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Josef Leitmann

Lessons from Cities
in the Developing World
Volume 2. Tools and Outputs

Rapid Urban
Environmental
Assessment

Urban
Management
Programme



13017 - Vol. 2

UNDP/UNCHS/World Bank
Urban Management Programme

Urban Management and the Environment

15

Rapid Urban Environmental Assessment

**Lessons from Cities in the Developing World
Volume 2—Tools and Outputs**

Josef Leitmann

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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 toward 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.

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FOREWORD

This volume has been prepared for the environment component of the Urban Management Programme (UMP), a joint undertaking of the United Nations Development Programme (UNDP), the United Nations Centre for Human Settlements (UNCHS), and the World Bank. The UMP represents a major cooperative and coordinated effort by the United Nations family of organizations, together with external support agencies, to strengthen the contribution that cities and towns in developing countries make toward economic growth, social development, and the alleviation of poverty. The UMP develops and promotes appropriate policies and tools for urban environmental management, infrastructure, land management, urban poverty alleviation, and municipal finance and administration. Through capacity building, the UMP is establishing an effective partnership with national, regional, and global networks and ESAs in applied research, information dissemination as well as exchanges of experience concerning best practices and options.

A milestone was achieved at the UNCED Earth Summit (Rio de Janeiro, 1992) when cities were successful in broadening the environmental debate to focus attention on urban priorities. There was broad-based agreement that the developing world's growing urban populations need attention, and their main concern is the "brown agenda"—involving pollution problems, environmental hazards, and poverty. The Earth Summit also recognized that local authorities and interest groups are best able to take concrete actions on the urban environment. The challenges now are to maintain the momentum built up before and during the Rio conference and to implement the decisions reached at the Summit.

A second milestone occurred at the final meeting of the Ford Foundation-supported global review of urban research in the developing world (Cairo, 1993). While virtually every regional analysis in this two-year study emphasized the urban environment as a priority topic for the urban research agenda in the 1990s, there was scant evidence of actual research having been completed and disseminated. During the last decade, explicit research on the urban environment only constituted between 1.5% (southern Africa) to 4% (southern cone of Latin America) of the urban research portfolio.

The consequence of these events is that there is a need for action at the local level, but there is little solid information available for planning and making decisions. One solution for resolving this contradiction is to apply the methodology for rapid urban environmental assessment that is developed in this paper. The methodology has been explicitly designed to be low cost, rapid, locally managed, and participatory. The first volume in this set develops the techniques, derives general lessons for urban environmental management from their application in a select number of cities, and suggests future directions and improvements. This volume consists of the tools that make up the methodology and examples of information they can generate.

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, DC, 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
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Technical Cooperation Division
United Nations Centre for
Human Settlements (HABITAT)

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Director
Transportation, Water, and
Urban Development Department

ABSTRACT

The 1992 UNCED Earth Summit concluded that the environmental problems of the world's growing urban population need attention; however, the 1993 Ford Foundation-supported evaluation of urban research in developing countries noted that scant data are available on the urban environment, as little research has been done on this topic. Thus, there is a need for environmental action at the local level but there is little solid information available for building public commitment, planning, and decision making. One solution for resolving this contradiction is to apply the tools for rapid urban environmental assessment that are presented in this report. The methodology has been explicitly designed to be low cost, rapid, locally managed, and participatory; it is also a starting point for environmental planning and management.

This is the second of a two-volume set on rapid urban environmental assessment. It is composed of the tools that can be directly applied in the field by practitioners and researchers concerned with urban environmental problems. The tools consist of an urban environmental data questionnaire, an urban environmental profile, and guidelines for consultations. These tools form the basis for a three-step process for rapid urban environmental assessment: (a) data collection, which leads to (b) analysis that supports (c) the involvement of stakeholders. The first volume in this set is designed for an audience of urban managers, policy makers, analysts, and researchers. It describes the development of the process, suggests future directions and improvements, and summarizes results from applying the approach in a select number of cities.

ACKNOWLEDGMENTS

This volume was assembled by Josef Leitmann of the World Bank's Urban Development Division, who also directed the field testing of the tools. The work could not have been done without the knowledge, experience, and specialized skills of key local consultants in the seven case study cities on four continents who are listed in Annex 1 of this publication. Useful overall advice was received from the external reviewers of this volume: Patricia L. McCarney (Center for Urban and Community Studies, University of Toronto) and Jeb Brugmann (Executive Director, International Council for Local Environmental Initiatives). Development of the data questionnaire was guided by Carl Bartone with the help of Helen Garcia, Stephen Maber and Celso N.E. Oliveira. Jochen Eigen and Jens Lorentzen provided useful comments on the initial design of the environmental profile. The consultations were managed by the "World Cities and the Environment: Five Cities Consultation Project" (directed by Ms. McCarney) and supported by a consortium of Canadian funding institutions.

ABBREVIATIONS*

AMA	Accra Metropolitan Authority
BOD	biochemical oxygen demand
DKI	National Capital Area (of Jakarta)
EAP	environmental action plan
EMS	environmental management strategy
ICLEI	International Council for Local Environmental Initiatives
Jabotabek	Jakarta metropolitan region
SCP	UNCHS (Habitat) Sustainable Cities Programme
SPMR	São Paulo Metropolitan Region
SWM	solid waste management
TMG	Tianjin Municipal Government
UMP	UNDP/UNCHS (Habitat)/World Bank Urban Management Programme
UMP/E	Environment component of the UMP
UNCED	United Nations Conference on Environment and Development
UNCHS	United Nations Centre for Human Settlements
UNDP	United Nations Development Program
UNEP	United Nations Environmental Programme
USAID	US Agency for International Development
USIR	Upper Silesian Industrial Region

* See Chapter 1, Annex A ("Units & Symbols") for abbreviations that are specific to the urban environmental data questionnaire.

INTRODUCTION AND USER'S GUIDE

Introduction

The 1992 UNCED Earth Summit concluded that the environmental problems of the world's growing urban population need attention; however, the 1993 Ford Foundation-supported evaluation of urban research in developing countries noted that scant data are available on the urban environment, as little research has been done on this topic. Thus, there is a need for environmental action at the local level but there is little solid information available for building public commitment, planning, and decision making. One solution for resolving this contradiction is to apply the tools for rapid urban environmental assessment that are presented in this report. The methodology has been explicitly designed to be low cost, rapid, locally managed, and participatory; it is also a starting point for environmental planning and management.

The rapid assessment approach

In the same spirit as rapid and participatory rural appraisal, a three-step process was developed to assess rapidly the state of the urban environment:

- An **urban environmental data questionnaire** was designed to measure a consistent set of data that are cross-sectoral and cross-media in nature.
- An **urban environmental profile** was outlined to analyze the nature, trends, and factors that influence environmental quality in cities.
- The framework of a **consultation process** was developed to initiate a public dialogue on environmental priorities and options as well as to partially validate the results of the questionnaire and profile through public discussion.

Rapid assessment can be the first step in a strategic approach to urban environmental planning and management. The technique helps to clarify issues, involve key actors, identify priorities, and build political commitment in a setting where some or all of these elements are lacking. Subsequent steps in the strategic approach are: (a) the formulation of an integrated **urban environmental management strategy** that embodies issue-specific strategies, long-term environmental goals, and phased targets for meeting the goals; (b) agreement on **issues-oriented action plans** for achieving the targets, including identification of least-cost project options, policy reforms, and institutional actions; and (c) a **consolidation** phase in which agreed programs and projects are initiated, policy reforms and institutional arrangements are solidified, the overall process is made routine, and monitoring and evaluation procedures are put in place. More information on this strategic approach can be found in *Towards Environmental Strategies for Cities*, Urban Management Programme Discussion Paper (forthcoming).

Development of the methodology

The rapid urban environmental assessment approach was developed by the environment component of the Urban Management Program (UMP), a joint undertaking of the United Nations

Development Program, the United Nations Centre for Human Settlements (UNCHS-Habitat), and the World Bank. This development was undertaken to address gaps in knowledge and to test a process that can support efforts to manage the urban environment. Little information is readily available on environmental conditions, the interaction between urban development and ecosystems, or the managerial setting that exists to respond to environmental problems in the cities of the developing world. Recent attempts to develop such information have been incomplete. Thus there appears to be a need for urban environmental research that is comprehensive, multisectoral, relatively short term, and consistent between cities. Similarly, there is a need for an action-oriented, informed process that can support better environmental planning and management at the city level.

A Brief User's Guide

Who should use this volume? This is the second of a two-volume set on rapid urban environmental assessment. It is composed of the tools that can be directly applied in the field by practitioners and researchers concerned with urban environmental problems. The tools consist of an urban environmental data questionnaire, an urban environmental profile, and guidelines for consultations. These tools form the basis for a three-step process for **rapid urban environmental assessment**: (a) data collection, which leads to (b) analysis that supports (c) the involvement of stakeholders. The first volume in this set is designed for an audience of urban managers, policy makers, analysts, and researchers. It describes the development of the process, suggests future directions and improvements, and summarizes results from applying the approach in a select number of cities.

How can this volume be used? The first three chapters contain the instruments that correspond with the three steps of rapid urban environmental assessment (collecting data; profiling conditions, interactions, and institutions; and involving stakeholders), preceded by some guidance about using each of them. The remaining three chapters provide samples of information that were generated by each of the tools (select urban environmental data, executive summaries of urban environmental profiles for several cities, outcomes of consultations). These chapters can be used in different combinations according to the needs of the user. The following box suggests how they might be combined.

How to Use the Chapters in this Volume	
NEED	SOURCE
Basic data collection; identification of areas where information is missing	Chapter 1 on Collecting Data Chapter 4 on Urban Environmental Indicators
Analyzing: environmental quality; linkages between development and environment; institutional setting	Chapter 2 on Profiling Conditions, Interactions and Institutions; Chapter 5 on Urban Environmental Profiles
Involving key publics to: identify constraints; set priorities; build political commitment	Chapter 3 on Involving Stakeholders; Chapter 6 on Urban Environmental Consultations
Conducting a rapid urban environmental assessment; initiating a process to develop an urban environmental strategy	Chapters 1-3 for the tools and how to use them; Chapters 4-6 for examples of results obtained in other cities; Volume 1 for lessons learned from the application of the approach in several cities

I. COLLECTING DATA

Guidance for Collecting Data on the Urban Environment

This section provides guidance for collecting data on the urban environment using the Urban Environmental Data Questionnaire. Guidance consists of: (a) recommendations, in the form of questions and answers, for completing the questionnaire; (b) a checklist of tasks for gathering and checking the data; and (c) sample terms of reference for the individual or team that will fill out the questionnaire. The actual questionnaire makes up the second half of the chapter. The English-language version is available on diskette with a downloadable database. French and Spanish versions, on paper and diskette but without the database, are also available from the Urban Management Programme.

Recommendations for completing the questionnaire

What skills are needed to complete the questionnaire?

The individual, firm, institution, or study team that prepares the questionnaire should have: (a) a professional background in urban and environmental issues; (b) an understanding of the range of information sources; and (c) access to those sources (see draft terms of reference below).

How should the questionnaire be prepared?

Mailing or distributing all or parts of the questionnaire to officials for them to fill in is usually less productive and more time-consuming than directly requesting, compiling, and summarizing the data.

How does one get access to the data?

Gathering information to prepare the questionnaire will require access to a range of governmental and other organizations at the local, regional, and national levels. This takes knowledge of information sources, appropriate contacts within the agencies where the information is located, and patience. A letter of introduction from a respected official or group associated with the rapid assessment can be helpful.

Can the questionnaire be modified?

Yes. The questions and categories can and should be revised, updated, or added to according to the needs for information, nature of the city, and availability of data.

How comprehensive should the data collection effort be?

Do not try to complete all of the tables in the questionnaire. In most cities, data are not available to do so. The blank spaces and tables are still useful as indicators of where important information may need to be collected in the future.

What common errors are made in filling out the questionnaire?

- The source, year, and appropriate jurisdiction for the data are not provided.
- Different years, units and/or jurisdictions are used in the same table.
- All possible sources of information are not considered for a particular table or item.
- Non-standard units of measurement are used.
- The necessary maps are not obtained.

What if my question is not answered in this section?

If you still have a question after checking in Volume 1 and the other sections of this volume, then contact the Urban Management Programme (address, phone and fax numbers are listed on the back page of this document).

Checklist

The following table provides a checklist of actions that should be completed in order to gather data on the urban environment using the questionnaire. It refers to the process, not to the contents of the questionnaire itself. A separate checklist referring to the questionnaire's contents is found at the end of the questionnaire itself (see Section D of the Annex).

Checklist for Urban Environmental Data Collection	
Activity	Completed?
Obtain appropriate version of data questionnaire: language (English, French, Spanish); format (paper copy or diskette)	
Translate questionnaire or sections, if necessary	
Identify key sources of information (local, regional and national governmental and other agencies)	
Identify, assess and select the person or team that will research and complete the questionnaire	
Contact the key information sources and inform them of the purpose of the data collection exercise	
Monitor the work of the data collection team to identify and solve problems	
Review a first draft of the completed questionnaire to locate missing information, errors, and inconsistencies	
Have missing information collected (if possible) and have errors and inconsistencies corrected	
Check individual sections and tables with appropriate information sources to ensure that data are correct and up-to-date	
Print and make questionnaire available to interested parties	

Sample terms of reference

1. As the first step in preparing a rapid urban environmental assessment of _____, you will be responsible for completing an urban environmental data questionnaire. Specifically, you will undertake the following tasks:
 - (a) Modify or translate the base questionnaire (a copy of which is attached for your use), if necessary;
 - (b) Identify potential sources of information for each section of the questionnaire;
 - (c) Gather relevant data, reports, and other documents from these sources of information;

- (d) Complete as much of the data questionnaire for this city as possible;
- (e) Present this first draft of the questionnaire so that it can be reviewed for missing information, alternative sources of data, errors, and inconsistencies;
- (f) Revise the questionnaire in light of the review;
- (g) Arrange for the completed tables and sections to be reviewed by relevant sources of information to ensure that they are accurate and up-to-date; and
- (h) Provide advice about/disseminate all or part of the completed questionnaire to stakeholders who are affected by, interested in, or influence urban environmental problems.

2. You will have two staff-months to complete this data collection exercise. A first draft should be available by _____; a final draft should be submitted by _____. You should submit both a paper copy and diskette/database of the completed questionnaire (if possible).

Urban Environmental Data Questionnaire

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GENERAL INFORMATION

1. This questionnaire seeks to collect data on a core set of urban environmental data which will be used in:
 - (a) The formulation of a comprehensive environmental profile of the city; and
 - (b) The development of a data base useful for urban environmental policy analysis and evaluation.

It is organized based on problem-focused indicators, specifically: land use, energy use, urban transport, air and noise pollution, water resources, water supply, sanitation, and solid and hazardous wastes. Statistics on socio-economics, housing, health conditions, and the natural environment are also collected as baseline data. The questionnaire is intended to be filled out by a consultant or study team and may require 4-6 person weeks of effort. It is intended to be mailed-out and completed by a number of separate sources of information.

2. Provide city level data as far as possible. If this is not available, use state (provincial, departmental, district, etc.) or national-level data in order of preference. Indicate the level or jurisdiction of the information reported, the year of the information and the source. The following city-level definitions are employed:

City Proper

The principal political jurisdiction containing the historical city center

Metropolitan Area

A politically defined urban area set up for planning or administrative purposes which may combine several jurisdictions (municipalities or cities)

Urban Agglomeration

Total contiguous built up area which may spill over defined political boundaries

3. The information to be gathered will come from a wide range of sources, for example, published and unpublished materials and personal interviews or official enquiries with agencies or institutes dealing with urban environmental issues. Published materials would include statistical yearbooks, digests, journals, country profiles, annual reports, etc. If the information was gathered through a personal interview, give the name of the person interviewed, his/her position, and organization/agency. Provide additional information on

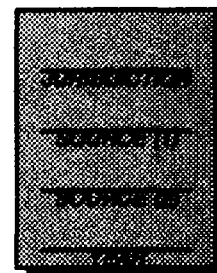
the data or its sources. Include bibliographic notes and/or attach a copy of the document or relevant information to the questionnaire. Always identify your sources and indicate these in the Source Box as follows:

Jurisdiction to which the data applies

Sources of data

(refer to a numbered bibliography list and attach this separately)

Base year of the data



4. The information given should be based on standard units of measurements for each item. If it is available in another unit of measurement, either convert it to the required unit of measurement using the appropriate conversion factors or if this is not feasible, give the unit of measurement used. Refer to Annex A for the Table on Units and Symbols. Quote all prices in US\$ equivalent (denoted by the \$ symbol). For current prices use the current exchange rate (as quoted in the table in paragraph 8). For past prices use exchange rates corresponding to the same time period. Exchange rates and inflation rates for the past 12 months and previous years are available from the World Bank.
5. Provide a base map of the city showing its political/geographic boundaries of the city proper, the metropolitan area and urban agglomeration. Information that requires map designations are indicated in the questionnaire. For a more effective presentation, provide overlay maps to illustrate the city's land use patterns and indicate locations of:
 - (a) Disposal points of urban wastes;
 - (b) Discharge sites of industrial wastewater and solid and hazardous waste; and
 - (c) Treatment/disposal facilities.
6. If the information requested can not be given please respond accordingly:

Not Available: **N/AV**

Not Applicable: **N/AP**

7. For further information or clarification on any aspect of this questionnaire, please contact:

Carl Bartone or Joe Leitmann

**Room S-10-141
INURD
The World Bank
1818 H Street NW
Washington DC 20433
USA**

**Tel.: 202-473-1301
Fax: 202-477-1391**

8. Fill in the general information below for the city and for the person responsible for completing the questionnaire.

NAME OF CITY			
COUNTRY			
CURRENCY			
EXCHANGE RATE		DATE	
INFLATION RATE		DATE	

CONTACT PERSON			
POSITION/TITLE			
ORGANIZATION			
ADDRESS			
TELEPHONE/FAX			
DATE			

HELP NOTES

I 1 Provide a **Map** showing the physical location and boundaries.

