



Urban
Management
Programme

Land Use
Considerations in
Urban Environmental
Management

Janis D. Bernstein

The background features a dark green field on the left and a grey stepped landscape on the right. A dashed line descends from the top right, passing through a stylized tree and ending at the bottom right. Another dashed line ascends from the bottom left, passing through a rectangular area with a wavy pattern. Two stylized human figures are positioned at the top right.

12

Urban Management and the Environment

12

**Land Use Considerations in
Urban Environmental Management**

Janis D. Bernstein

This document has been prepared under the auspices of the United Nations Development Programme/United Nations Center for Human Settlements (Habitat)/World Bank-sponsored Urban Management Programme. The findings, interpretations, and conclusions expressed here are those of the authors and do not necessarily represent the views of the United Nations Development Programme, UNCHS, World Bank, or any of their affiliated organizations.

Deputy Director
Division for Global
and Interregional Programmes
United Nations Development
Programme

Chief
Technical Co-operation
Division
United Nations Center
for Human Settlements
(Habitat)

Chief
Urban Development Division
Transport, Water, and Urban
Development Department
Environmentally Sustainable
Development
The World Bank

Copyright © 1994
The International Bank for Reconstruction
and Development/THE WORLD BANK
1818 H Street, N.W.
Washington, D.C. 20433, U.S.A.

All rights reserved
Manufactured in the United States of America
First printing January 1994
Second printing November 1995

The Urban Management Programme (UMP) represents a major approach by the United Nations family of organizations, together with external support agencies (ESAs), to strengthen the contribution that cities and towns in developing countries make towards economic growth, social development, and the alleviation of poverty. The program seeks to develop and promote appropriate policies and tools for municipal finance and administration, land management, infrastructure management, and environmental management. Through a capacity building component, the UMP plans to establish an effective partnership with national, regional, and global networks and ESAs in applied research, dissemination of information, and experiences of best practices and promising options.

The findings, interpretations, and conclusions expressed in this paper are entirely those of the author(s) and should not be attributed in any manner to the World Bank, to its affiliated organizations, or to members of its Board of Executive Directors or the countries they represent. The World Bank does not guarantee the accuracy of the data included in this publication and accepts no responsibility whatsoever for any consequence of their use. Some sources cited in this paper may be informal documents that are not readily available. Any maps that accompany the text have been prepared solely for the convenience of readers; the designations and presentation of material in them do not imply the expression of any opinion whatsoever on the part of the World Bank, its affiliates, or its Board or member countries concerning the legal status of any country, territory, city, or area or of the authorities thereof or concerning the delimitation of its boundaries or its national affiliation.

The material in this publication is copyrighted. Requests for permission to reproduce portions of it should be sent to the Office of the Publisher at the address shown in the copyright notice above. The World Bank encourages dissemination of its work and will normally give permission promptly and, when the reproduction is for noncommercial purposes, without asking a fee. Permission to copy portions for classroom use is granted through the Copyright Clearance Center, Inc., Suite 910, 222 Rosewood Drive, Danvers, Massachusetts 01923, U.S.A.

Library of Congress Cataloging-in-Publication Data

Bernstein, Janis D.

Land use considerations in urban environmental management / Janis D. Bernstein.

p. cm. — (Urban management program, ISSN 1020-0215 ;

12. Urban management and the environment)

Includes bibliographical references.

ISBN 0-8213-2723-2

1. City planning—Environmental aspects—Developing countries.

2. Land use, Urban—Environmental aspects—Developing countries.

3. Urbanization—Environmental aspects—Developing countries.

I. Title. II. Series: Urban management program ; 12. III. Series: Urban management program. Urban management and the environment.

