and operating conditions; (3) security concerns

over topographic information; and (4) reliability of existing data.

Skill constraints concern both the ability of municipal personnel to operate computer technology and also for outside expertise to support development, upgrading, and maintenance of information systems. Systems need to be "user-friendly" enough to minimize training needed to operate the system. However, the system must also offer enough "transparency" so that technicians with computer proficiency or local computer consultants can adapt the system to particular needs or applications. The system should be more than a simple "filing system" replacing paper records with electronic ones--it should be seen as an analytic tool. From the design viewpoint, there is apparently little publicized work being carried out on the design of GIS. We are aware of one system using ARCINFO and some other elementary GIS software systems installed in a few institutions in India, but none of these have been used to develop practical applications. Systems Research Institute (SRI) in Pune has developed a GIS called CMAPS. This software has capabilities to carry out basic mapping functions and database management, but still possesses only rudimentary statistical analysis capacity. Thus, given the paucity of Indian software designers with any GIS experience, it is likely some US consultant time would be necessary to assist in the design and development of system software, whether imported or indigenous software is used.

Indian policy appears to limit hardware options to domestically available technology. In terms of computing power, this does not appear to be a major concern, since 386-generation personal computers are now appearing from domestic assemblers. Other peripherals, such as digitizing tablets (for translating maps and photos into computer-encoded forms) and tape storage drives (for creating backup copies of the complete database) may not be readily available from domestic producers and would likely require import permission. Additionally, the hardware configuration should be kept as simple as possible, since the system will likely be operating in a sub-optimal environment (in terms of user familiarity and availability of servicing). In place of the peripherals, less technologically sophisticated alternatives (such as mechanical digitizing algorithms) might be considered.

Access to detailed geographic or topographic information is controlled (due to security concerns) in India. Thus, standard sources of information, such as aerial photographs and large-scale topographic maps, may not be available. Some satellite imagery may be available through the Remote Sensing Center in Hyderabad (which receives technical assistance through the Dutch government). Low resolution satellite images are also available from SPOT Image and LANDSAT; these photos provide adequate detail at scales (from 1:100,000 to 1:25,000) suitable for land use studies and urban planning exercises. Satellite images represent the lowest cost alternative for obtaining geographic information. Aerial photography displays a wide range of costs depending on a variety of factors (ie, the area to be covered, scale of the photographs, correction of distortion)--Bertaud (1989) estimates aerial photographs covering a 60 square kilometer area would cost 20 to 50 times the price of a SPOT Image satellite photo of the same area (about US$1,100). Ground surveys give the greatest detail on topography, but are by far the costliest method.

Finally, much of the development of an LIS would utilize existing data already

collected and maintained by the local authorities. However, there is potential for the quality of this data to be low. For example, cadastral records may be imprecise and not fully describe parcels. To the extent information already collected by the local authority is faulty, greater time and cost will be associated with creating a fully working LIS.

Given these constraints, the first step required would be a feasibility analysis to assess the interest of local and state authorities, to identify potential candidates for the project, and to determine the balance of support required from local and US consultants. From our initial discussions, the design of a successful urban LIS project should incorporate the following characteristics:

1. Problem-focused approach. Previous attempts to transfer GIS technology have not enjoyed much success because they simply placed exotic technology in an institutional setting (usually academic) which had no incentive to develop applications for the technology. As a result, practically all of the existing systems are used solely for demonstration or "research" purposes. Thus, rather than developing the system in a research facility for some abstract use, it will be important to actually develop and implement the system for a local authority. Keeping system design focused on the solution of a particular problem or set of problems will provide a more useful end product which will be readily applicable to other local authorities facing similar situations.

2. Local involvement. System development ought to involve at least three parties: the local authority, a domestic systems design consultant, and a US design consultant. The participation of the local authority is important not only so the problem is clearly understood and defined for the consultants, but also so the analytic potential and usefulness of the LIS can be conveyed during the system design. The consultants will carry out the system design as well as helping the municipality rationalize the functions which the LIS is supposed to assist.

3. Staged development. As noted above, there are many different aspects of urban land management to which LIS can be applied. Given the uncertainties about access to and quality of information, the LIS ought to be developed in separate stages. This staging might involve sub-areas of the municipality or sub-tasks of the identified problem.

B.4 PROJECT IMPLEMENTATION

Based on the discussion in the previous sections, this section offers a possible outline for development of an AID-sponsored urban LIS project. The project would develop a basic LIS for a mid-size Indian city (approximately 100,000 persons) as a demonstration prototype which might be utilized in other urban centers. Consultations with the city would establish at the outset the scope of the LIS to be developed (in terms of range and type of information at hand and to be collected) and the applications to be developed for use with the LIS (e.g., what analytic or administrative tasks could be improved through the application of information technology).

The core of the LIS would be based on the fiscal and legal cadastres for the

municipal area. These records contain the most comprehensive information on land in the municipality. In the initial stage of development, the LIS need only achieve a degree of accuracy available through satellite imagery--thus avoiding the more expensive ground survey work (assuming large flaws are not found in the cadastre). The first stage of the project would be to encode the cadastre into a GIS format and develop processes for collecting and updating information, compiling historical data, and providing suitable documentation of land transactions.

Following the successful creation of the base LIS, a second stage would involve development of basic applications utilizing the information in the database. These first applications might involve one or more of the following sub-tasks:

- Automation of the property tax administration function of the municipality. Such an application could be used to generate tax bills and receipts, identify delinquent accounts, and print notices and other related correspondence.
- Development of analytic routines for use in town planning. These might include monitoring of urban expansion, changes in land use, and development densities in order to establish priorities for new land development and extension of infrastructure.
- Automation of other operational aspects of urban management, such as billings and collections management for water and sewer, trash collection, or other municipal services.

Key implementation steps for carrying out the project would be to identify the Indian consultant group and a subject city administration. Since the number of potential consultants is very limited, it may be necessary to locate the consultant first before choosing a city so that the city is relatively close to the consultants' location. The subject city should have a relatively well-documented cadastre and be willing to set up a system to share information between the fiscal and legal cadastre as well as between operational areas within the municipality.

The program would not be eligible for HG funding; all funding would have to be allocated out of the Mission's DA budget (although there may be some chance of using the US-India fund to cover some of the technical assistance if it can be shown that development of such low-cost information systems might have applications in the US). Although it is difficult to assess the cost of the project without knowing the exact characteristics of the subject city and the quality of the data to be provided, we would estimate approximately $50,000 for hardware and satellite image costs (for one city) and $100,000 for consultants (assuming approximately 6 person-months for Indian consultants and 2 person-months for the US consultant; clerical and data-entry services would be provided by the local authority).