Provide a **Population Pyramid** to illustrate age and male/female distributions.

Explain how the **Year-2000** population was estimated.

I 2 Provide a **Population Density Map** of the City.

Annual Growth Rate "The average annual rate of population growth in the preceding five-year period"

Net Migration Rate "The difference between gross migration and gross emigration per 1,000 of the mid-year population"

Gross Pop. Density "Divide total population by the total land area"

Net Pop. Density "Divide total population by the built-up land area only, or specify the denominator used"

I SOCIO-ECONOMIC BACKGROUND

1 URBAN POPULATION			
Year	City Proper	Metropolitan Area	Urban Agglomeration
1950			
1960			
1970			
1980			
1990			
2000			
Explain Estimations			
Stable Population	Size		
	Year		

JURISDICTION _____
 SOURCE (1) _____
 SOURCE (2) _____
 YEAR _____

2 DEMOGRAPHIC STATISTICS				
Item	Units	City Proper	Metropolitan Area	Urban Agglomeration
Annual Growth Rate	%/year			
Net Migration Rate	%/year			
Gross Population Density	No./km ²			
Net Population Density	No./km ²			

JURISDICTION _____
 SOURCE (1) _____
 SOURCE (2) _____
 YEAR _____

HELP NOTES

I 3 Provide city-level urban data where available. If not available, give state or national statistics and indicate this clearly.

Population below the Poverty Line	"Those having less income than that needed to buy the minimum requirement of calories and protein, shelter, clothing and other necessities"
--	---

This information may only be available in research studies on income inequalities undertaken by the national or city economic planning agency or academic institutions engaged in economic research. Use the country's definition of urban poverty line (\$/capita/year) and give the value. If this is *not* available, use the WORLD BANK/WORLD DEVELOPMENT REPORT 1990 estimate of **\$370/capita/year** and check the box.

Income Distribution	Percentage share of the total income for each 20% quintile of all the incomes ranked in order (the 1st quintile is the lowest, 5th is highest income)
--------------------------------	---

I 4 **Informal Sector** For example; cottage industries, households with workshops, unregistered small factories, etc. If other industrial size definitions are used, please specify.

JURISDICTION
 SOURCE (1)
 SOURCE (2)
 YEAR

URBAN EMPLOYMENT BY MANUFACTURING INDUSTRY SIZE				
#	Industry Size	Employees	Number of Firms	Number of Employees
1	Large-Scale	> 500		
2	Medium-Scale	101 - 500		
3	Small-Scale	5 - 100		
4	Very Small-Scale	1 - 4		
5	Informal Sector	-		

JURISDICTION
 SOURCE (1)
 SOURCE (2)
 YEAR

POPULATION QUOTIENTS		
Adult Literacy Rate	%	
Regional Domestic Product per Capita per Year	\$/cap/year	
Urban Poverty Line OR World Bank Estimate?	\$/cap/year	<input type="checkbox"/>
Population below the Poverty Line	%	
Income Distribution	1st quintile %	
	2nd quintile %	
	3rd quintile %	
	4th quintile %	
	5th quintile %	

1 SOCIO-ECONOMIC BACKGROUND

HELP NOTES

I 5 Provide details of any industry that appears under *Other Manufacturing Industry* (ISIC Code 39).

If your country does not use ISIC Codes provide national industrial categories and corresponding information. Also, if there are more specific industrial categories in the urban area that are major sources of pollution identify them and provide appropriate data.

I SOCIO-ECONOMIC BACKGROUND

URBAN EMPLOYMENT BY MAJOR ECONOMIC SECTOR				
ISIC Code	Description	Number of Industries	Total Employment	Output (\$/yr)
31	Food Industry			
32	Textiles/ Clothing and Leather			
33	Wood and Wood Products			
34	Paper and Paper Products			
35	Chemical/Coal Petro/Plastic Products			
36	Nonmetallic Mineral Products			
37	Basic Metal Industry			
38	Fabrication of Machinery and Equipment			
39	Other Manufacturing Industry			
62	Retail Trade			
94	Recreational and Cultural Services			
95	Personal and Household Services			

JURISDICTION

SOURCE (1)

SOURCE (2)

YEAR

HELP NOTES

- I 6** Do *not* include services provided by the state or national-level government.

- I 7** For a metropolitan area with several municipalities give a breakdown of expenditures and services provided by each jurisdiction.

1 SOCIO-ECONOMIC BACKGROUND

6 MUNICIPAL SERVICES PROVIDED	
Service	YES NO
Water Supply	<input type="checkbox"/> <input type="checkbox"/>
Sewerage	<input type="checkbox"/> <input type="checkbox"/>
Drainage	<input type="checkbox"/> <input type="checkbox"/>
Solid Waste Collection	<input type="checkbox"/> <input type="checkbox"/>
Street Cleaning	<input type="checkbox"/> <input type="checkbox"/>
Street Lighting	<input type="checkbox"/> <input type="checkbox"/>
Electricity	<input type="checkbox"/> <input type="checkbox"/>
Gas	<input type="checkbox"/> <input type="checkbox"/>
Telephone	<input type="checkbox"/> <input type="checkbox"/>
Parks and Recreation	<input type="checkbox"/> <input type="checkbox"/>
Education	<input type="checkbox"/> <input type="checkbox"/>
Health Care	<input type="checkbox"/> <input type="checkbox"/>
Other _____	<input type="checkbox"/> <input type="checkbox"/>
Other _____	<input type="checkbox"/> <input type="checkbox"/>

JURISDICTION _____
 SOURCE (Y) _____
 SOURCE (Z) _____
 YEAR _____

7 ANNUAL MUNICIPAL EXPENDITURES (\$)	
Recurrent Costs	
Capital Investment	

JURISDICTION _____
 SOURCE (Y) _____
 SOURCE (Z) _____
 YEAR _____

HELP NOTES

- II 1 Dwelling Unit** "A separate and independent place of abode occupied by one household; for example, house, flat, apartment, suite or rooms."
- II 2** List the percentage of dwellings that have each type of facility. Provide city-level urban data where available. If not available, give state or national statistics and indicate this clearly.
- II 3 Room** "A separate habitable space inside the dwelling used for living, sleeping, or eating."
- Floor Area** "Usable floor area of habitable rooms inside the dwelling, including bathrooms, internal corridors, and closets."

II HOUSING CONDITIONS

1	OWNERSHIP OF OCCUPIED DWELLING UNITS		
	Dwelling	No.	%
	Owner-Occupied		
	Rented		
	Other		
	TOTAL		100.0

JURISDICTION
SOURCE (1)
SOURCE (2)
YEAR

2	DWELLINGS WITH SPECIAL FACILITIES	
	Facility	%
	Kitchen	
	Lighting	
	Water Supply Inside	
	Fixed Bath or Shower	
Any Type of Sanitation System		

JURISDICTION
SOURCE (1)
SOURCE (2)
YEAR

3	SIZE OF DWELLING UNITS		
	Average Number of Occupants per Room	No.	
	Floor Area per Person	m ²	

JURISDICTION
SOURCE (1)
SOURCE (2)
YEAR

HELP NOTES

- II 4** **Marginal Dwelling Unit** "Dwelling units without water and sanitation facilities and constructed with inadequate or dangerous building materials. Generally, marginal housing is considered unfit for habitation."
- Collective Living Quarters** "Structurally separate and independent place of abode intended for habitation by large groups of individuals or several households; for example, hotels, rooming houses, institutions, camps, compounds, or other living quarters."

II**HOUSING CONDITIONS**

4	MARGINAL DWELLING UNITS		
	Total Number of Marginal Dwelling Units	No.	
	Population Living in Marginal Dwelling Units	%	
	Annual Number of New Dwelling Units	No./yr	
	Annual Number of New Marginal Dwelling Units	No./yr	
	Number of Collective Living Quarters	No.	

JURISDICTION

SOURCE (1)

SOURCE (2)

YEAR

HELP NOTES

- III 1** **Life Expectancy at Birth** "The average number of years newborn babies can be expected to live if health conditions stay the same."
- Infant Mortality Rate** "Number of deaths per 1,000 infants born alive aged less than one year."
- Child Mortality Rate** "Number of deaths per 1,000 infants born alive aged one to five years."

The above are common statistics and should be available from the health authorities. However, *Productive Days Lost due to Illness* and *Productive Years Lost due to Early Death* are not common statistics and may only be available from health authorities, health policy research institutes or institutions engaged in economic research.

- III 2** **Worm Infections** e.g.: Ascaris, Trichuris, Hookworm, Pinworm, Dwarf Tapeworm, Other Tapeworms, Guinea Worm
- Insect-Borne Diseases** e.g.: Dengue, Malaria, Chagas, Urban Yellow Fever, Bancroftian Filariasis

Provide city-level/urban data where available, alternatively give state/national statistics and indicate this under *Jurisdiction*.

III HEALTH CONDITIONS

1	BASIC STATISTICS		
	Life Expectancy at Birth	Years	
	Infant Mortality Rate	No./1,000	
	Child Mortality Rate	No./1,000	
	Productive Days Lost due to Illness	Days/Year	
	Productive Years Lost due to Early Death	Years	

JURISDICTION

SOURCE (1)

SOURCE (2)

YEAR

2	MORTALITY RATES (per 100,000)		
	Code	Cause of Death	Rate
1	Diarrheal Diseases		
2	Gastrointestinal Diseases		
3	Infectious and Parasitic Diseases		
3a	- Measles		
3b	- Worm Infections		
3c	- Hepatitis		
3e	- Insect-Borne Diseases (specify): - _____ - _____		
4	Respiratory Diseases		
4a	- Acute Respiratory Infections		
4ai	- Pneumonia		
4b	- Tuberculosis		
4c	- Chronic Obstructive Lung Diseases		

JURISDICTION

SOURCE (1)

SOURCE (2)

YEAR

III

HEALTH CONDITIONS

2	MORTALITY RATES (per 100,000)		
	Code	Cause of Death	Rate
continued	5	Genito-Urinary Diseases	
	6	Gynecological Diseases	
	7	Obstetric Diseases	
	8	Perinatal Diseases	
	9	Sexually-Transmitted Diseases	
	9a	- AIDS	
	10	Cancer	
	11	Cardio-Vascular Diseases	
	11a	- Rheumatic Heart Disease	
	12	Cerebro-Vascular Diseases	
	13	Trauma	
	13a	- Fire	
	13b	- Traffic Accidents	
	13bi	- Occupants	
	13bii	- Pedestrians	
	13c	- Natural Disasters	
	13d	- Industrial Disasters	
	13e	- Homicide	
	13f	- Suicide	
	14	Malnutrition	
15	Skin Diseases		

HELP NOTES

IV 1 Provide data for the geographical center of the city.

IV 2 Use the classification codes from the following table:

GOODALL ECOLOGICAL SYSTEM OF CLASSIFICATION	
TERRESTRIAL ECOSYSTEMS	AQUATIC ECOSYSTEMS
<p>Natural Terrestrial Ecosystems</p> <p>1 Wet Coastal Ecosystems 2 Dry Coastal Ecosystems 3 Polar and Alpine Tundra 4 Swamp, Bog, Fen and Moor 5 Shrub Steppe and Cold Desert 6 Coniferous Forest 7 Temperate Deciduous Forest 8 Natural Grassland 9 Heath and Related Shrubland 10 Temperate Broad-Leaved Evergreen Forest 11 Maquis and Chaparral 12 Hot Desert and Arid Shrubland 13 Savannah and Savannah Woodland 14 Seasonal Tropical Forest 15 Equatorial Forest 16 Ecosystems of Disturbed Ground</p> <p>Managed Terrestrial Ecosystems</p> <p>17 Managed Grassland 18 Field Crop Ecosystems 19 Tree Crop Ecosystems 20 Greenhouse Foundation 21 Bio-Industrial Ecosystems</p>	<p>Inland Aquatic Ecosystems</p> <p>22 Rivers and Stream Ecosystems 23 Lake and Reservoir Ecosystems</p> <p>Marine Ecosystems</p> <p>24 Intertidal and Littoral Ecosystems 25 Ecosystems of Estuaries and Enclosed Seas 26 Coral Reefs 27 Ecosystems of the Continental Shelves 28 Ecosystems of the Deep Ocean</p> <p>Managed Aquatic Ecosystems</p> <p>29 Managed Aquatic Ecosystems</p>

IV 3 Provide data from the meteorological station closest to the city center. Use mean monthly values for months of minimum and maximum occurrences

IV NATURAL ENVIRONMENT

1	LOCATION OF THE CITY CENTER		
	Latitude	Degrees	
	Longitude	Degrees	
	Mean Elevation	Meters	

JURISDICTION

SOURCE (1)

SOURCE (2)

YEAR

2	ECOSYSTEM TYPE (Use Goodall Classification Codes)		
	Terrestrial Ecosystems	Natural	
		Managed	
	Aquatic Ecosystems	Inland	
		Marine	
		Managed	

JURISDICTION

SOURCE (1)

SOURCE (2)

YEAR

3	METEOROLOGICAL DATA						
	Attribute	Units	Minimum		Maximum		Mean Annual Value
			Mean Value	Month	Mean Value	Month	
	Temperature	°C					
	Humidity	%					
	Rainfall	mm/mo					
	Wind Speed	km/hr					
	Wind Direction	bearin g					
Sunshine	hrs/da y						

JURISDICTION

SOURCE (1)

SOURCE (2)

YEAR

HELP NOTES

IV 4	Dispersion Conditions	<i>Favorable</i>	Good ventilation and rapid dispersion of emissions.				
		<i>Unfavorable</i>	Poor ventilation and frequent temperature inversions trapping emissions over city.				
	Temperature Inversion	<i>Daily, Weekly, Monthly, Seasonally</i> (in which seasons do inversions mainly occur?)					
IV 5	Slope	<i>Flat, Basin, Rolling Hills, Valley, Plateau, Mountainous</i> (or a suitable alternative)					
		Drainage	<table border="0"> <tr> <td><i>Good</i></td> <td>Only infrequent, localized flooding.</td> </tr> <tr> <td><i>Average</i></td> <td>Infrequent flooding with perhaps a major flood every few years.</td> </tr> <tr> <td><i>Poor</i></td> <td>Major flooding every year.</td> </tr> </table>	<i>Good</i>	Only infrequent, localized flooding.	<i>Average</i>	Infrequent flooding with perhaps a major flood every few years.
<i>Good</i>	Only infrequent, localized flooding.						
<i>Average</i>	Infrequent flooding with perhaps a major flood every few years.						
<i>Poor</i>	Major flooding every year.						
IV 6	Natural Risk Factors	<i>Severe</i>	Frequent occurrence accompanied by loss of life, injury and property damage.				
		<i>Moderate</i>	Frequent occurrence with little loss of life, injury or property damage.				
		<i>Low</i>	Occasional occurrence without loss of life or injury and only minor damage.				
		<i>None</i>	Not characteristic of the region.				

IV NATURAL ENVIRONMENT

4	DISPERSION CONDITIONS		
	Feature	Urban Area	Regional
	Dispersion Conditions		
	Temperature Inversion	Frequency	
		Season	

JURISDICTION
SOURCE (1)
SOURCE (2)
YEAR

5	TOPOGRAPHY		
	Feature	Urban Area	Regional
	Slope		
	Drainage		

JURISDICTION
SOURCE (1)
SOURCE (2)
YEAR

6	ENVIRONMENTAL HAZARDS		
	Hazard	Urban Area	Regional
	Volcanic Activity		
	Seismic Activity		
	Flooding		
	Storms, Typhoons, etc.		
	Landslides, Mudslides		
	Others _____ _____		

JURISDICTION
SOURCE (1)
SOURCE (2)
YEAR

HELP NOTES

- V I** Provide a land-use map of the city and show clearly below where categories are aggregated when detailed breakdowns are inadequate.