HT169.5.B47 1993

333.77'13'091724—dc20

93-40298

CIP

FOREWORD

This paper has been prepared for the Urban Management and Environment component of the joint UNDP/UNCHS/World Bank—Urban Management Programme (UMP). The UMP represents a major coordinated approach by the United Nations family of organizations, together with external support agencies (ESAs), to strengthen the contribution that cities and towns in developing countries make towards economic growth, social development, and the alleviation of poverty. The program seeks to develop and promote appropriate policies and tools for environmental management, land management, infrastructure management, poverty alleviation, and municipal finance and administration. Through a capacity building component, the UMP plans to establish an effective partnership with national, regional, and global networks and ESAs in applied research, dissemination of information, and experiences of best practices and promising options.

This paper is one in a series of discussion papers that has been used, in combination with case studies and research, to develop an overall report on formulating environmental strategies for cities. Other papers in the series cover regulatory and economic instruments for waste management and pollution control, priorities for urban waste management and pollution control, energy/environmental linkages in the urban sector, and rapid urban environmental assessment. Each paper provides background information on key urban development and environment linkages and/or suggest elements of an environmental management strategy for cities in the developing world. In addition, research reports have been prepared on the following topics: health impacts of urban environmental problems, economic spillover effects of urban environmental problems, the application of remote sensing and geographic information systems to urban environmental planning, privatization of municipal solid waste services, and local management of wastes from small-scale and cottage industries. Finally, case studies on priority urban environmental problems have been prepared for Accra, Jakarta, Katowice, Sao Paulo, the Singrauli region of India, Tianjin, and Tunis. A list of background publications is presented in Annex B.

Phase 2 of the UMP (1992-96) is concerned with capacity building at both the country and regional levels and with facilitating national and municipal dialogue on policy and program options. It emphasizes a participatory structure that draws on the strengths of developing country experts and expedites the dissemination of that expertise at the local, national, regional, and global levels.

Through its regional offices in Africa, the Arab States, Asia and the Pacific, and Latin America and the Caribbean, the UMP seeks to strengthen urban management by harnessing the skills and strategies of regional experts, communities, and organizations in the private sector.

Regional coordinators use these networks to address the five programme themes in two ways:

- **City and country consultations.** The UMP brings together national and local authorities, private-sector networks, community representatives, and other actors to discuss specific problems within the UMP's subject areas and to propose reasoned solutions. Consultations are held at the request of a country or city, and often provide a forum for discussion of a cross-section of issues.

- **Technical cooperation.** To sustain follow-up to the consultations, the UMP uses its regional networks of expertise to provide technical advice and cooperation.

Through its nucleus team in Nairobi and Washington, D.C., the UMP supports its regional programmes and networks by synthesizing lessons learned, conducting state-of-the-art research, and supporting dissemination of programme related materials.

Mark Hildebrand
Chief
Technical Cooperation Division
United Nations Centre for
Human Settlements (HABITAT)

Louis Y. Pouliquen
Director
Transportation, Water, and
Urban Development Department

ABSTRACT

In rapidly growing developing country cities, distorted land markets and ineffective urban land management often have resulted in the degradation of environmentally fragile land; occupation of hazard-prone areas; loss of cultural resources, open space, and prime agricultural land; and excessive urban sprawl. To prevent further degradation, governments should exert some degree of control over urban land use and development, but not unnecessarily constrain the supply of land for housing or discourage the private sector from providing affordable housing in safe locations. An important challenge is to achieve a balance between urban development and environmental protection, taking into account linkages among land use, poverty, and the environment.

Balancing environmental and economic objectives requires a land management strategy that facilitates the land market and protects sensitive land and cultural resources. Implementing such a strategy requires a mix of policies and locally appropriate instruments (regulatory, economic, property rights, acquisition, government provision of infrastructure, and information and education) to guide and motivate the behavior of actors causing land degradation problems and those responsible for managing urban land to avoid these problems. The paper presents the most promising land management approaches and instruments for protecting sensitive resources, managing hazard-prone areas, protecting cultural resources, conserving open space, discouraging excessive urban sprawl, and managing prime agricultural land.

ACKNOWLEDGMENTS

The author would like to thank the following for their useful comments on and contributions to earlier drafts of this paper: Alain Bertaud, Carl Bartone, Michael Cohen, Fitz Ford, Patricia Annez, Roberto Chavez, Braz Menezes, George Gattoni, Alcira Kreimer, June Taboroff, Felix Jakob, Vijay Jagannathan, Bill Dillinger, John Dixon, Catherine Farvaque, Joe Leitmann, K.C. Sivaramakrishnan, and Mary McNeil. The paper further benefitted from the comments of the following external reviewers: Stephen Bender, Bain D'Souza, A.K. Maitra, and Warren Brown. Research assistance was provided by Anita Nirody.

CONTENTS

EXECUTIVE SUMMARY	1
I. BACKGROUND	9
Purpose and Organization of Paper	9
Urbanization and the Environmental Dimensions of the Urban Land Crisis	9
II. ENVIRONMENTAL ISSUES IN URBAN LAND USE	12
Land Degradation	12
Occupation of Hazard Prone Lands	15
Loss of Cultural Resources and Open Space	22
Loss of Prime Agricultural Land	25
Excessive Urban Sprawl	26
III. FACTORS THAT PERPETUATE LAND-USE PROBLEMS	28
Inappropriate Regulation	28
Inadequate Information	32
Lack of Tenure Security	33
Inadequate Infrastructure Capacity	33
Inappropriate Pricing and Taxation	34
Weak Institutions and Poorly Coordinated Actors in the Land Market	34
IV. NEED FOR INTEGRATED LAND MANAGEMENT STRATEGY	36
Land Management Strategies for Balancing Environmental Protection and Urban Development	36
Building Land Management Capacity	45
V. CONCLUSIONS	47
ANNEX A: LAND MANAGEMENT INSTRUMENTS FOR MEETING ENVIRONMENTAL OBJECTIVES	58
Regulatory Instruments	58
Economic Instruments	70
Property Rights	74
Land Acquisition Alternatives	75
Government Provision of Infrastructure	79
Information and Education	81
ANNEX B: RELATED URBAN MANAGEMENT PROGRAMME PAPERS	92
REFERENCES	93
BOXES	
Box 1. Hillside settlement site in Mozambique	17
Box 2. Flooding in Rio de Janeiro	18

Box 3. Flood damage in Buenos Aires	19
Box 4. Earthquake damage in Dubrovnik	20
Box 5. Urban vulnerability in Katowice	21
Box 6. Industrial accident at Bhopal	22
Box 7. Hazardous chemicals threaten slum dwellers in Bangkok	23
Box 8. Agricultural land conversion in Dhaka	26
Box 9. Performance standards for wetlands	61
Box 10. Green area preservation in Seoul	62
Box 11. Shoreline restriction in Costa Rica	67
Box 12. Tax measures to discourage land speculation in Korea	72
Box 13. Land pooling/readjustment in Indonesia	82
Box 14. Low-cost GIS in Lobito Benguela	83
Box 15. Application of GIS to urban expansion and resettlement	84
Box 16. One hundred historic coastal sites of common Mediterranean interest	88
Box 17. Guidelines for coastal areas in Indonesia	90
Box 18. Role of NGOs in historic preservation	91

TABLES

Table 1. Annual agricultural land conversion in selected cities	10
Table 2. Wetland outputs	15
Table 3. Potential natural hazards	16
Table 4. Land management instruments to meet environmental objectives	48
Table 5. Land management instruments: their applicability, requirements, and costs	55
Table 6. Shoreland exclusion or restriction setbacks	66

EXECUTIVE SUMMARY

Introduction

i. Third World cities are growing at unprecedented rates. Since 1950, the urban population in these cities rose from under 300 million to 1.3 billion persons (World Bank 1991). By the year 2030, developing country cities are expected to grow by 160 percent. Although the urbanization process often means accelerated economic performance for a country, the accompanying increases in urban land prices as well as the conversion of land—whether that land lies within or outside the existing urbanized area—may have negative implications for natural and cultural resources as well as the urban poor.