V**LAND USE**

I		
URBAN LAND USE		
Code	Category	Area (km²)
1	Residential	
1a	- Marginal Settlements	
1b	- 1-2 Stories	
1c	- >3 Stories	
2	Commercial	
3	Industrial	
4	Public (government, schools, hospitals, churches, etc.)	
5	Mixed Use	
6	Transport and Communications	
6a	- Road Network	
6ai	- Paved	
6aii	- Unpaved	
6b	- Railways, Ports, Airports	
7	Technical Infrastructure (water, sewerage, wastes, power)	
8	Recreational and Other Open Land	
8a	- Parks, Green Areas, Natural Areas, Wetlands, etc.	
8b	- Cultivated	
8c	- Vacant	

TRANSITION

**AREA
DEFINED**

SOURCE (1)

SOURCE (2)

HELP NOTES

- V 2** Newly Incorporated Land "Non-urban land that has been reclassified as built-up or urban land during the last year."
- V 3** Provide a land-ownership map of the city.

V**LAND USE**

2	NEWLY INCORPORATED URBAN LAND		
	Previous Land Use	Area (km²)	Conversion Rate (km²/yr)
	Cultivated		
	Natural		
	Built-Up and Related Areas		
Unclassified Squatter Settlements			

JURISDICTION
SOURCE (1)
SOURCE (2)
PERIOD

3	LAND OWNERSHIP		
	Owner	Area (km²)	Percent of Total Area (%)
	National & Regional Government		
	Municipal Government		
	Private		
	Public, Collective, etc.		
Other _____			

JURISDICTION
SOURCE (1)
SOURCE (2)
YEAR

4	LAND REGISTRATION		
	Total Number of Parcels (estimated)	No.	
	Legally Titled Parcels	%	
	Registered in Fiscal Cadastre or Tax Roll	No.	

JURISDICTION
SOURCE (1)
SOURCE (2)
YEAR

HELP NOTES

- V 6** **House Price to
Income Ratio** "Ratio of the median free-market price of a dwelling unit and the median household income."
- Rent to Income
Ratio** "Ratio of the median annual rent of a dwelling unit and the median household income of renters."

This information can generally be obtained from the *Board of Realtors* or equivalent.

V LAND USE

5	LAND USE REGULATION		
	Density Regulation	Floor Ratio	
	Area of City Under Land Use Regulation	km ²	
		% of Total Area	
	Historical Sites Preserved	No.	

JURISDICTION
SOURCE (1)
SOURCE (2)
YEAR

6	LAND MARKET		
	Cost of Commercial Floorspace	\$/m ²	
	House Price to Income Ratio	\$\$	
	Rent to Income Ratio	\$\$	
	Is There Price Control ?	YES	<input type="checkbox"/>
		NO	<input type="checkbox"/>
	Is There Rent Control ?	YES	<input type="checkbox"/>
		NO	<input type="checkbox"/>

JURISDICTION
SOURCE (1)
SOURCE (2)
YEAR

H E L P N O T E S

VI 1	Motorization Rate	"Motorized Trips/Total Trips"
	Private Sector Share of Public Transport	"Proportion (%) of public transport owned and/or operated by the private sector (e.g., taxis, buses, subways, collectives, etc.)."

Be sure to quote the area defined by these statistics.

VI**URBAN TRANSPORT**

I				BASIC STATISTICS			
Motorization Rate				%			
Energy Intensity of Urban Transport				kgoe/cap/day			
Private Sector Share of Public Transport				%			
Road Network		Paved		km			
		Unpaved		km			
Gasoline		Lead Content		g/l			
Diesel		Sulphur Content		g/l			
Coal		Sulphur Content		g/kg			

 JURISDICTION

 AREA
DEFINED

 SOURCE (1)

 SOURCE (2)

2				VEHICLE STOCKS			
		Mode		Number		Increase (No./yr)	
		Cars					
		Electric Buses and Trolleys					
		Diesel Buses and Goods Vehicles					
		Other Buses and Goods Vehicles					
		Motorized 2-3 Wheeler					
		Bicycles					
		Water Transport (taxi, ferry, barge, etc.)					

 JURISDICTION

 SOURCE (1)

 SOURCE (2)

 YEAR

HELP NOTES

VI 3 If available, include bicycle/pedestrian data under *Others*.

VI 4

CO ₂	Carbon Dioxide
CO	Carbon Monoxide
H-C	Hydro-Carbons
NO _x	Nitrogen Oxides
SO _x	Sulphur Oxides
A	Aldehydes
SPM	Suspended Particulate Matter
Pb	Lead

For more information on emission coefficients refer to page 46 of "*Automotive Air Pollution - Issues and Options for Developing Countries*" a PRE Working Paper published by the World Bank in August 1990 by Asif Faiz et al.

VI

URBAN TRANSPORT

3

MOTORIZED TRAVEL BY MODE			
Mode	Vehicle-km per day	Passenger-trips per day	Passenger-km per day
Cars			
Electric Buses			
Trolley Buses			
Rail or Subway			
Goods Vehicles			
2-3 Wheelers			
Others _____			

JURISDICTION _____
 SOURCE (1) _____
 SOURCE (2) _____
 YEAR _____

4

EMISSIONS FROM URBAN TRANSPORT (Ktons/year)								
Mode	CO ₂	CO	H-C	NO _x	SO _x	A	SPM	Pb
Cars								
Electric Buses								
Trolley Buses								
Rail or Subway								
Goods Vehicles								
2-3 Wheelers								
Ships/Boats								
Aircraft								
Others _____								

JURISDICTION _____
 SOURCE (1) _____
 SOURCE (2) _____
 YEAR _____

HELP NOTES

VI 5 Accident Index "Number of deaths/vehicle-km."

VI 6 Describe *all* environmental restrictions.

VI

URBAN TRANSPORT

5 INJURIES RESULTING FROM VEHICLE ACCIDENTS (Number/year)				
Accident	Vehicle Occupants	Pedestrians	Total	Accident Index
Injuries				
Deaths				

JURISDICTION _____
 SOURCE (1) _____
 SOURCE (2) _____
 YEAR _____

6 PASSENGER CAR RESTRICTIONS		
Are there any environmental restrictions placed on the circulation of private passenger cars ?	YES	<input type="checkbox"/>
If YES, describe below:	NO	<input type="checkbox"/>

JURISDICTION _____
 SOURCE (1) _____
 SOURCE (2) _____
 YEAR _____

H E L P N O T E S

- VII 1** Refer to the Energy Conversion Tables in Annex B, if required. Specify any other major fuel(s) used.

VII ENERGY USE

ANNUAL GROSS ENERGY CONSUMPTION (Ktoe/year OR _____)						
Source	Residential	Transport	Industry	Government and Commercial	Total	% of National Total
Electricity						
Fuel oil						
Gasoline						
Diesel						
Kerosene						
LPG						
Natural Gas						
Coal Gas						
Coal						
Soft Coke						
Charcoal						
Firewood						
Other _____						
Totals						

JURISDICTION _____
 SOURCE (1) _____
 SOURCE (2) _____
 YEAR _____

HELP NOTES

VII 2	CO₂	Carbon Dioxide
	CO	Carbon Monoxide
	H-C	Hydro-Carbons
	NO_x	Nitrogen Oxides
	SO_x	Sulphur Oxides
	A	Aldehydes
	SPM	Total Suspended Particulate Matter
	SPM₁₀	Suspended Particulate Matter < 10 microns ("smoke")
	Pb	Lead
	OT	Other Toxins

For more information on emission coefficients refer to page 46 of *"Automotive Air Pollution - Issues and Options for Developing Countries,"* a PRE Working Paper published by the World Bank in August 1990 by Asif Faiz et al.

VII ENERGY USE

2	EMISSIONS FROM COMBUSTION (Ktons/year)										
	Fuel	CO₂	CO	H-C	NO_x	SO_x	A	SPM	SPM₁₀	Pb	OT
	Fuel Oil										
	Gasoline										
	Diesel										
	Kerosene										
	LPG										
	Natural Gas										
	Coal										
	Soft Coke										
	Charcoal										
	Firewood										
	Other _____										

JURISDICTION
 SOURCE (1)
 SOURCE (2)
 YEAR

HELP NOTES

VII 3 Refer to the national or sub-national grid that supplies the city.

VII

ENERGY USE

3

INTERCONNECTED ELECTRICITY GRID GENERATION				
Source	Production (GWh/yr)	Share of Production (%)	Installed Capacity (MW)	Share of Capacity (%)
Coal				
Soft Coke				
Hydro				
Fuel Oil				
Diesel				
Nuclear				
Other ____				

JURISDICTION
 SOURCE (1)
 SOURCE (2)
 YEAR

4

IN-CITY ELECTRICITY UTILITY		
Source	Generating Capacity (MW)	Average Capacity Utilization (MW)
Coal		
Soft Coke		
Hydro		
Fuel Oil		
Diesel		
Nuclear		
Other ____		

JURISDICTION
 SOURCE (1)
 SOURCE (2)
 YEAR

HELP NOTES

VII 7 **Energy Intensity** = $\frac{\text{Total Annual Gross Energy Consumption}}{\text{Total Urban Population}}$

VII 8 Provide the average price over the year quoted.

Include other major fuels (e.g., gasohol) under *Other*.

VII

ENERGY USE

7 OTHER ENERGY INDICATORS		
Proportion of Households Electrified	%	
Average Energy Intensity	toe/cap/yr	

JURISDICTION _____
 SOURCE (1) _____
 SOURCE (2) _____
 YEAR _____

8 ENERGY PRICING		
Electricity	\$/kWh	
Fuel oil	\$/l	
Gasoline	\$/l	
Diesel	\$/l	
Kerosene	\$/l	
LPG	\$/m ³	
Natural Gas	\$/m ³	
Coal Gas	\$/m ³	
Coal	\$/ton	
Soft Coke	\$/ton	
Charcoal	\$/ton	
Firewood	\$/ton	
Other _____	\$/__	

JURISDICTION _____
 SOURCE (1) _____
 SOURCE (2) _____
 YEAR _____

HELP NOTES

VIII 1

Add in other sources of pollution to the combustion-related emissions recorded in VII 2.

HELP NOTES

VIII 4 Use the following guidelines to determine *percentage exceeded*:

Pollutant	Guideline ($\mu\text{g}/\text{m}^3$)	Averaging Period	Source
CO	10,000	8 hours	US
NO _x	320	1 hour	WHO
SO ₂	40 - 60	1 year	WHO
SPM	60 - 90	1 year	WHO
SPM ₁₀ (Smoke)	40 - 60	1 year	WHO
Lead	1.5	3 months	US
Ozone	60	8 hours	WHO

VIII

AIR POLLUTION

3 ARE THESE POLICIES/REGULATIONS BEING IMPLEMENTED?

Policy/Regulation	YES	NO
Emission Standards	<input type="checkbox"/>	<input type="checkbox"/>
Fuel Quality Standards	<input type="checkbox"/>	<input type="checkbox"/>
Product Standards	<input type="checkbox"/>	<input type="checkbox"/>
Mandatory Control Technologies	<input type="checkbox"/>	<input type="checkbox"/>
Subsidized Control Technologies	<input type="checkbox"/>	<input type="checkbox"/>
Land Use Control	<input type="checkbox"/>	<input type="checkbox"/>
Emission Permits	<input type="checkbox"/>	<input type="checkbox"/>
Other _____	<input type="checkbox"/>	<input type="checkbox"/>

JURISDICTION _____
 SOURCE (1) _____
 SOURCE (2) _____
 YEAR _____

4 AMBIENT CONCENTRATIONS

Pollutant	Annual Average (µg/m ³)	% of Daily Samples Exceeding Guidelines
Carbon Monoxide		
Nitrogen Oxides		
Sulphur Oxides		
Total SPM		
Smoke SPM ₁₀		
Lead		
Ozone		

JURISDICTION _____
 SOURCE (1) _____
 SOURCE (2) _____
 YEAR _____

VIII

AIR POLLUTION

5 MONITORING NETWORK			
Area	Number of Stations	Average Number of Days Sampled per Year	Total Number of Daily Samples per Year
Residential			
Industrial			
Business			
Total			

JURISDICTION _____
 SOURCE (1) _____
 SOURCE (2) _____
 YEAR _____

6 ENVIRONMENTAL HEALTH			
Is there a health warning system currently in effect ?	YES	<input type="checkbox"/>	
	NO	<input type="checkbox"/>	
If YES, give the following data:			
Description of the system			
Number of Days with Warnings During the Past Year			
Number of Days with Warnings During the Past Ten Years			
Number of Days with Industrial Stoppages During the Past Year			
Number of Days with Industrial Stoppages During the Past Ten Years			

JURISDICTION _____
 SOURCE (1) _____
 SOURCE (2) _____
 YEAR _____

IX NOISE POLLUTION

1					
NOISE LEVELS					
Population Living in Areas Exposed to Excessive Noise				%	
Residential	Day			decibels	
	Night			decibels	
Elsewhere	Day			decibels	
	Night			decibels	
Standard for "Excessive Noise"					

JURISDICTION _____
 SOURCE (1) _____
 SOURCE (2) _____
 YEAR _____

2		
NOISE POLLUTION CONTROL		
Is there a noise pollution control currently in effect ?	YES NO	<input type="checkbox"/> <input type="checkbox"/>
If YES, give the following data:	Agency responsible for implementing the program	Year began
Description of the program		(Is it regulations only?)

JURISDICTION _____
 SOURCE (1) _____
 SOURCE (2) _____
 YEAR _____

HELP NOTES

- X 2** **Severity** Severe, Moderate, Low, None
- Seasonality** If there is a period of the year when the problem is
 more serious, specify the month(s) or season.

X WATER AND SANITATION

1 WATER RESOURCES		
Source	Water Abstraction (m ³ /day)	
Surface Water	Total	
	River	
	Lake	
	Reservoir	
	Inter-Basin Transfer	
Groundwater		
Other _____		

JURISDICTION _____
 SOURCE (1) _____
 SOURCE (2) _____
 YEAR _____

2 GROUNDWATER ABSTRACTION PROBLEMS			
Problem	Severity	Seasonality	
Overdraft			
Land Subsidence			
Saline Intrusion			
	Bacterial		
Water Quality	Nitrogen		
	Landfill Contamination		
Other _____			

JURISDICTION _____
 SOURCE (1) _____
 SOURCE (2) _____
 YEAR _____

X WATER AND SANITATION

3	FUTURE RESOURCES		
	Question	Units	Answer
	Distance to the Furthest Water Source	km	
	Incremental Cost of the Next/Latest Major Source	\$/m ³	
	Alternative Sources and their Proposed Costs	Name US/m ³	
		Name US/m ³	
		Name US/m ³	

JURISDICTION

SOURCE (1)

SOURCE (2)

YEAR

4	WATER SUPPLY		
	User	Water Consumption	
		m ³ /day	l/capita/day
	Municipal		
	Industrial		
	Domestic		
	Other _____		

JURISDICTION

SOURCE (1)

SOURCE (2)

YEAR

HELP NOTES

- X 6** Specify other systems as follows: septic tanks, cess pools, soak pits, VIP latrines, vault latrines, bucket latrines, open-air defecation, etc.

X WATER AND SANITATION

5	WATER DELIVERY		
	Households with Easy Access to a Standpipe (within 200m)	%	
	Households with Piped Water Supply House Connections	%	
	Average cost of Water Supply Production and Distribution	\$/m ³	
	Average Recovered Cost (Tariffs)	\$/m ³	
	Unaccounted For Water (Water Produced but not Billed)	%	

JURISDICTION _____
 SOURCE (1) _____
 SOURCE (2) _____
 YEAR _____

6	HOUSEHOLD SANITATION INSTALLATIONS		
	Type	Description	Population Served (%)
	Sewer Connection		
	Communal Sanitation		
	On-Site Sanitation		
	Other Systems _____ _____ _____		

JURISDICTION _____
 SOURCE (1) _____
 SOURCE (2) _____
 YEAR _____

HELP NOTES

X 8 Sewage "Domestic wastewater *collected* by a piped system."

X WATER AND SANITATION

7	DRAINAGE NETWORK COVERAGE	
	Type of Drain	Urbanized Land Area Covered (%)
	Sanitary Sewers	
	Combined Sewers	
	Open Sewers	
	Combined Surface Drains	

JURISDICTION _____
 SOURCE (1) _____
 SOURCE (2) _____
 YEAR _____

8	SEWAGE FLOW RATES	
	Source	Average Flow (m³/day) Proportion Treated (%)
	Municipal	
	Industrial	
	Domestic	
	Total	

JURISDICTION _____
 SOURCE (1) _____
 SOURCE (2) _____
 YEAR _____

HELP NOTES

- X 9** Provide a map showing the location of the treatment plants and the major sewer collectors and interceptors. Indicate capacities and flows (m^3/day).

- X 10** On the same map show the location of each point of sewage discharge identified. Indicate flows (m^3/day).