ii. As demand for limited supplies of urban land rises, for example, low-income groups may be forced to occupy illegal unserviced subdivisions often on the periphery of cities, where the land tends to be most vulnerable to both natural and man-made hazards. The urbanization process also may exert pressure on sensitive ecosystems. Within existing built-up areas of cities, uncontrolled growth and inadequate infrastructure may cause irreversible losses of cultural resources and open space. Poorly managed development also may cause excessive urban sprawl and negative impacts on air quality, energy consumption, and aesthetic quality. The conversion of prime agricultural land to urban use may increase costs for locating, storing, and purchasing food.

iii. The purpose of this paper is to discuss pressing environmental risks associated with urban land use, the factors that perpetuate these problems in developing country cities, and available land management strategies and instruments for addressing them. It also is intended to provide expanded information and guidance related to the land use aspects of the urban environmental planning and management process presented in *Toward Environmental Strategies for Cities: A Framework for Urban Environmental Management in Developing Countries* (Bartone, Bernstein, Leitmann 1993). The paper is directed primarily to urban policy makers and land managers working at the technical level as well as other professionals responsible for designing or influencing land management policies or strategies in Third World cities.

Factors That Perpetuate Land Use Problems

iv. In most Third World cities, distorted land markets and inadequate management of land and environmental resources—both of which are exacerbated by rapid urban growth—have caused to varying degrees the environmental problems discussed above. The six key factors that account for continued resource degradation, occupation of hazard-prone areas, and excessive urban sprawl are: inappropriate regulation, lack of tenure security, inadequate infrastructure capacity, inadequate information, inappropriate pricing and taxation, and weak institutions and poorly coordinated actors in the land market.

Inappropriate regulation

v. The most important factor accounting for losses of natural and cultural resources as well as the occupation of hazard-prone land is inappropriate regulation. In many cases, the problem lies

in excessive regulation whereby land development standards reduce the supply of affordable serviced urban land by requiring large lot sizes or excessive amounts of land for circulation. These standards raise the costs of safe housing beyond the reach of low-income groups, who are then forced to seek housing in illegal settlements, often located in hazard-prone areas. In India, for example, the Madhya Pradesh land use regulations established development standards that were affordable to only the wealthiest 20 percent of the households. Because they could not afford such formal housing (or the transport costs to locate elsewhere), the victims of the 1984 Bhopal chemical accident were forced to live in the squatter settlements located near the Union Carbide factory.

vi. In many countries, excessive land survey regulations, titling requirements, and subdivision approval requirements present costly bottlenecks in acquiring and developing land. The time and costs involved in resolving disputes and obtaining clear title lead many households to obtain land and housing in informal settlements or subdivisions, often located on hazard-prone lands. In Kuala Lumpur, Malaysia, for example, stringent development standards and complicated time-consuming procedures to obtain the necessary subdivision approvals from about 55 separate government departments were principal factors accounting for the increase in new housing prices by 3 to 4 times the annual income of a typical urban household in the 1970s to 5.5 to 7 times the average annual income in the 1980s. During the same period in Bangkok, Thailand, where the entire subdivision approval process takes approximately 100 days, the price of housing in relation to annual income fell over the same period from roughly 5 times the annual income in the 1970s to about 2.5 times the annual income in the mid-1980s.

vii. In other situations, inadequate regulation is responsible for resource degradation and the occupation of hazard-prone lands. Many governments have not formulated effective land use policies, laws, and standards that address development in sensitive or hazardous areas or have not adequately enforced existing regulations. In Morocco, for example, the government declared certain portions of Rabat off limits for permanent housing because they were located on the steep slopes and adjacent salt marshes bordering the river that divides Rabat and Sale. Because these lands could not be used for “higher” purposes, the regulation essentially directed squatters right to them. In other cases, numerous codes and ordinances have been adopted from developed countries, which have very different land and construction conditions. These regulations usually are unenforceable because they are unrealistic or have been formulated without consultation with public or private interests and therefore lack political acceptance and adequate incentives.

Inadequate information

viii. Another severe constraint on land management as well as environmental planning, property taxation, and hazard mitigation is the lack of adequate data and maps. Without information on the resources to be managed, it is extremely difficult, if not impossible, for local authorities to establish effective regulations and policies that affect hazard-prone areas or sensitive land and cultural resources. Similarly, the lack of timely and accurate data necessary for land transactions seriously constrains the land market. Inadequate tax rolls have direct implications for financing urban services and thus expanding the supply of serviced land in the formal market. Lack of financial resources also means that existing services cannot be properly maintained, thus increasing the vulnerability of land in hazard-prone areas. In addition to inadequate data, most developing countries

also lack capacity in data interpretation. This inhibits the formulation and implementation of land management strategies as well as environmental impact assessments of proposed development projects.

Lack of tenure security

ix. The pervasive lack of secure tenure and poor titling and land registration systems in many developing countries poses a considerable constraint on urban land markets and therefore has a profound effect on the ability of the poor to acquire safe land for housing. One of the major implications of poor titling and land registration systems is the inability of landowners to gain access to formal credit sources because they cannot use their property as collateral. In most situations, banks will not provide loans for home improvements without a clear title. Further, without secure tenure, residents have little incentive to maintain their dwellings or invest in improvements, thereby increasing the vulnerability of the area to floods, earthquakes, and other hazards.

Inadequate infrastructure capacity

x. The lack of adequate infrastructure is another principal factor accounting for the degradation of natural and cultural resources. Few rapidly growing cities can meet the demand for services. In the squatter communities or illegal subdivisions located in hazard-prone lands, inadequate infrastructure and services make the land as well as its inhabitants particularly vulnerable. In the event of a flood, for example, accumulated garbage and human waste flowing through an area can have tragic implications for human health. The lack of adequate roads impedes access of emergency vehicles to these areas. In the case of cultural resources, inadequate wastewater disposal and drainage systems often result in substantial damage to historic properties. The inability of local governments to provide the necessary infrastructure and services is due in large part to its failure to consider appropriate technology as well as its deficient management practices and inability to mobilize the necessary financial resources.

Inappropriate pricing and taxation

xi. Because many of the benefits of conserving sensitive land resources (that is, wetlands and coastal areas) are difficult to measure, the value of conservation rather than development often is under-estimated. Consequently, the costs of protection in terms of development opportunities that must be given up, as well as government expenditures to acquire and manage a protected area, appear considerable. As a result, a smaller amount of land is protected than there would be if there was a full accounting of all the benefits and costs associated with each alternative land use. In the case of protecting cultural resources, the costs of protection are usually easy to quantify, while the benefits of preserving cultural resources are generally under-valued. In many cities, therefore, property owners view tearing down historic properties and building new structures as more profitable than rehabilitation and reuse although the latter approach may be equally profitable.

xii. Inefficient tax policies are significant factors encouraging urban sprawl. For example, low or non-existent property taxes and the absence of development fees or special assessments to cover the cost of publicly provided infrastructure not only subsidize the landowner but they enable landowners to tie up parcels of land unproductively at relatively low cost to themselves, while forcing

the government and their neighbors to assume additional costs of extending infrastructure to pay for urban sprawl. Due to inadequate taxation systems, most developing country cities also do not have sufficient resources to finance urban services as well as improved land titling and registration systems. In addition, local governments have not applied effective policies for collecting development fees, exactions, user charges, or other charges that could finance new or improved services and thus expand the supply of serviced land.

Weak institutions and poorly coordinated actors in the land market

xiii. Lastly, weak institutional capacity undermines most government efforts to manage urban land and cultural resources effectively. This encompasses lack of expertise in environmental planning and management, inadequate financial resources, and inadequate or lack of private sector and community involvement. Moreover, in many countries, there can be many land management institutions that formulate plans or policies or make investments in urban land. National land administration agencies, state planning departments, urban development or municipal housing authorities, land development agencies, and urban planning officials all have roles in determining the use of sensitive land and cultural resources. To further complicate this situation, there are traditional authorities as well as private organizations that are significant actors in urban land markets and the provision of housing. In most countries, however, there is no coordination among these actors; the entity making the plans often is not the one making decisions about public investments and private development.