X WATER AND SANITATION

9 SEWAGE TREATMENT PLANTS					
Type	Description	Number	Capacity (m ³ /day)	Average Flow (m ³ /day)	
Conventional	Primary/Mechanical				
	Secondary/Biological				
	Tertiary/Advanced				
Nightsoil					
Other _____					

JURISDICTION _____
 SOURCE (1) _____
 SOURCE (2) _____
 YEAR _____

10 SEWAGE DISPOSAL				
Receiving Body	Name(s) of Principal Disposal Site(s)	Volume (m ³ /day)	Average BOD (mg/l)	
Stream Bed				
River				
Lake				
Estuary				
Ocean				
Land				
Reuse				
Other _____				

JURISDICTION _____
 SOURCE (1) _____
 SOURCE (2) _____
 YEAR _____

X WATER AND SANITATION

II	INDUSTRIAL EFFLUENT			
	Item	Number	Capacity (m ³ /day)	Average Flow (m ³ /day)
	Number and Volume of Direct Industrial Discharges to Water or Land		N/A	
	Number and Capacity of Industrial Waste Water Treatment Plants	Individual		
		Regional (shared)		

JURISDICTION
SOURCE (1)
SOURCE (2)
YEAR

X WATER AND SANITATION

12 WATER POLLUTION POLICY INSTRUMENTS				
Instrument	YES	NO	?	Agency/Organization
Environmental Impact Assessment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Discharge Permit System	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Effluent Standards	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
- for Discharge to Sewers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
- for Specific Industries	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
- for Specific Pollutants	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Mandatory Pretreatment/Treatment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Special Sewer Charges	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Effluent Tax	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Subsidies for Treatment Facilities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Effluent Monitoring	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
- Self-Monitoring and Reporting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Process/Product Standards	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Other _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

JURISDICTION _____ SOURCE (N) _____ SOURCE (P) _____ YEAR _____

X**WATER AND SANITATION**

13	WATER QUALITY MONITORING				
	Parameters	Monitored		Frequency (Times/yr)	Samples (No./yr)
		YES	NO		
	Streamflow	<input type="checkbox"/>	<input type="checkbox"/>		
	Particulate matter	<input type="checkbox"/>	<input type="checkbox"/>		
	- Total Suspended Solids	<input type="checkbox"/>	<input type="checkbox"/>		
	- Turbidity	<input type="checkbox"/>	<input type="checkbox"/>		
	Organic Pollution Indicators	<input type="checkbox"/>	<input type="checkbox"/>		
	- BOD ₅	<input type="checkbox"/>	<input type="checkbox"/>		
	- COD	<input type="checkbox"/>	<input type="checkbox"/>		
	- Dissolved Oxygen	<input type="checkbox"/>	<input type="checkbox"/>		
	Nutrients	<input type="checkbox"/>	<input type="checkbox"/>		
	- Phosphates	<input type="checkbox"/>	<input type="checkbox"/>		
	- Organic Nitrogen	<input type="checkbox"/>	<input type="checkbox"/>		
	- Ammonia	<input type="checkbox"/>	<input type="checkbox"/>		
	- Nitrates and Nitrites	<input type="checkbox"/>	<input type="checkbox"/>		
	Microbiological Indicators	<input type="checkbox"/>	<input type="checkbox"/>		
	- Coliforms	<input type="checkbox"/>	<input type="checkbox"/>		
	- Parasites	<input type="checkbox"/>	<input type="checkbox"/>		
	Salinity	<input type="checkbox"/>	<input type="checkbox"/>		
	- pH	<input type="checkbox"/>	<input type="checkbox"/>		
	- Electrical Conductivity	<input type="checkbox"/>	<input type="checkbox"/>		
	- Specific Ions	<input type="checkbox"/>	<input type="checkbox"/>		
	Metals	<input type="checkbox"/>	<input type="checkbox"/>		
	Organic Micropollutants	<input type="checkbox"/>	<input type="checkbox"/>		
	Pesticides	<input type="checkbox"/>	<input type="checkbox"/>		
	Others	<input type="checkbox"/>	<input type="checkbox"/>		

X**WATER AND SANITATION**

14	MONITORING AGENCIES	
	Total Number of Water Quality Monitoring Stations	
	Agency/Agencies Responsible for Water Quality Monitoring	

JURISDICTION

SOURCE (1)

SOURCE (2)

YEAR

HELP NOTES

- XI 1** Include hospital and medical wastes under the *Hazardous Source* category.
- XI 2** Provide a map to show the location of all disposal or treatment facilities identified. Indicate capacities and flows (tons/day).

XI SOLID AND HAZARDOUS WASTES

TOTAL SOLID WASTES GENERATED						
Source	Generated		Collected		Private Collection	
	tons/day	Estimate? YES NO	tons/day	Estimate? YES NO	Available? YES NO	%
Municipal		<input type="checkbox"/> YES <input type="checkbox"/> NO		<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	
Commercial		<input type="checkbox"/> YES <input type="checkbox"/> NO		<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	
Industrial		<input type="checkbox"/> YES <input type="checkbox"/> NO		<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	
- Hazardous		<input type="checkbox"/> YES <input type="checkbox"/> NO		<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	
Others		<input type="checkbox"/> YES <input type="checkbox"/> NO		<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	

JURISDICTION _____

SOURCE (1) _____

SOURCE (2) _____

YEAR _____

JURISDICTION _____

SOURCE (1) _____

SOURCE (2) _____

YEAR _____

MUNICIPAL SOLID WASTES	
Municipal Solid Wastes Generated	kg/cap/day
Households with a Collection Service	No.
Communal Bin Transfer Stations	No.
	tons/day
Conventional Transfer Stations	No.
	tons/day
Collection Vehicles	No.
	% operating

XI SOLID AND HAZARDOUS WASTES

3

DISPOSAL OF MUNICIPAL SOLID WASTES

Site	Quantity (tons/day)
Open Dump	
Sanitary Landfill	
Incineration	
Composting	
Recycling	
Total	

JURISDICTION _____
 SOURCE (1) _____
 SOURCE (2) _____
 YEAR _____

4

MUNICIPAL EXPENDITURES FOR SOLID WASTE MANAGEMENT

Activity	Cost (\$/ton)	Proportion (%)
Collection		
Street Sweeping		
Transfer		
Open Dumping		
Sanitary Landfilling		
Incineration		
Composting		
Recycling		
Total		100.0

JURISDICTION _____
 SOURCE (1) _____
 SOURCE (2) _____
 YEAR _____

XI SOLID AND HAZARDOUS WASTES

DUMPSITES	
Is there informal scavenging at dumpsites?	YES <input type="checkbox"/>
	NO <input type="checkbox"/>
Is scavenging legal/controlled?	YES <input type="checkbox"/>
	NO <input type="checkbox"/>
How many people are involved in scavenging activities?	No.
Leachate pollution detected?	Surface Water YES <input type="checkbox"/>
	Surface Water NO <input type="checkbox"/>
	Groundwater YES <input type="checkbox"/>
	Groundwater NO <input type="checkbox"/>

JURISDICTION
SOURCE (1)
SOURCE (2)
YEAR

HELP NOTES

- XI 7** Provide a map to show the location of all hazardous waste disposal or treatment facilities identified.

XI SOLID AND HAZARDOUS WASTES

7 HAZARDOUS WASTE FACILITIES					
Facility	Available? YES NO	Capacity (tons/yr)	Average Use (tons/day)	Responsible Operator? YES NO	
Physical/Chemical Treatment	<input type="checkbox"/> <input type="checkbox"/>			<input type="checkbox"/> <input type="checkbox"/>	
Incineration	<input type="checkbox"/> <input type="checkbox"/>			<input type="checkbox"/> <input type="checkbox"/>	
- Hospital Wastes	<input type="checkbox"/> <input type="checkbox"/>			<input type="checkbox"/> <input type="checkbox"/>	
Other Treatment _____	<input type="checkbox"/> <input type="checkbox"/>			<input type="checkbox"/> <input type="checkbox"/>	
Controlled Landfill	<input type="checkbox"/> <input type="checkbox"/>			<input type="checkbox"/> <input type="checkbox"/>	
- Co-disposal	<input type="checkbox"/> <input type="checkbox"/>			<input type="checkbox"/> <input type="checkbox"/>	
Uncontrolled Landfill Disposal	<input type="checkbox"/> <input type="checkbox"/>			<input type="checkbox"/> <input type="checkbox"/>	
Containment	<input type="checkbox"/> <input type="checkbox"/>			<input type="checkbox"/> <input type="checkbox"/>	
Open Dumping	<input type="checkbox"/> <input type="checkbox"/>			<input type="checkbox"/> <input type="checkbox"/>	

JURISDICTION _____
 SOURCE (1) _____
 SOURCE (2) _____
 YEAR _____

HELP NOTES

- XI 8** Add any additional data below regarding the specific responsibilities of each of the agencies identified.

XI SOLID AND HAZARDOUS WASTES

JURISDICTION _____
SOURCE (1) _____
SOURCE (2) _____
YEAR _____

8	HAZARDOUS WASTE POLICIES BEING IMPLEMENTED		
Policy	Implemented? YES NO	Agency	
Waste Minimization and Recycling	<input type="checkbox"/> YES <input type="checkbox"/> NO		
Chemical and Waste Storage	<input type="checkbox"/> YES <input type="checkbox"/> NO		
Facility and Plant Inspection	<input type="checkbox"/> YES <input type="checkbox"/> NO		
Transport and Manifest System	<input type="checkbox"/> YES <input type="checkbox"/> NO		
Treatment/Disposal Standards	<input type="checkbox"/> YES <input type="checkbox"/> NO		
Permit and Approval Fees	<input type="checkbox"/> YES <input type="checkbox"/> NO		
Subsidies for Treatment/Disposal	<input type="checkbox"/> YES <input type="checkbox"/> NO		
Site Clean-Up	<input type="checkbox"/> YES <input type="checkbox"/> NO		
Waste Import	<input type="checkbox"/> YES <input type="checkbox"/> NO		
Waste Export	<input type="checkbox"/> YES <input type="checkbox"/> NO		
Waste Exchange Service	<input type="checkbox"/> YES <input type="checkbox"/> NO		
Household Hazardous Waste Collection	<input type="checkbox"/> YES <input type="checkbox"/> NO		
Other _____	<input type="checkbox"/> YES <input type="checkbox"/> NO		

A**UNITS AND SYMBOLS**

Weights and Measures		Energy Abbreviations		Others	
m	meter	kgoe	kilograms of crude oil equivalent	d	day
m²	square meter			hr	hour
km	kilometer	toe	tons of crude oil equivalent	mo	month
km²	square kilometer			yr	year
kg	kilogram	MW	MegaWatt	No.	number
t ton	metric ton	GW	GigaWatt	cap	capita
mm	millimeter	KWh	Kilo Watt-Hour	K	thousand
l	liter	MWh	Mega Watt-Hour		
m³	cubic meter	GWh	Giga Watt-Hour		

B (1)**T.O.E of LIQUID FUELS**

METRIC TON OIL EQUIVALENTS OF LIQUID FUELS							
FUELS		Thousand Metric Tons Actual Measure per:					
		Thousand Metric Tons	Thousand Long Tons	Thousand Cubic Meters	Thousand Barrels	Million Imperial Gallons	Million U.S. Gallons
Gas	LPG/LRG	1.0	1.016	0.54	0.086	2.45	2.04
	Propane	1.0	1.016	0.51	0.081	2.32	1.93
	Butane	1.0	1.016	0.58	0.092	2.63	1.96
Gasoline	Natural	1.0	1.016	0.63	0.100	2.86	2.38
Fuel	Gasoline	1.0	1.016	0.74	0.118	3.36	2.80
	Aviation	1.0	1.016	0.71	0.113	3.23	2.69
	Motor	1.0	1.016	0.74	0.118	3.36	2.80
	Jet (Gas Type)	1.0	1.016	0.76	0.121	3.45	2.88
Kerosene	Kerosene	1.0	1.016	0.81	0.129	3.68	3.07
	Jet Fuel (Kero)	1.0	1.016	0.82	0.130	3.72	3.10
	Other	1.0	1.016	0.81	0.129	3.68	3.07
Oil	Distillate Fuel	1.0	1.016	0.86	0.137	3.91	3.26
	Oil	1.0	1.016	0.83	0.132	3.77	3.14
	Highway Diesel	1.0	1.016	0.84	0.134	3.82	3.18
	Industrial Diesel	1.0	1.016	0.88	0.140	4.00	3.33
Fuel Oil	(nfd)	1.0	1.016	0.90	0.143	4.09	3.41
Fuel Oil Equivalent	Fuels Other than Oil	1.0	1.016	0.90	0.143	4.09	3.41
Residual Fuel Oil	Normal	1.0	1.016	0.94	0.149	4.27	3.56
	Light	1.0	1.016	0.93	0.148	4.22	3.52
	Heavy	1.0	1.016	0.96	0.153	4.36	3.32
Crude Oil	(nfd)	1.0	1.016	0.86	0.137	3.91	3.26
	Identified Crudes	1.0	1.016	(cd)	(cd)	(cd)	(cd)
	Petroleum Products (nfd)	1.0	1.016	1.86	0.137	3.91	3.26
Naphtha		1.0	1.016	0.74	0.118	3.36	2.80
Petrochemical Feedstocks		1.0	1.016	0.74	0.118	3.36	2.80
White Spirit		1.0	1.016	0.78	0.124	3.54	2.95
Jet Fuel (nfd)		1.0	1.016	0.82	0.130	3.72	3.10
Lubes		1.0	1.016	0.88	0.140	4.00	3.33
Asphalt/Bitumen		1.0	1.016	1.05	0.167	4.77	3.97
Petroleum Coke		1.0	1.016	1.35	0.215	6.13	5.11
Wax		1.0	1.016	0.89	0.142	4.04	3.37
NON-PETROLEUM PRODUCTS		Thousand Metric Tons Oil Equivalent					
Liquified Natural Gas		1.26	1.28	0.53	0.084	2.41	2.01
Ethyl Alcohol		0.66	0.67	0.52	0.083	2.36	1.97
Methyl Alcohol		0.50	0.51	0.40	0.064	1.82	1.51
Tar		0.92	0.93	1.10	0.175	5.00	4.16

(cd) = Country-Dependent

(nfd) = Not Further Defined

B (ii)**T.O.E of SOLID FUELS**

METRIC TON OIL EQUIVALENTS OF SOLID FUELS				
Fuels		Thousand Metric Tons per:		
		Thousand Metric Tons	Thousand Long Tons	Thousand Short Tons
Bituminous Coal	Imported/Exported For Power Plants	0.70	0.71	0.64
	Consumed Elsewhere	0.70	0.71	0.64
	Source/Use Unknown	0.60	0.61	0.54
Anthracite	USA	0.70	0.71	0.64
	Other Countries	0.75	0.76	0.68
Coal Equivalent	Coal and Other Fuels	0.70	0.71	0.64
Briquettes	Coal/Patent Fuel	0.70	0.71	0.64
	Lignite	0.48	0.49	0.44
	Coke	0.57	0.58	0.52
	Peat	0.52	0.53	0.47
Coke	Gas	0.68	0.69	0.62
	Oven	0.68	0.69	0.62
	Soft (India)	0.60	0.61	0.54
	Brown Coal	0.48	0.49	0.44
	Semicoke	0.68	0.69	0.62
	Breeze	0.55	0.56	0.50
Petroleum Coke		0.84	0.85	0.76
Charcoal		0.69	0.70	0.63
Sub-Bituminous Coal		(cd)	(cd)	(cd)
Brown Coal/Lignite		(cd)	(cd)	(cd)
Peat		0.35	0.36	0.32

(cd) = Country-Dependent

C**USER QUESTIONNAIRE**

Question	Answer
What were your main sources for the data collected?	
Which of these sources was the most useful/helpful?	
Which of these was the least useful/helpful?	
How long did it take to complete this questionnaire?	
Which was the most difficult information to find? Why?	
Are there any other questions you think should be included in the questionnaire?	
Were any questions irrelevant to your city? Which ones?	
Were the "Help Notes" useful? How could they be improved?	
Were the "Conceptual Notes" useful? How could they be improved?	
Was the layout of the questionnaire clear? How could it be improved?	
Would you prefer to fill in the questionnaire directly into a computer database?	
Any other comments?	

D**USER CHECKLIST**

Please ensure that you provide the following items with your completed questionnaire:

Section	Item	Description	Provided?
I 1	MAP	Location of the City and its Boundaries	
	DIAGRAM	Population Pyramid	
I 2	MAP	Population Density	
I 5	DATA	Details of Other Manufacturing Industries (if needed)	
V 1	MAP	Land-Use within the City	
V 3	MAP	Land-Ownership within the City	
X 9	MAP	Location of Treatment Plants, Sewer Collectors, Interceptors and Sewage Disposal Points	
X 10	MAP		
XI 2	MAP	Location of Municipal Solid Waste and Hazardous Waste Disposal and/or Treatment Facilities	
XI 7	MAP		

II. PROFILING CONDITIONS, INTERACTIONS AND INSTITUTIONS

Guidance for Profiling the Urban Environment

This section provides guidance for describing urban environmental conditions, interactions between the environment and urban development, and the institutional setting for environmental management in a particular city. This is done using an urban environmental profile; a generic outline for the profile is provided in the following section. Guidance consists of: (a) recommendations, in the form of questions and answers, for completing the questionnaire; (b) a checklist of tasks for preparing the profile; and (c) sample terms of reference for the individual or team that will assemble the profile. Once completed, the profile along with the questionnaire can be used as base documents for the final step in the rapid assessment process -- consultations.

Recommendations for preparing the profile

What skills are needed to prepare the profile?

The individual, firm, institution, or study team that completes the profile should have: (a) a professional background in urban and environmental issues; (b) an understanding of the range of information sources (key actors, reports, data, other analyses) available in the city, the country, and internationally; and (c) access to those individuals and sources (see draft terms of reference below). Often, the same individual or team that filled in the questionnaire is qualified to complete the profile as well.

How should the profile be prepared?

Data from the questionnaire should be used extensively, particularly for the section on the status of the environment in the urban region (see generic outline of profile below). Other existing data and reports should be used to identify and describe development-environment interactions. Interviews, organizational annual reports, and other published information are helpful for describing the institutional setting for environmental management.

How does one get access to the information?

Gathering data and analyses to prepare the profile will require access to a range of governmental and other organizations at the local, regional, national, *and* international levels. This takes knowledge of information sources, appropriate contacts within the agencies where the information is located, and patience. A

contacts within the agencies where the information is located, and patience. A letter of introduction from a respected official or group associated with the rapid assessment can be helpful.

Can the profile outline be modified?

At a minimum, the structure of the outline should be respected so that results can be compared and contrasted with other cities. The contents of each section should be covered, assuming that they are relevant to the city in question. Additional points can be addressed to the extent that they are relevant and add insights to the profile.

How comprehensive should the profile preparation exercise be?

The profile should be a concise document of no more than 50 pages, including a summary section. The summary should be readable by the wide range of people who might participate in a consultation; the longer text should be sufficiently detailed to be of use by decision makers and sectoral specialists.

What common errors are made in writing the profile?

- The questionnaire data are not fully used and analyzed.
- Relevant information and reports available outside the city and country are not used and referenced (for example, external support agencies often fund urban studies; their national offices should be contacted for such information).
- All points in the generic outline are not covered or are not addressed in sufficient detail (this has happened most frequently with the section on the institutional setting).
- Maps, especially those showing the city location and administrative boundaries, are not included.
- Recommendations are included. The profile should be a descriptive, rather than a prescriptive, document to aid the consultative process.

What if my question is not answered in this section?

If you still have a question after checking in Volume 1 and the other sections of this volume, then contact the Urban Management Programme (address, phone number, and fax numbers are listed on the back page of this document).

Checklist

The following table provides a checklist of actions that should be completed in order to prepare the urban environmental profile. It refers to the process, not the contents of the profile itself. In many ways, the steps are similar to those required for collecting data on the urban environment.

Checklist for Profiling the Urban Environment	
Activity	Completed?
Translate the generic outline for non-English speakers in the study team, if necessary.	
Obtain the completed urban environmental data questionnaire.	
Identify key sources of information (local, regional, national, and international agencies and individuals).	
Identify, assess and select the person or team that will research and prepare the profile.	
Contact the key information sources and inform them of the purpose of the environmental profile and rapid assessment.	
Monitor the work of the profile preparation team to identify and solve problems.	
Review a first draft of the profile to locate missing information, errors, and inconsistencies; remove any subjective conclusions such as recommendations.	
Have missing information collected and analyzed (if possible), and have errors and inconsistencies corrected.	
Circulate a draft profile to key actors and agencies to ensure that the information and descriptions are accurate and up-to-date.	
Print and make the profile available to interested parties.	

Sample terms of reference

1. As the second step in preparing a rapid urban environmental assessment of _____, you will be responsible for preparing an urban environmental profile. Specifically, you will undertake the following tasks:

- (a) Enhance and/or translate the generic outline of the profile for use by your study team;
- (b) Identify potential sources of information for each section of the profile;
- (c) Gather relevant data, reports, and other documents from these sources of information;
- (d) Meet with appropriate individuals who can provide background on urban environmental problems, issues, institutions, and decision-making, including representatives of the municipality, government ministries, the private sector, non-governmental organizations, the donor community, etc.;
- (e) Prepare an initial environmental profile with an executive summary;
- (f) Present this first draft of the profile so that it can be reviewed for missing information, alternative sources of information, errors, and inconsistencies;
- (g) Revise the profile in light of the review;
- (h) Arrange for the revised profile to be reviewed by the key actors and agencies to ensure that it is accurate and up-to-date; and
- (i) Provide advice about/disseminate the completed profile to stakeholders who are affected by, interested in, or influence urban environmental problems.

2. As a general guide, your profile should be no more than 50 pages in length, including an executive summary. The report should be prepared using standard wordprocessing software. You should submit both a hard copy and diskette containing your final version of the profile. You will have approximately two staff-months of consulting time to complete the profile. A first draft should be available by _____; a final draft should be submitted by _____.

Generic Outline of an Urban Environmental Profile

ENVIRONMENTAL DATA SHEET

EXECUTIVE SUMMARY

ACKNOWLEDGEMENTS

ABBREVIATIONS & CONVERSION RATES

I. INTRODUCTION

- Background
- Geophysical and Land Use
- Socio-economic Setting
 - Demographics
 - Economic Structure
 - Urban Poverty
- Environment-Development Linkages

II. STATUS OF THE ENVIRONMENT IN THE URBAN REGION

- Natural Resources
 - Air Quality
 - Water Quality
 - Surface
 - Ground
 - Coastal
 - Fisheries
 - Land
 - Forests and Natural Vegetation
 - Agricultural Land
 - Parks, Recreation and Open Space
 - Historical Sites and Cultural Property
- Environmental Hazards
 - Natural Risks
 - Human-induced Risks

III. DEVELOPMENT-ENVIRONMENT INTERACTIONS

- Water Supply
- Sewerage and Sanitation
- Flood Control
- Solid Waste Management
- Industrial Pollution Control/Hazardous Waste Management
- Transportation and Telecommunications
- Energy and Power Generation
- Housing
- Health Care
- Other

IV. THE SETTING FOR ENVIRONMENTAL MANAGEMENT

Key Actors

- Government
 - Central
 - Regional
 - Local
- Private Sector
- Popular Sector
 - Community Groups and NGOs
 - Media

Management Functions

- Instruments of Intervention
 - Legislative and regulatory
 - Economic and fiscal
 - Direct investment
 - Planning and policy development
 - Community organizations
 - Education, training and research
 - Promotion and protest
- Environmental Coordination and Decision-making
 - Mechanisms for public participation
 - Intersectoral coordination
 - Across levels of government
 - Between public and private sector
 - Intertemporal
- Information and Technical Expertise
- Constraints on Effective Management
- Ongoing Initiatives for Institutional Strengthening

REFERENCES

III. INVOLVING STAKEHOLDERS

Guidance for Involving Urban Environmental Stakeholders

This section provides guidance for involving the key actors who hold stakes in the quality of the urban environment through a consultation process. Guidance consists of: (a) recommendations, in the form of questions and answers, for preparing and carrying out the consultations; (b) a checklist of tasks for initiating and supervising the consultation process; and (c) sample terms of reference for the individual or team that will manage the consultations. An immediate outcome of engaging stakeholders is to create a local public dialogue on urban environmental issues. In the longer term, this can build consensus on priority problems and political commitment to move forward with the preparation of an environmental management strategy and set of issue-focussed action plans.

Additional guidance on organizing, conducting and following up on consultations will be available from two sources: (a) a forthcoming publication titled, *World Cities and the Environment - Lessons from Public Consultations and the Creation of a Local Dialogue Amongst Urban Stakeholders: A Tale of Five Cities*, by Patricia L. McCarney of the Centre for Urban and Community Studies, University of Toronto, and (b) the UNCHS (Habitat) Sustainable Cities Programme (SCP) and GTZ are preparing a "consultation shell" that includes replicable procedures and re-usable materials for preparing, conducting and reporting on city environmental consultations. It will include a standard format for a five-day consultation and appendices on, for example, a participants' manual, logistic needs, and an outline of a consultation report.

Recommendations for preparing consultations

Who are the stakeholders?

Stakeholders belong to one of three sets of actors: (a) representatives of individuals and groups in society who are adversely affected by urban environmental degradation as well as those who have an interest in urban environmental conditions (e.g., NGOs, community leaders, public advocacy groups); (b) those with expertise about one or more environmental problems that affect the city (e.g., academics, research institutes, private consultants); and (c) those who have the power to make decisions that influence urban environmental quality (e.g., government officials at the municipal, regional and national levels, private and informal sector enterprises). The configuration of stakeholders will vary from city to city and, within a city, and will vary over time and according to the issues being addressed.

What skills are needed to initiate and carry out a series of consultations?

The individual, firm, institution, or team that prepares the consultations should have: (a) a professional background in urban and environmental issues; (b) the ability to organize and facilitate meetings; and (c) awareness of and access to the key stakeholders in all three categories. The skills may be present within the entity that prepared the questionnaire and/or profile but does not have to be the same person(s).

How should the consultations be organized?

There is no set recipe for preparing consultations. The consultations with individuals and sets of stakeholders as well as the final forum will probably be organized differently in each city according to local customs and practices. The process will vary; however, there should be a common set of issues and questions that are discussed (see sample terms of reference).

How does one get access to the stakeholders?

Again, this will vary according to local customs and the role of the particular stakeholder. Sometimes it can be useful to secure the endorsement of the top local political official (mayor, governor, metropolitan chairperson) as a means of gaining the attention of people inside and outside government. In politically complicated situations, it may be more useful to have a neutral sponsor.

What common errors are made in carrying out consultations?

- One or more of the key stakeholders is overlooked in the process.
- Key issues and priorities of particular stakeholders are misinterpreted or not included in the preparation of the agenda for the final forum.
- The consultation process becomes overpoliticized (while the top local official should be informed and involved in the process, especially the final forum, there should be an arm's-length relationship when it comes to managing the consultations).
- There is a failure to make use of earlier work done as part of the rapid assessment. Versions of the questionnaire data and profile can be very helpful as a starting point or basis for a common understanding of problems and key interactions.
- Premature assumptions about the existence of a consensus may be made. The consultation process should ideally continue over time. It is unlikely that one set

of meetings and a forum will resolve all outstanding environmental issues in a city. While it may not be possible to achieve consensus about priorities and options, the process can be useful in that it allows stakeholders to clarify their positions and inform others about them.

- Consultant/team does not synthesize the list of priorities before the final public forum making the task of prioritizing and building consensus difficult, lengthy, and possibly unmanageable.

Checklist

The following table provides a checklist of actions that should be completed in the preparation and implementation of consultations. It refers more to the consultative process itself, and less to the contents of the consultations. Most of the steps are spelled out in more detail in the sample terms of reference that follow.

Checklist for Urban Environmental Consultations	
Activity	Completed?
Obtain copies of previous work done as part of the rapid assessment (completed questionnaire and profile).	
Identify, assess and select the person or team that will manage the consultative process.	
Identify the stakeholders and invite them to participate in the process (including the top local political official).	
Conduct consultations with the stakeholders using locally appropriate formats for discussion.	
Prepare an interim report on the perspectives of different stakeholders, based on the consultations and comparisons with the profile.	
Using this report, prepare an agenda for the final public forum.	
Organize the final public forum, again using an acceptable local format.	
Submit a final report that describes the results of the final forum, including an assessment of how citizens' priorities differ from what the questionnaire and profile data suggest should be priorities.	
Develop a strategy to disseminate the outcome of the process to the public.	

Sample terms of reference^{1/}

1. As the third and final step in preparing a rapid urban environmental assessment of _____, you will be responsible for initiating a consultation process on the urban environment. This process will involve two steps. First, conduct consultations with a range of key actors who represent those affected by urban environmental problems (NGOs, community leaders, municipal politicians), those with specialized expertise about such problems (academics, research institutes, consultants), and those who can solve problems (local, regional, and national government officials, private sector representatives, community groups, etc.). Second, organize a public forum that brings together representatives of these groups and sectors. Specifically, you will undertake the following tasks:

- (a) Obtain and review the completed urban environmental questionnaire and profile (these should be used as background documents for the consultations);
- (b) Identify the key actors to be consulted;
- (c) Conduct consultations with the key actors through individual interviews, questionnaires, small roundtables, community meetings, and other culturally appropriate means of discussion. Ensure that, at a minimum, the following topics are covered:
 - i) water resources, water supply and sanitation,
 - ii) land use,
 - iii) urban transport and energy use,
 - iv) solid and hazardous wastes,
 - v) air pollution,
 - vi) open and recreational space,
 - vii) cultural and historical preservation, and
 - viii) environmental risks;
- (d) Prepare an interim report that describes the first step (who was involved, what types of discussions were held, on what dates, what issues, alternative strategies, constraints, and priorities emerged, and how priorities differed from those suggested by the questionnaire and profile data). This report should be concise and is due by _____;

^{1/} This detailed terms of reference is based on: Patricia McCarney "Draft Terms of Reference for Local Consultants Working on 'World Cities & Environment: A Five City Consultation Process,'" Toronto; Centre for Urban and Community Studies, University of Toronto, 1991.

- (e) Using this report, prepare the agenda for the final public forum. The objective of this "environmental town meeting" is to arrive at a public consensus on priority urban environmental problems, constraints, opportunities, and strategies. Thus, the forum should cover the problem areas listed in (c) above and address issues such as political and economic trade-offs, jurisdictional conflicts, public awareness, regulatory versus incentive approaches, and integrating environmental concerns into local development planning;
- (f) Organize the final public forum which should be attended but not chaired by the top local political official (mayor, governor, metropolitan chairperson). The forum should involve representatives of all groups contacted in the first set of consultations; the chair should be a respected member from one of these groups. The structure and duration of the forum are flexible and should be consistent with local practices; and
- (g) Submit a final report that details the results of the consultations and final forum. The report should identify the viewpoints of different actors, the differences and commonalities in priorities and strategies proposed, a synopsis of the final forum, and identification of the areas where consensus was reached (e.g., priority problems, key constraints, options, strategies).

IV. URBAN ENVIRONMENTAL INDICATORS: SELECT DATA

Accra

I. BACKGROUND STATISTICS				
Indicator	Unit	Year	Metro Area	City
Population	'000	1970	735	625
		1990	1,566	1,330
		2000	2,674	2,273
			Jurisdiction	Value
Share of GDP	%			NA
Annual Growth	%	70-84	Metropolis	4.3
Total employment (industrial)	% of jobs	1987	Metropolis	19
Density	n/km ²	1984	Metropolis	526
< Poverty line	%	1990	Metropolis	48
Substandard housing	%	1989	City	18
Overcrowding	n/room	1989	Metropolis	2.9
Life expectancy	years	85-90	National	54
Infant mortality	/1000 births	1988	City	57.7
Top three causes of morbidity	% all illness	1987	Cause 1) malaria 2) respiratory 3) diarrhea	45 10 7

II. NATURAL ENVIRONMENT AND LAND USE- ACCRA				
Indicator	Unit	Jurisdiction	Value	Year
Key ecosystems:	type			
Terrestrial		Metropolis	dry coastal	1991
Aquatic		Metropolis	rivers.inter tidal	1991
Temperature:	monthly			
Minimum	°C	City	24.7	1990
Maximum	°C	City	28.1	1990
Rainfall:	monthly			
Minimum	mm	City	14.7	1990
Maximum	mm	City	208.7	1990
Average slope		Metropolis	flat/var.	1991
Drainage (natural)		Metropolis	poor	1991
Natural risks:	severity			
Flooding		Metropolis	moderate	1991
Seismic		Metropolis	moderate	1991
Total area	km ²	Metropolis	1079	1991
Built-up area	km ²	Metropolis	935	1980
Residential	%		70	
Industrial	%		20	
Commercial	%		2	
Open/Green	%		8	
Public/Other	%		-	

III. AIR POLLUTION AND ENERGY USE - ACCRA				
Indicator	Unit	Jurisdiction	Value	Year
Emissions:	'000 t/year			
CO ₂			NA	
CO			NA	
Hydrocarbons			NA	
NO _x			NA	
SO ₂			NA	
SPM			NA	
Motorized fleet	vehicles/capita	City	.04	1989
Annual increase in motorized vehicles	%	City	13	'85-89
Gross energy use:	'000 tons of oil equivalent	National	1353	1987
Electricity			357	
Petroleum products			677	
Other			319	
Households electrified	%		NA	
Industrial pollution control policies?	incipient/advanced	Metropolis	incipient	1991
Vehicular pollution control policies?	incipient/advanced	Metropolis	incipient	1991
Monitoring network	# of stations	Metropolis	0	1991
# of measurements exceeding standards	annual %		NA	

IV. WATER RESOURCES AND URBAN WASTE - ACCRA				
Indicator	Unit	Jurisdiction	Value	Year
Total water use:	m ³ /day	Metropolis	263,251	1990
Municipal	l/cap/day	Metropolis	134	1990
Industrial/commercial	l/cap/day	Metropolis	34	1990
Households with piped water supply	%	City	46	1989
Households with easy access to standpipe	%	City	47	1989
Unaccounted for H ₂ O	%	Metropolis	40	1990
Households sewerred	%	City	1	1991
Main alternative sanitation system	type (%)	City	pit latrine (27)	1989
Principal point of sewage disposal	location	City	streams/ rivers	1991
Sewage flow	m ³ /day	Metropolis	46,000	
Sewage treated	%		20	
Solid waste generated:	tons/day	Metropolis	1000	1990
Municipal (MSW)	kg/cap/day	Metropolis	0.6	1990
Industrial	kg/cap/day		NA	
MSW collection rate	%	City	75	1990
Principal solid waste disposal method	type	Metropolis	open dump	1991
Hazardous waste management program	incipient/ advanced	Metropolis	incipient	1991