Need for Integrated Land Management Strategy

xiv. Notwithstanding the failures of government interventions in urban land markets, some degree of government control must be exerted over urban land use and development. Without effective policies and regulations, it is unlikely that private actors in the land market will take into account the costs that their decisions concerning the use, density, design, location, and timing of development may impose on sensitive land and cultural resources. At the same time, government policies and regulations should not prevent the private sector from providing affordable housing for low-income populations in safe locations—or impose development restrictions that unnecessarily constrain the supply of residential land. For cities undergoing rapid expansion, therefore, one of the most important challenges is to achieve a proper balance between urban development and environmental protection.

Strategies for balancing environmental protection and urban development

xv. Balancing environmental and urban development objectives requires a two-prong urban land management strategy designed to facilitate land markets as well as protect priority land and cultural resources. The two components of this strategy are:

- **Protect priority resources.** Protecting priority land and cultural resources involves 1) restricting development in specific areas through special controls, development standards, or special taxes—coupled with effective enforcement,

and when necessary, designation and servicing of alternative locations; 2) allowing or encouraging appropriate or acceptable use of sensitive land or cultural property accompanied by the necessary impact mitigation measures and management controls; 3 encouraging preservation through tax incentives; and 4) improving citywide environmental management (that is, providing effective urban infrastructure and services so as to minimize externalities as well as guide development to environmentally suitable land).

- **Facilitate the land market.** Although the nature of the land market or resource management problems in an urban area will determine the most effective approach, improving the functioning of the land market so as to promote resource protection involves 1) providing infrastructure so as to reduce developers' risk and encourage high density development where desirable and 2) formulating regulations that are appropriate to local conditions, establish flexible development standards, and involve a minimum of administrative requirements.

xvi. To implement such a two-prong strategy, there is no one set of policies and policy instruments that will be effective under all conditions. Planners and policy makers in each city should evaluate their own local land use-related problems—and through an extensive participatory planning process—negotiate priorities and formulate locally appropriate strategies, policies, and investments, taking into account the interests of a wide range of public and private actors in the land market and the costs and benefits of each approach to both public and private sectors. Although the land use-related problems in a city will vary according to the physical, demographic, cultural, and economic conditions of a particular setting as well as the needs, roles, and capabilities of many public and private actors in the land market, the following highlights the most promising approaches to managing sensitive and hazard-prone land, cultural resources, agricultural land, and urban sprawl.

Protect sensitive land resources

- Improve citywide environmental management to minimize environmental externalities threatening natural resources.
- Establish buffer zones to minimize encroachment of activities that will threaten resources.
- Allow development or redevelopment of some critical zones accompanied by the necessary impact mitigation measures.
- Guide development to environmentally appropriate sites, while banning development on land where that development will cause irreversible impacts to significant natural resources.
- Where necessary, relocate households occupying environmentally fragile land to serviced land near employment and provide appropriate compensation.

Manage hazard-prone areas

- Improve citywide environmental management to reduce vulnerability of hazard-prone areas.
- Clarify land tenure to encourage investments in housing and infrastructure improvements that will withstand hazards.
- Allow appropriate use of hazard-prone areas provided that the necessary management controls are in place (for example, the land adjacent to heavy industry should be used for light industry or commercial establishments, and in some cases, parks and other open space uses).
- Ban development where hazardous conditions cannot be mitigated through appropriate infrastructure development or other measures (for example, building codes).
- Wherever there are land restrictions, carry out the necessary enforcement measures and service alternative sites (or increase allowable densities in existing urbanized areas) to ensure that new migrants do not take the place of the relocated groups.