Jakarta

I. BACKGROUND STATISTICS				
Indicator	Unit	Year	Metro Area	City
Population	'000	1970	NA	4,437
		1990	16,828	8,223
		2000	NA	11,000
			Jurisdiction	Value
Share of GDP	%	1990	Metropolis	12
Annual Growth	%	'80- '90	City	2.4
Total employment (industrial)	% of jobs	1980	City	15
Density	n/km ²	1990	City	12,436
< Poverty line	%	1988	City	17
Substandard housing	%	1989	City	7
Overcrowding	n/room			NA
Life expectancy	years	1990	City	68.5
Infant mortality	/1000 births	1990	City	31.8
Top three causes of mortality	% all deaths	1990	Cause 1) cardiovasc. 2) respiratory 3) cerebrovasc.	17 9 9

II. NATURAL ENVIRONMENT AND LAND USE - JAKARTA				
Indicator	Unit	Jurisdiction	Value	Year
Key ecosystems:	type			
Terrestrial		Metropolis	wet coastal	1991
Aquatic		Metropolis	rivers/inter-tidal	1991
Temperature:	monthly			
Minimum	°C	City	20.4	1990
Maximum	°C	City	28.4	1990
Rainfall:	monthly			
Minimum	mm	City	0.9	1990
Maximum	mm	City	462.6	1990
Average slope		City	flat	
Drainage (natural)		City	poor	
Natural risks:	severity			
Flooding		City	moderate	1991
Seismic		Metropolis	low	1991
Total area	km ²	Metropolis	5500	1989
Built-up area	km ²	City	660	1989
Residential	%		45	
Industrial	%		6	
Commercial	%		2	
Open/Green	%		42	
Public/Other	%		5	

III. AIR POLLUTION AND ENERGY USE - JAKARTA				
Indicator	Unit	Jurisdiction	Value	Year
Emissions:	'000 t/year	City		1989
CO ₂			NA	
CO			1095	1989
Hydrocarbons			108	1989
NO _x			83	1989
SO ₂			16	1989
SPM			7	1991
Motorized fleet	vehicles/capita	City	0.1	1987
Motorization rate	motorized/total trips	Metropolis	0.529	1985
Gross energy use (annual):	'000 tons of oil equivalent	City	5779	1988
Electricity			1716	
Petroleum products			4050	
Other			13	
Households electrified	%	City	92	1989
Industrial pollution control policies?	incipient/advanced	Metropolis	incipient	1991
Vehicular pollution control policies?	incipient/advanced	Metropolis	incipient	1991
Monitoring network	# of stations	City	4	1991
# of measurements exceeding standards	annual %		NA	

IV. WATER RESOURCES AND URBAN WASTE - JAKARTA				
Indicator	Unit	Jurisdiction	Value	Year
Total water use:	m ³ /day	City	1,468,800	1991
Municipal	l/cap/day	City	148	1991
Industrial/commercial	l/cap/day	City	30	1991
Households with piped water supply	%	Metropolis	28.4	1988
Households with easy access to standpipe	%	Metropolis	53.6	1988
Unaccounted for H ₂ O	%	Metropolis	51	1988
Households sewered	%	City	1	1991
Main alternative sanitation system	type (%)	City	on-site (85)	1991
Principal point of sewage disposal	location	City	streambed	1991
Sewage flow	m ³ /day	City	34,500	1990
Sewage treated	%	City	1	1991
Solid waste generated:	tons/day	City	5000	1991
Municipal (MSW)	kg/cap/day	City	0.38	1990
Industrial	kg/cap/day	City	0.20	1990
MSW collection rate	%	City	79	1989
Principal solid waste disposal method	type	City	open dump	1991
Hazardous waste management program	incipient/advanced	Metropolis	incipient	1991

Katowice

I. BACKGROUND STATISTICS				
Indicator	Unit	Year	Metro Area	City
Population	'000	1970	1,674	322
		1990	2,086	373
		2000	2,183	389
			Jurisdiction	Value
Share of GDP	%	1990	Region	24
Annual Growth	%	'80- '90	City	0.8
Total employment (industrial)	% of jobs	1990	City	36
Density	n/km ²	1989	City	2219
< Poverty line	%	1990	Metropolis	2.5
Substandard housing	%			NA
Overcrowding	n/room	1989	Metropolis	0.86
Life expectancy	years	1989	Metropolis	69
Infant mortality	/1000 births	1989	City	25.5
Top three causes of mortality	% all deaths	1989	Cause 1) cardiovasc. 2) cancers 3) trauma	36 30 12

II. NATURAL ENVIRONMENT AND LAND USE - KATOWICE				
Indicator	Unit	Jurisdiction	Value	Year
Key ecosystems:	type			
Terrestrial		Region	temperate decid. forest	
Aquatic		Region	river/streams	
Temperature:	monthly			
Minimum	°C	City	-0.6	1990
Maximum	°C	City	17.8	1990
Rainfall:	monthly			
Minimum	mm	City	20.2	1990
Maximum	mm	City	122.8	1990
Average slope		Metropolis	flat	
Drainage (natural)		Metropolis	good	
Natural risks:	severity			
Subsidence		Metropolis	moderate	1991
Total area	km ²	City	165	1990
Built-up area	km ²	City	132	1990
Residential	%		20	
Industrial	%		10	
Commercial	%		1	
Open/Green	%		21	
Public/Other	%		48	

III. AIR POLLUTION AND ENERGY USE - KATOWICE				
Indicator	Unit	Jurisdiction	Value	Year
Emissions:	'000 t/year			
CO ₂			NA	
CO		Region	380	1989
Hydrocarbons		City	3.2	1990
NO _x		Region	210	1989
SO ₂		Region	700	1989
SPM		City	185.2	1990
Motorized fleet	vehicles/capita	City	0.37	1990
Motorization rate	motorized/total trips	City	0.64	1990
Gross energy use:	'000 tons of oil equivalent		NA	
Electricity			NA	
Petroleum products			NA	
Other			NA	
Households electrified	%	City	100	1989
Industrial pollution control policies?	incipient/advanced	Region	advanced	1991
Vehicular pollution control policies?	incipient/advanced	Region	advanced	1991
Monitoring network	# of stations	Region	36	1991
# of measurements exceeding standards	annual %		NA	

IV. WATER RESOURCES AND URBAN WASTE - KATOWICE				
Indicator	Unit	Jurisdiction	Value	Year
Total water use:	m ³ /day	Region	3,590,000	1989
Municipal	l/cap/day	Region	465	1989
Industrial/commercial	l/cap/day	Region	438	1989
Households with piped water supply	%	Metropolis	94	1989
Households with easy access to standpipe	%		NA	
Unaccounted for H ₂ O	%	Region	23.5	1990
Households sewered	%	Metropolis	88	1990
Main alternative sanitation system	type (%)	Metropolis	septic tank (12)	1990
Principal point of sewage disposal	location	Region	rivers	1990
Sewage flow	m ³ /day	Region	2,269,400	1990
Sewage treated	%	Region	63-71	1990
Solid waste generated:	tons/day	City	14,406	1989
Municipal (MSW)	kg/cap/day	City	1.6	1989
Industrial	kg/cap/day	City	37.0	1989
MSW collection rate	%	City	78	1989
Principal solid waste disposal method	type	City	open dump	1991
Hazardous waste management program	incipient/advanced	Region	incipient	1991

São Paulo

I. BACKGROUND STATISTICS				
Indicator	Unit	Year	Metro Area	City
Population	'000	1970	8,139	5,924
		1990	17,448	11,380
		2000	23,106	13,130
			Jurisdiction	Value
Share of GDP	%	1990	Metropolis	18
Annual Growth	%	'80-'90	Metropolis	3.3
Total employment (industrial)	% of jobs	1988	Metropolis	18
Density	n/km ²	1987	City	13,100
< Poverty line	%	1990	Metropolis	37
Substandard housing	%	1987	City	8
Overcrowding	n/room	1989	Metropolis	0.8
Life expectancy	years	1983	Metropolis	66.2
Infant mortality	/1000 births	1987	Metropolis	36.1
Top three causes of mortality in the metropolitan area	% all deaths	1988	Cause 1) cancers 2) cardiovasc. 3) cerebrovasc.	12 11 9

II. NATURAL ENVIRONMENT AND LAND USE - São Paulo				
Indicator	Unit	Jurisdiction	Value	Year
Key ecosystems:	type			
Terrestrial		Metropolis	seasonal trop. forest	
Aquatic		Metropolis	river/streams	
Temperature:	monthly			
Minimum	°C	Metropolis	12.5	
Maximum	°C	Metropolis	28.8	
Rainfall:	monthly			
Minimum	mm	Metropolis	33.0	
Maximum	mm	Metropolis	216.1	
Average slope		Metropolis	variable	
Drainage (natural)		Metropolis	poor	
Natural risks:	severity			
Flooding		Metropolis	severe	
Storms, typhoons		Metropolis	moderate	
Total area	km ²	City	1577	1989
Built-up area	km ²	City	900	1989
Residential	%		30	
Industrial	%		5	
Commercial	%		6	
Open/Green	%		28	
Public/Other	%		31	

III. AIR POLLUTION AND ENERGY USE - São Paulo				
Indicator	Unit	Jurisdiction	Value	Year
Emissions ^a :	'000 t/year			
CO ₂			NA	
CO		Metropolis	1391	1988
Hydrocarbons			2718	1988
NO _x			226	1988
SO ₂			107	1988
SPM			68	1988
Motorized fleet	vehicles/capita	Metropolis	0.14 ^b / 0.25 ^c	1990
Motorization rate	motorized/total trips	Metropolis	0.64	1987
Gross energy use:	'000 tons of oil equivalent		NA	
Electricity			NA	
Petroleum products			NA	
Other			NA	
Households electrified	%		NA	
Industrial pollution control policies?	incipient/ advanced	State	advanced	1991
Vehicular pollution control policies?	incipient/ advanced	State	advanced	1991
Monitoring network	# of stations	Metropolis	24	1991
# of measurements exceeding standards	annual %	City	15-70	1989

a/ from vehicular sources only; does not include industrial emissions

b/ based on estimated number of vehicles actually operating

c/ based on registered vehicles, including those that are disabled

IV. WATER RESOURCES AND URBAN WASTE - São Paulo				
Indicator	Unit	Jurisdiction	Value	Year
Total water use:	m ³ /day	Metropolis	5,017,000	1990
Municipal	l/cap/day	Metropolis	215	1990
Industrial/commercial	l/cap/day	Metropolis	49	1990
Households with piped water supply	%	Metropolis	91	1991
Households with easy access to standpipe	%		NA	
Unaccounted for H ₂ O	%	Metropolis	34	1991
Households sewered	%	Metropolis	65	1989
Main alternative sanitation system	type (%)		NA	
Principal point of sewage disposal	location	Metropolis	rivers	1991
Sewage flow	m ³ /day	Metropolis	2,400,000	1991
Sewage treated	%	Metropolis	26	1991
Solid waste generated:	tons/day	Metropolis	22,445	1990
Municipal (MSW)	kg/cap/day	Metropolis	0.9	1990
Industrial	kg/cap/day	Metropolis	0.4	1990
MSW collection rate	%	Metropolis	95	1988
Principal solid waste disposal method	type	Metropolis	sanitary landfill	1991
Hazardous waste management program	incipient/advanced	Metropolis	advanced	1991

Singrauli Region

I. BACKGROUND STATISTICS				
Indicator	Unit	Year	Singrauli Region*	Core Area**
Population	'000	1971	23,431	74,641
		1991	696,329	450,626
		2001	1,394,956	1,046,217
			Jurisdiction	Value
Share of GDP	%			
Annual Growth	%	1990	Singrauli	7.2
Total employment (industrial)	% of jobs	1990	Core Area	85.1
Density	n/km ²	1990	Singrauli	206
< Poverty line	%	1988	Singrauli	60
Substandard housing	%			
Overcrowding	number / house	1981	Singrauli	6.06
Life expectancy	years	1991	India	59
Infant mortality	/1000 births	1989	India	91
Top three causes of mortality in core area	% all deaths	1990	Cause	
			1) Digestive complaints	29
			2) Fevers (malaria)	19
			3) other	12

* Refers to the planning area and consists of four districts and the Rihand Reservoir and comprises an area of 31,32 km².

** Within the above-mentioned area, approximately 470 km² is an active development zone and constitutes the core area. Most of the thermal power plants, coal mines, residential and industrial activity is concentrated in this area.

II. NATURAL ENVIRONMENT AND LAND USE - SINGRAULI REGION				
Indicator	Unit	Jurisdiction	Value	Year
Key ecosystems:	type			
Terrestrial		Singrauli	dry, deciduous	1991
Aquatic		Singrauli	river/ reservoir	1991
Temperature:	monthly			
Minimum	oC	Singrauli	4oC	1987
Maximum	oC	Singrauli	48oC	
Rainfall:	Average Annual	Singrauli	1111mm/year	1987
Minimum	mm			
Maximum	mm			
Average slope		Singrauli	variable	1990
Drainage (natural)		Singrauli	poor	1990
Natural risks:	severity			
Flooding		Singrauli	low	1990
Seismic		Singrauli	none	1990
Total area	km ²	Core area	479.2	1990
Townships	*	Core Area	15.15	1990
Coal Mines	%	Core Area	39.56	1990
Thermal Plants	%	Core Area	41.67	1990
Other Industrial areas (proposed)	%	Core Area	3.67	1990

III. AIR POLLUTION AND ENERGY USE - SINGRAULI REGION				
Indicator	Unit	Jurisdiction	Value	Year
Emissions from Thermal Power Plants	'000 t/year			
CO ₂				
CO		Core area	10.7	1990
Hydrocarbons		"	3.21	"
NO _x		"	192.51	"
SO ₂		"	142.24	"
SPM		"	13.69	"
Motorized fleet	vehicles/capita			
Motorization rate	motorized/total trips			
Gross energy use:	'000 tons of oil equivalent			
Electricity				
Petroleum products				
Other				
Households electrified	%	Singrauli	19	1981
Industrial pollution control policies?	incipient/advanced	Singrauli	incipient	1991
Vehicular pollution control policies?	incipient/advanced advanced	Singrauli	incipient	1991
Monitoring network	# of stations	Singrauli	3	1990
# of measurements exceeding standards	annual %			

IV. WATER RESOURCES AND URBAN WASTE - SINGRAULI REGION				
Indicator	Unit	Jurisdiction	Value	Year
Total water use:	m ³ /day			
Municipal	l/cap/day	Project Townships*	300	1990
Industrial/commercial	l/cap/day			
Households with potable water supply	%	Singrauli	55.4	1990
Households with potable water supply	%	Project Townships	99.4	1990
Unaccounted for H ₂ O	%			
Households sewered	%	Project Townships	40	1990
Main alternative sanitation system	type (%)			
Principal point of sewage disposal	location			
Sewage flow	m ³ /day			
Sewage treated	%			
Solid waste generated:	tons/day			
Municipal (MSW)	kg/cap/day			
Industrial	kg/cap/day			
MSW collection rate	%			
Principal solid waste disposal method	type	Singrauli	Local open dump	
Hazardous waste management program	incipient/advanced	Singrauli	incipient	

* Set up by each industrial project to house their employees, project townships are often spread over large areas. Currently there are 19 project townships in existence.

Tianjin

I. BACKGROUND STATISTICS				
Indicator	Unit	Year	Metro Area	City
Population	'000	1970	6,530	2,620
		1990	8,660	3,600
		2000	9,700	NA
			Jurisdiction	Value
Share of GDP	%	1990	Metropolis	3
Annual Growth	%	85-90	Metropolis	0.99
Total employment (industrial)	% of jobs			
Density	n/km ²	1990	City	23,700
< Poverty line	%			NA
Substandard housing	%	1990	City	5.6
Overcrowding	m ² /cap	1989	City	6.58
Life expectancy	years	1989	Metropolis	73.3
Infant mortality	/1000 births	1990	Metropolis	10.75
Top three causes of mortality in the metropolitan area	% all deaths	1990	Cause	
			1) cardio-vascular	40
			2) cerebro-vascular	27
			3) cancer	20

II. NATURAL ENVIRONMENT AND LAND USE - TIANJIN				
Indicator	Unit	Jurisdiction	Value	Year
Key ecosystems:	type	Metropolis		
Terrestrial		wet and dry coastal		
Aquatic		river/stream; enclosed sea		
Temperature:	monthly			
Minimum	°C	Metropolis	-3	
Maximum	°C	Metropolis	26	
Rainfall:	monthly			
Minimum	mm	Metropolis	9	
Maximum	mm	Metropolis	390	
Average slope		Metropolis	flat	
Drainage (natural)		Metropolis	good	
Natural risks:	severity			
Flooding		Metropolis	low	
Seismic		Metropolis	moderate	
Total area	km ²	Metropolis		
Built-up area	km ²	City	332.24	1987
Residential	%		13	
Industrial	%		15	
Commercial	%		6	
Open/Green	%		15	
Public/Other	%		51	

III. AIR POLLUTION AND ENERGY USE - TIANJIN				
Indicator	Unit	Jurisdiction	Value	Year
Emissions:	'000 t/year			
CO ₂			NA	
CO		Metropolis	10.736	1989
Hydrocarbons			NA	
NO _x		Metropolis	84.231	1989
SO ₂		Metropolis	151.096	1989
SPM		Metropolis	87.700	1989
Motorized fleet	vehicles/capita	Metropolis	0.03	1990
Motorization rate	motorized/total trips	Metropolis	0.23	1990
Gross energy use:	tons of oil equivalent ('000)			
Electricity		Metropolis	2882	1989
Petroleum products			4063	1989
Other			7490	1989
Households electrified	%	City	100	1990
Industrial pollution control policies?	incipient/advanced	Metropolis	advanced	1991
Vehicular pollution control policies?	incipient/advanced	Metropolis	incipient	1991
Monitoring network	# of stations	Metropolis	23	1990
# of measurements exceeding standards	annual % (for SO ₂)	City	35	1990

IV. WATER RESOURCES AND URBAN WASTE - TIANJIN				
Indicator	Unit	Jurisdiction	Value	Year
Total water use:	m ³ /day	Urbanized	1,240,000	1989
Municipal	l/cap/day		142	1989
Industrial/commercial	l/cap/day		190	1989
Households with piped water supply	%	Urbanized	100	1989
Households with easy access to standpipe	%		NA	
Unaccounted for H ₂ O	%	Urbanized	14	1989
Households sewered	%	Urbanized	59.7	1990
Main alternative sanitation system	type (%)	Metropolis	communal	
Principal point of sewage disposal	location	Metropolis	rivers	1991
Sewage flow	m ³ /day	City	1,207,500	1990
Sewage treated	%	City	45	1990
Solid waste generated:	tons/day	Urbanized	16,785	1990
Municipal (MSW)	kg/cap/day	Urbanized	1.34	1990
Industrial	kg/cap/day	Urbanized	2.92	1990
MSW collection rate	%	Urbanized	100	1990
Principal solid waste disposal method (MSW)	type	Urbanized	resource recovery	1990
Hazardous waste management program	incipient/advanced	Metropolis	advanced	1991

Tunis

I. BACKGROUND STATISTICS				
Indicator	Unit	Year	Metro Area	City
Population	'000	1975	1,050,300	550,400
		1989	1,630,700	620,100
		2000	2,217,000	690,000
			Jurisdiction	Value
Share of GDP	%	NA		
Annual Growth	%	84-89	Metro	3.1
Total employment (industrial)	% of jobs	NA		
Density	n/km ²	89	Metro	635
< Poverty line	%	90	Metro	4.2
Substandard housing	%	89	Metro	4.3
Overcrowding	n/room	89	Metro	1.9
Life expectancy	years	89	Metro	71.7
Infant mortality	/1000 births	89	Metro	40
Top three causes of mortality	% all deaths	90	Cause 1) Cardiovasc. 2) Perinatal 3) Traumas	29.3 13.4 12.7

II. NATURAL ENVIRONMENT AND LAND USE - TUNIS				
Indicator	Unit	Jurisdiction	Value	Year
Key ecosystems:	type			
Terrestrial		Metro	Treecrop	
Aquatic		Metro	Intertidal	
Temperature:	monthly			
Minimum	°C	Metro	11.1	
Maximum	°C	Metro	26.6	
Rainfall:	monthly			
Minimum	mm	Metro	<10	'24-87
Maximum	mm	Metro	40-50	'24-87
Average slope		Metro	variable	
Drainage (natural)		Metro	average	
Natural risks:	severity			
Flooding		Metro	low	
Seismic		Metro	low	
Total area	km ²	Metro	2567	
Built-up area	km ²			
Residential	%			
Industrial	%			
Commercial	%			
Open/Green	%			
Public/Other	%			

III. AIR POLLUTION AND ENERGY USE - TUNIS				
Indicator	Unit	Jurisdiction	Value	Year
Emissions:	'000 t/year	Metro		1990
CO ₂				
CO			55.3	
Hydrocarbons			15.1	
NO _x			8.8	
SO ₂			5.0	
SPM			2.5	
Motorized fleet	vehicles/capita	Metro	0.26	1990
Motorization rate	motorized/total trips	Metro	47%	1990
Gross energy use:	'000 tons of oil equivalent			
Electricity		Metro	358	1990
Petroleum products		Metro	686	1990
Other			NA	
Households electrified	%	Metro	96	1989
Industrial pollution control policies?	incipient/advanced	National	incipient	1992
Vehicular pollution control policies?	incipient/advanced	National	incipient	1992
Monitoring network	# of stations		none	
# of measurements exceeding standards	annual %		NA	

IV. WATER RESOURCES AND URBAN WASTE - TUNIS				
Indicator	Unit	Jurisdiction	Value	Year
Total water use:	m ³ /day	Metro	230,000	1990
Municipal	l/cap/day	City	242	1990
Industrial/commercial	l/cap/day	City	44	1990
Households with piped water supply	%	City	82	1990
Households with easy access to standpipe	%	City	18	1990
Unaccounted for H ₂ O	%	City	28	1990
Households sewerred	%	City	73	1990
Main alternative sanitation system	type (%)	City	Septic tank (27)	1990
Principal point of sewage disposal	location	Metro	lake, sea	1990
Sewage flow	m ³ /day	City	217,000	1990
Sewage treated	%	City	70	1990
Solid waste generated:	tons/day	Metro	1600	1990
Municipal (MSW)	kg/cap/day	Metro	0.74	1990
Industrial	kg/cap/day	Metro	0.25	1990
MSW collection rate	%	Metro	96	1990
Principal solid waste disposal method	type	Metro	managed dump	1990
Hazardous waste management program	incipient/advanced	Metro	incipient	1992

V. URBAN ENVIRONMENTAL PROFILES: EXECUTIVE SUMMARIES

The following examples are summaries of lengthier environmental profiles of Accra (Ghana) and São Paulo (Brazil). The full profiles are approximately 50 pages in length for each city, with extensive references. They were initially drafted by one or several local consultants in each city. Profiles were also prepared for Jakarta (Indonesia), Katowice (Poland), the Singrauli region (India), Tianjin (China), and Tunis (Tunisia). Full copies of each profile are available from the Urban Management Program.

Accra, Ghana¹

Introduction

The Accra Metropolitan Area (AMA) has an estimated 1990 population of 1.6 million that is expected to grow to more than 4 million by the year 2020 (1). The AMA covers an area of 1,079 km² and consists of the cities of Accra and Tema, as well as a rural district. The city of Accra, with 75 percent of the AMA's population, is generally unplanned and characterized by overcrowding, inadequate sanitation and other municipal services, and substandard housing, especially in low-income areas. The city of Tema, with 15 percent of the metropolitan population, is well planned with clearly defined residential, recreational, and industrial areas. For the urbanized area of the AMA, 70 percent of land use is residential, 20 percent industrial, 8 percent recreational/open space, and 2 percent commercial (2). Maps of the city and the AMA are presented in Figure 5.1.

The metropolis has a preeminent position in the national economy. According to the 1987 industrial census, 32 percent of the country's manufacturing industries are situated in the AMA. In addition, major financial institutions, Government ministries, parastatals, other industries and multinational corporations are concentrated in the metropolitan area. In terms of employment, the 1984 census indicated that 26 percent of the work force is in the service sector, 24 percent in the wholesale/retail trade, 19 percent in manufacturing, and 3 percent in agriculture. Although the AMA has the highest average per capita expenditure, poverty is a significant issue in the metropolis. Almost half of the urban population has income below the World Bank's absolute poverty threshold. The poor tend to be concentrated in core indigenous settlements and migrant residential areas that are economically depressed, high-density neighborhoods with poor access to environmental infrastructure and services.

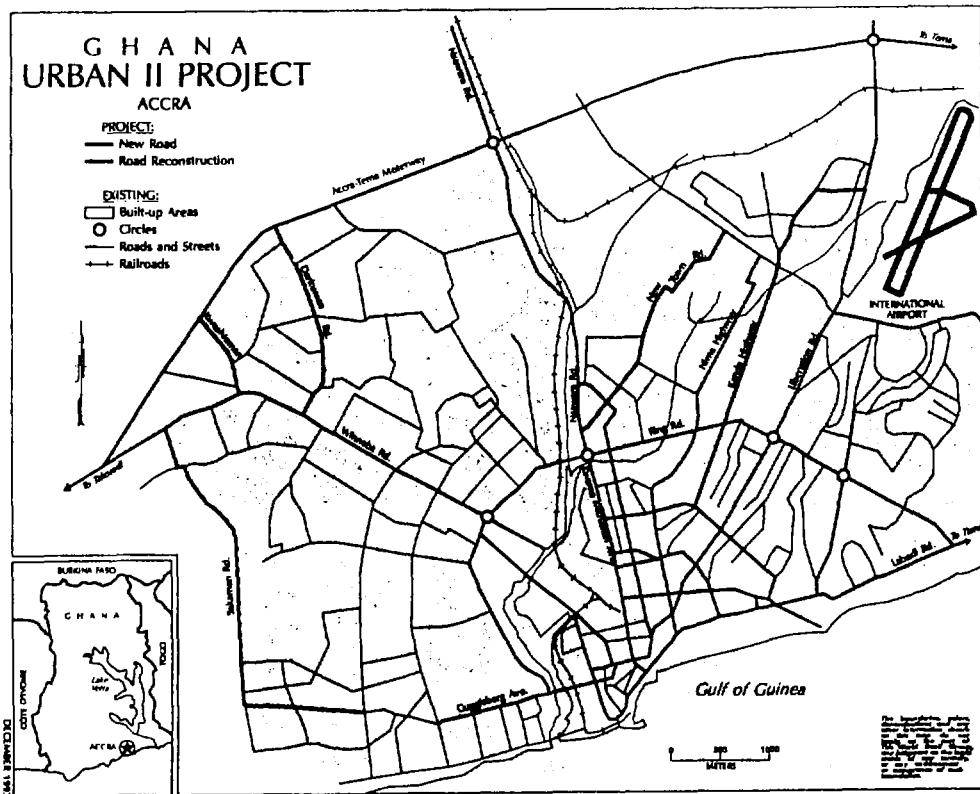
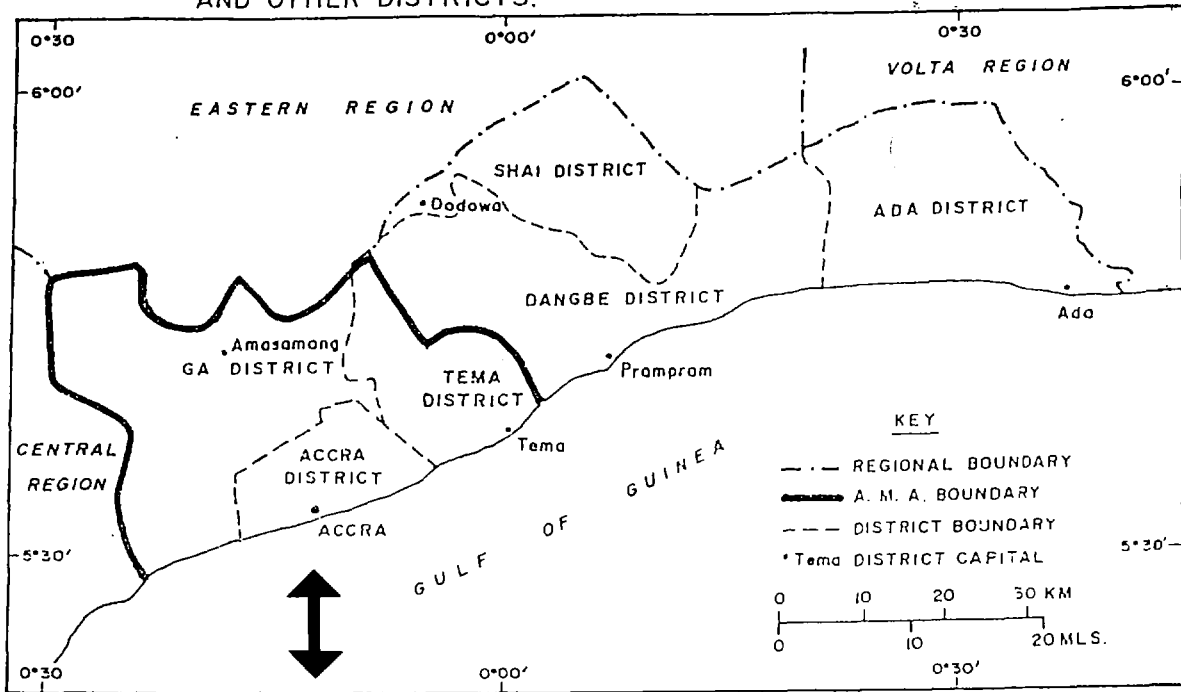
Status of the environment in the urban region

With respect to **natural resources**, the profile assessed the status of air quality, water quality (surface water, the sea front, and groundwater), and land (forests and natural vegetation, agriculture, fisheries, the salt industry, wetlands, parks and open space, and cultural/historical property). From this assessment, the key environmental quality issues appear to be:

1. The environmental profile for Accra, Ghana, was prepared by A.T. Amuzu and Josef Leitmann.

FIGURE 5.1: Maps of the City and Metropolitan Area of Accra

GREATER ACCRA REGION SHOWING ACCRA METROPOLITAN AREA AND OTHER DISTRICTS.



SOURCES: Republic of Ghana, "Demographic Studies and Final Projections for Accra Metropolitan Area (AMA)," Accra: University of Ghana, July 1990, and World Bank, "Urban II Project," Staff Appraisal Report No. 8331-GH, Washington, DC: World Bank, 1990.

- (a) ambient **air pollution** concentrated in the Tema industrial area as well as polluted air inside poorly ventilated and overcrowded slum households throughout the AMA, caused by the combustion of biomass;
- (b) a series of **water-related problems**, including lagoon pollution from industrial and domestic wastes, health problems from improper excreta disposal on beaches, food and water that are sold and consumed under unhygienic conditions, and high concentrations of chloride and iron in some of the groundwater; and
- (c) the declining availability of **open and recreational space** for the growing urban population.

On the positive side, ambient (as opposed to indoor) air pollution is not a problem, fisheries and agriculture have not been adversely affected by urban effluents, and some important historical buildings are being maintained through daily use.

The AMA faces two sets of **environmental hazards**: those that occur naturally and those that are caused by human activities. In the former category, Accra faces some risk from earthquakes, waterlogging due to the soil structure, shoreline erosion, occasional flooding, and high winds. The human-induced risks include health problems from inadequate sewage disposal, deforestation, noise pollution from the airport, and a variety of flood-related problems if there is a rise in the sea level due to global warming.

Development-environment interactions

In the AMA, the key sectors and development activities with environmental consequences and constraints are: population growth and family planning, water supply and distribution, sewerage and sanitation, solid waste management, industrial pollution control, power generation/energy consumption, housing, health care, transportation, and mining. The extent to which these facets of urban development have environmental impacts, or are constrained by environmental factors, is summarized below.

Demographically, Accra is currently growing at a rate of 4.3 percent annually, compared to the national rate of 2.8 percent. Two thirds of the city's population growth is natural and one-third is from rural-urban migration. With half of the national population aged under 15 years, and expected increase in life expectancy from the current 56 years to 68 years by 2015, current fertility rates would result in a national population of 36 million, requiring 484,000 new jobs per year. This would push the AMA's population to 5.9 million. With a declining fertility scenario (halving the current average of six children/woman between 1985 and 2015), Ghana would have 27 million citizens requiring 311,000 new jobs annually; Accra's population would be 4.2 million. Thus, the stakes are high for Accra with regard to reducing fertility. The 40 percent difference in the AMA's population between these two scenarios has significant implications for the need to maintain and supply key environmental services and infrastructure, energy, transport, low-risk land, and acceptable housing (3).

Fortunately, Accra has the **family planning** record in Ghana for responding to this fertility challenge. Nationally, 12.3 percent of currently married women use some form of birth control, with 5.2 percent using modern methods. However, in Accra, 27.2 percent use family

planning methods, with 10.6 percent using modern techniques. If knowledge is a precursor to action (in this case, greater use of birth control), then the women of Accra are well versed; 93 percent of currently married women in the AMA have some knowledge about contraception methods (4). Still, fertility reduction in Accra faces the following constraints:

- there has been instability and lack of coherence in program implementation;
- as a result, family planning services are poorly distributed and inaccessible to many potential clients in Accra; and
- consequently, Ghana's family planning program (the second oldest in sub-Saharan Africa), has one of the poorest ratings on the continent for program effort and level, service, record keeping, availability, and accessibility.

If Ghana is to emulate successful family planning programs such as those in Mauritius and Indonesia, analysts agree that the program must shift from a clinic-based delivery system to a community-oriented "doorstep service" approach (5).

The capacity of the Metropolis' two **water supply** systems is nearly 300,000 m³ per day and water quality at the source is generally good (6). On the demand side, average consumption per person (including industrial and commercial demand) is 168 liters per day, though actual use varies by income class, with the poor using only about one third as much water as the wealthy (7).