Protect cultural resources

- Register and protect priority historic buildings, landmarks, or districts.
- Establish flexible controls on the uses of historic buildings so as to encourage adaptive reuse and ensure preservation.
- Clarify land tenure and register properties in the legal cadastre to enable owners to obtain loans or credits for investments in building improvements.

Conserve open space

- Where identified as a pressing environmental problem, preserve open space to meet minimum needs for recreation, drainage, or other urban purpose by designating land as parks or protected areas and apply the necessary management controls to prevent encroachment of non-conforming land uses.

Discourage excessive urban sprawl

- Clarify land tenure and implement other regulatory reforms that would expand housing opportunities in existing urbanized areas (for example, increase allowable densities in existing urbanized areas, encourage historic property preservation and rehabilitation, streamline the development approval process).
- Establish rights-of-way for primary infrastructure to guide new development.

Manage prime agricultural land

xvii. The measures to discourage urban sprawl are the principal means for either avoiding the loss of prime agricultural land or promoting the orderly conversion of agricultural land to urban use. Additional restrictions are not recommended (there is no evidence that any country has successfully limited land conversion without creating serious inflationary pressure on land prices for other uses). In most cases, the loss of agricultural land can be compensated for increasing the productivity of remaining farms, investing in the cultivation of new agricultural areas, or increasing food imports.

xviii. Implementing these land management approaches requires a mix of policies and instruments to guide and motivate the behavior of actors causing land degradation problems and those responsible for managing urban land so as to avoid them. Some of these instruments will influence market behavior (for example, increasing the land supply by removing excessive land use controls or improving land titling systems); others will affect the land management process through improved regulation, subsidies, or provision of information. The range of instruments fall into six basic categories:

- **Regulatory instruments.** These include zoning, subdivision regulations, transfer of development rights, and other types of land use controls designed to protect sensitive land resources, public interests, and environmental and cultural values;
- **Economic instruments.** These include economic incentives such as preferential taxation schemes, transfer and development taxes, and subsidies, all of which can be used to encourage developers and landowners to develop (or keep in natural state) land in accordance with environmental objectives;
- **Land acquisition alternatives.** These include various types of land acquisition approaches, such as voluntary sales, expropriation, easements, and land exchanges, that will enable urban land managers to meet conservation objectives;
- **Property rights.** This approach involves the provision of secure land tenure to promote investment in housing and infrastructure improvements;
- **Government provision of infrastructure.** This approach involves the provision of appropriate infrastructure to guide development as well as to serve the special needs of land resources or hazard-prone areas; and
- **Information and education.** These are methods for expanding knowledge of the issues, land conditions, and the environmental implications of various types of development on sensitive or hazard-prone lands. They can be used to support land use decisions and to encourage landowners and public authorities to carry out voluntary conservation. They include land information systems, various types of assessments, and public information.

xix. No single instrument will be effective in achieving all land management objectives. The choice of instruments should be matched to the special characteristics of each problem and locality,

the specific actor in the land market whose behavior needs changing, and the desired behavioral response. In determining the most appropriate instruments, urban land managers will need to assess such factors as existing and planned land uses, existing land use and other applicable controls that may or may not be appropriate or effectively enforced, existing rates of land conversion, and the extent of the urban or peri-urban land area requiring special protection. In addition, urban land managers will need to take into account local attitudes and interests; existing legal authorities and institutional capacities; prevailing economic and market conditions; the costs and benefits of alternative strategies for all actors; questions of efficiency, equity, and adaptability; available means for conflict resolution; and political constraints.

Building land management capacity

xx. Formulating and implementing land management strategies require a wide range of actions and capabilities from various public and private actors in urban land markets. Unfortunately, local agencies in many Third World cities lack the skills to adequately assess alternative strategies and communicate the tradeoffs to decision makers. Further, most Third World cities lack the necessary information for effectively carrying out most of the available land management strategies and tools. In developing any kind of strategic approach to land management, therefore, each city will need to build up its capabilities in formulating as well as assessing alternative management approaches, establishing clear institutional arrangements, encouraging public participation in the planning and decision-making processes, and building broad-based support.