This socioeconomic stratification also occurs in **water distribution**. About half the population (generally in upper and middle income neighborhoods) has indoor plumbing, while the poorer segments of the AMA get their water from vendors, community standpipes, or natural sources (8), with 87 percent of the lowest income quintile having to fetch their water (8). Because the distribution system to the poor is more vulnerable to contamination, water quality in low-income areas is generally worse than in those areas with indoor plumbing; a recent study indicated that 86 percent of drinking water samples from household water containers were contaminated with fecal coliform (9).

Regarding **sewerage and sanitation**, the average volume of sewage in the AMA is 0.74 m³/capita/day in high-income areas, and 0.19 m³ in other areas; about 20 percent of this waste is treated in some manner (6). The most common forms of human waste disposal in the AMA are pit latrines, pan/bucket latrines, and open defecation; 16 percent of households use flush toilets. Nearly three quarters of the lowest income quintile in the AMA share toilet facilities with more than 10 people (9). Most of Accra's central business district has sewers, although only 1 percent of the city's population is connected; almost all of Tema is connected to a sewer system. Both systems, along with a number of private sewage treatment works, are in varying stages of disrepair, with malfunctioning outfalls that contribute to beach pollution and possible health hazards. In poor neighborhoods, inadequate grey water (sullage) disposal also presents a health problem, giving rise to waterlogged soil and stagnant pools that can spread hookworm and provide breeding grounds for mosquitos.

Per capita **solid waste** (municipal and industrial) averages between 0.5-0.6 kg/day in the AMA with wealthy households generating double the output of low-income dwellers (6—Engmann). The composition is mainly putrescible organic matter (up to 90 percent), with paper and metal constituting 5 percent–10 percent of the waste stream. About 750 tons, or 75 percent, of municipal

solid waste is collected daily; most is used for landfill, with about 10 percent being composted. Only 11 percent of the population benefits from house-to-house collection; the overwhelming majority use communal disposal sites or bury or burn their wastes. Environmental problems include air and odor pollution from open burning of uncollected garbage, odor and disease vectors stemming from uncollected rubbish in poor neighborhoods, and blockage of drains from illegal dumping, although all these problems have been significantly reduced in recent years with improved collection and disposal services (10).

Enforcement of **industrial pollution control** is virtually nonexistent in the AMA. In Accra, car assembly plants, distilleries, breweries, and small-scale industries discharge wastes into streams and rivers that empty into Korle Lagoon, contributing to extensive pollution and disruption of its ecology. In Tema, industrial zoning has concentrated the flow of effluents, especially into Chemu Lagoon, which is heavily polluted with industrial waste. The primary source of water pollution is petroleum byproducts from the oil refinery, and a key source of air pollution is discharged from the aluminum plant (11).

The construction of hydroelectric dams for **power generation** has had several environmental consequences. On the negative side, it has resulted in the displacement of 80,000 people in 700 villages, the spread of schistosomiasis, and the reduction of prawn and clam populations in the river. On the positive side, fish catches behind the dam have risen dramatically, breeding grounds for the black fly that transmits river blindness have been eliminated, and the potential for irrigated agriculture has been increased (12). At the household level, supplying woodfuel for **energy consumption** has accelerated the depletion of forest reserves, and indoor air pollution is a potential health problem, particularly in high-density, low-income areas where 96 percent of the lowest income quintile uses biomass (charcoal and wood) as their principal cooking fuel (9).

Although homelessness and spontaneous squatter settlements are not a major problem in the metropolis, overcrowded **housing** is an environmental issue. With high average occupancy rates of 6.8 households per dwelling and 2.9 persons per room, there are enormous pressures on shared resources in low-income communities, such as kitchens, toilets, and bathing areas (13). As a result of inadequate sanitary facilities and poor drainage in these communities, residents are exposed to a greater risk of health problems from poor hygiene.

Concerning **health**, environment-related diseases such as malaria, skin and gastrointestinal infections, and respiratory ailments are common in Accra. Thirteen of the 36 significant diseases reported in the AMA can be linked to poor housing and ventilation, a dirty environment, poor drinking water, stagnant waters, poor drainage, and lack of facilities for waste disposal (14). This is especially true in the high-density, low-income neighborhoods of the AMA where circulatory, infectious/parasitic and respiratory diseases are key causes of mortality (15). Of particular concern are pests (the most prevalent being malaria-transmitting mosquitos, houseflies, cockroaches, bed bugs, lice, and rodents), along with the potential misuse of commercial pesticides. Food contamination is another health problem that has its roots in a number of environmental factors. Although no data on the economic costs of these problems exist for the AMA, 70 percent of national expenditures on health have been attributed to environment-related diseases (16).²

2. This estimate accounts for loss of productive person-hours, and the cost of resources such as doctors, nurses, technicians, administration, equipment, and drugs.

Finally, two additional dimensions of development have lesser environmental consequences in the AMA: **transportation** and **mining**. Accra is characterized by congested streets, vehicular conflicts, and vehicular-pedestrian conflicts. These all limit urban economic productivity, although, on the environmental side, air pollution is not a significant problem. Extraction and processing of clay, sand, and gravel have caused localized environmental degradation around the metropolis; shoreline erosion from sand winning has been generally halted but quarried land has not been reclaimed.

The setting for environmental management

The actors involved in urban environmental management encompass the political structure (both the central government and regional/district-level administrations), the private sector, community groups, the communications media, and, increasingly, environmental NGOs. Eight of 15 central ministries have portfolios that affect the environmental quality of the AMA, as do the district administrations that cover the cities of Accra and Tema.

The instruments available for managing the urban environment include legal mechanisms (general legislation on the environment and resource use, settlement planning rules, and enabling legislation on pollution), indirect economic and fiscal measures, planning systems, regulatory powers and standards, community organizing, public education and training, and public protests and promotional activities. Legal mechanisms are limited by lack of monitoring, enforcement, and coordination. Economic and fiscal instruments have not yet been used in Ghana to explicitly address environmental problems. Efforts at urban planning have had some success but are tempered by problems of poor maintenance and lack of zoning enforcement. The only standards that have been set are for ambient air quality in residential and industrial areas, and regulatory powers are often nonexistent; for example, there is no control of industrial siting on the basis of environmental considerations. Environmental education and training capabilities are increasing, as are incidents of public protests and promotion involving urban environmental issues. Perhaps the most successful mechanism for urban environmental management to date has been community organizing to address sanitation, waste, and hygiene problems.

A number of initiatives are under way to improve urban environmental management, particularly in the areas of coordination and decision-making. These include:

- (a) enhancing **public participation** through newly created environmental subcommittees in the urban District Assemblies, and consultative meetings;
- (b) improved communication **across levels of government** that has involved discussions at the community, metropolitan, and regional levels (e.g., in the replacement of bucket latrines with improved pit latrines in low-income areas);
- (c) increased **privatization of services** where private contractors are collecting and disposing of solid and human wastes and local consultants are providing environmental expertise to the public sector; and
- (d) a number of **environmental management initiatives** that directly affect the AMA are being undertaken, including implementation of a national environmental action plan, environmental impact assessments prior to new develop-

ments, cleanup of the Sakumo and Densu lagoons that border the AMA, new investments to reduce traffic congestion, accidents and unhygienic bus terminal conditions, urban coastal zone management planning, and flood modelling.

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São Paulo, Brazil³

Introduction

The São Paulo Metropolitan Region (SPMR) is the most urbanized, industrialized and affluent city in Brazil. It consists of 38 cities, with São Paulo City (SPC) being the largest (current population: 11.4 million). The SPMR is already one of the largest and fastest growing urbanized areas in the world, having a population approaching 20 million (1) and registering a growth rate averaging nearly 5 percent annually since 1960.⁴ Population is projected to be 24 million inhabitants by the year 2000, by which time the SPMR will be the second largest urban agglomeration in the world. SPC, capital of the state of São Paulo, was founded in 1554. It occupies a land mass of 1,577 km² while the SPMR covers 8,051 km². Within the city, 43 percent of this land is residential, 37 percent is not built up, 9 percent is commercial, 8 percent is industrial, and the remainder is used for other purposes (recreational, agricultural, etc.) (3). Maps of the city and the metropolitan area comprise Figure 5.2.

With 12 percent of Brazil's population and 12 percent of employees, the SPMR accounts for 18 percent of gross domestic product, 31 percent of industrial domestic product, and 25 percent of the industrial labor force (1). Despite its economic stature, a potentially significant number of residents live below the poverty line in the SPMR.

Status of the environment in the urban region

With respect to **natural resources**, the profile assessed the status of air quality, water quality, and land (solid waste, and forests/natural vegetation). The **air quality** of São Paulo is degraded by the presence of excessive levels of carbon monoxide, ozone and particulates. During 1989, health warnings because of air pollution from CO were issued for a total of 250 days; ozone, 108 days; and particulates, 54 days. Vehicles account for 73 percent–94 percent of most air pollutants in the SPMR except for particulates. Fifty-one percent of particulate matter comes from industries, 31 percent from vehicles, and 18 percent from open fires. Dust is also an important cause of reduced air quality in the city. The sources of this pollutant, averaged from sampler stations in 1989, were: vehicles (48%), street rubble (31%), and other (21%) (4).

As for **water quality**, the three most important rivers serving the SPMR and their associated reservoirs are seriously affected by urban sewage and industrial waste water. The rivers suffer from high levels of fecal coliform, BOD, nitrogen, and phosphorus. The reservoirs have significant amounts of dissolved oxygen and certain toxic substances: 40 m³/second of raw sewage and industrial effluent are discharged into the Tiete River which has become almost entirely devoid of oxygen (5). High levels of lead and mercury have been detected in several of the rivers that serve as major sources of drinking water for São Paulo. In addition, ground and coastal waters are experiencing some degradation linked to industrial emissions in the SPMR (6).

3. This summary is based on the environmental profile of São Paulo prepared by Josef Leitmann, with the help of Celso N.E. Oliveira and Arlindo Philippi Junior.

4. More recently (1980-91), growth has slowed to 1.9 percent annually in the SPMR, with 1.2 percent in the city and 3.2 percent in the periphery (2).

SPC generates about 11,000 tons of municipal **solid waste** per day, while the SPMR produces about 14,000 tons of MSW and 6200 tons of industrial solid waste daily. Of this, 90 percent is collected and disposed of in the city, but throughout the metropolitan area, only 80 percent of municipal and industrial wastes are handled by the official system (7). According to the Pan American Health Organization, the final condition of waste processed at disposal sites is: properly disposed - 65 percent (weight basis); adequately disposed - 10 percent; and improperly disposed - 25 percent (8); only 5 percent is recycled (9). Specific estimates of pollution attributed to these sources are not available. However, with 20 percent (more than 4,000 tons) of municipal, industrial, and hazardous wastes going unprocessed each day by the formal collection and disposal system, it is likely that there are associated health and sanitation problems, particularly in low-income neighborhoods and areas outside the city proper.

Concerning **natural lands**, protected water supply catchment areas constitute some of the city's most important ecosystems. These areas were reasonably managed until 1980. With the economic crisis of the 1980s, squatters (now estimated at more than 500,000 people) began to occupy the watersheds which has led to increasing degradation of the Guarapiranga reservoir that is used for drinking water (10). As for open space, the city has added 24 million m² of public garden area from 1979 to 1988. However, total green or open space still amounts to only 4.5 m² per inhabitant in the SPMR (11); public green space constitutes only 2.8 percent of the urbanized area in the city (8). Opportunities for using new areas are sometimes constrained by environmental conditions. For example, water pollution problems prevent use of the nearby reservoirs as recreation areas.

Environmental hazards in the SPMR consist of landslides, flooding, and thermal inversions. Uncontrolled urbanization and the economic crisis resulted in the creation of more slums, with 1,600 shantytowns housing a million people in 1987 (12). Steep hillsides and areas prone to flooding have been occupied by these low-income settlements. There are 783 slums located in water basins, 385 in erosion-prone areas, and 30 on or near garbage dumps (12). Flooding is common during the summer when heavy rains occur. In the city proper 468 areas have been identified as at risk from flooding; an estimated 75,000 people are periodically affected, most of them poor slum-dwellers (8,13). In March 1991, much of the city was affected by some of the worst flooding in its history. Thermal inversions, a human-exacerbated natural hazard, occur virtually every day during the winter season and lead to higher levels of air pollution.

Development-environment interactions

Rapid **population growth** has led to two streams of environmental impacts. First, urbanization and industrialization have been intertwined in SPMR's economic development. Federal policies of import substitution and industrialization attracted and relied on a large, skilled labor force. The growth of this population helped build and expand a number of industries in and around the SPMR that emit significant amounts of pollutants.

The second set of impacts stem from the resource requirements of the growing number of city-dwellers themselves. The component of the population that is born in the urban region, accounting for almost 40 percent of population growth in the SPMR, places a demand on existing infrastructure (water, sanitation, health, transport, telecommunications, and waste management) while the migratory component creates an often unfulfilled demand for new services in the periphery.

Changing economic conditions and increased awareness about **family planning** have led to a high contraception prevalence and reduced birth rate. In São Paulo, 74 percent of couples use

birth control, compared to 63 percent nationally. In 1960, the average Brazilian women could expect to have six children in her lifetime; this dropped to 4.5 by 1980 and 3.5 in 1985. Female sterilization and oral contraceptives are the two most common methods of family planning in Brazil. Nationally, the 1986 Demographic and Health Survey indicated that the prevalence of sterilization among married women was 27 percent, 32 percent in São Paulo. For São Paulo, this is twice the proportion found in 1978. One explanation for this is that tubal ligations are often performed with Cesarean sections; in São Paulo, the percentage of C-sections has risen to one third of all births (14). The cumulative effects have contributed to the drop in the SPMR's growth rate which is most profound in the city itself (2).

The key SPMR **public sector** activities that have an impact on environmental quality are: water supply, sewerage and sanitation, solid waste management, transportation, industrial pollution control, power generation, land management, and health care:

Water: An impressive 92 percent of SPMR residents have piped water. However, because of pollution problems coupled with growing demand, maintaining reliable supply is a problem; poor water quality has contributed to certain diseases; periodic rationing, affecting 3.5 million people, is still required (15).

Sewerage: Although 65 percent of the SPMR is connected to the sewer system, only 40 percent of sewage receives some sort of treatment, with waste water treatment plants processing less than 26 percent of the region's sewage flow (1).

Solid Waste: Collection and disposal of the 4000 tons of solid waste per day that are not processed by the formal system have lead to several environmental problems: (a) open burning of undisposed waste; (b) groundwater contamination; (c) surface water pollution; and (d) soil contamination.

Health: In the health field, environmental factors are associated with adult mortality, i.e., pollution exacerbates respiratory ailments, poor transport planning worsens vehicular deaths and inadequate occupational safety leads to a high death rate from industrial accidents. Several diseases are also associated with environmental problems: diarrhea, tuberculosis, cerebrospinal meningitis, schistosomiasis, and skin infections are linked to poor water quality, overcrowding, substandard housing, and underventilation. Life expectancy at birth in SPC is 64.4 years, more than a year below the national average of 65.6. On the other hand, infant mortality averages 37/1000 live births, well below the national mean of 60/1000 (1).

Transport: A highly motorized and congested transport system results in high levels of air pollution, accidents, and stress, as well as economic losses averaging more than US\$6 million daily (16).

Pollution Control: Enforcement of environmental standards has been relatively successful in reducing overall levels of industrial air pollution, though solid and hazardous wastes are still a problem.

Energy: Hydropower supply for São Paulo caused a regional environmental impact: to have enough capacity for the Cubatao hydro plant, water from two

polluted rivers was pumped into the Billings reservoir, leading to its degradation. As of mid-1993, this practice has stopped, but now there are concerns about adequate reservoir capacity.

Land: Land management regulations have had negative environmental consequences, accelerating a decline in the quality of the housing stock and illegal occupation of the watersheds.

Many of these interactions constitute an excess burden on the urban poor, who are negatively affected by: low participation in the municipal solid waste management system; substandard housing; occupation of hazard-prone lands; less access to infrastructure (sanitation, clean water, health services); and greater exposure to environment-related causes of mortality and morbidity.

Key **private sector** activities that have important linkages with the environment are industrial development, housing (especially informal settlements), and transportation. Industrial activities have several negative impacts on the urban environment, e.g., emission of one half of particulates that pollute the air, generation of 30 percent of the SPMR's solid waste, dumping of untreated industrial effluents, including hazardous wastes, into the regional watercourses,⁵ and high rates of occupational death and injury. Low-quality housing, built by the private and informal sectors, results in environmental problems, with particular impact on human health. Environmental health problems associated with poor quality housing include respiratory infections, diarrhea, an increase in communicable diseases, skin infections, and diseases from pests. Construction practices have resulted in increased runoff, localized dust pollution, and higher levels of siltation (18). In addition, mining for sand and stone has caused environmental problems with noise, vibration and air pollution. With 2.2 million vehicles in the SPMR, most privately owned, there are the previously mentioned problems with emissions, as well as a high rate of vehicular deaths and the risk of accidents from the transport of hazardous materials through the city.

The setting for environmental management

The **key actors** crucial to urban environmental management are the federal government, state authorities, municipal government agencies, private-sector enterprises, and the popular sector. Policy guidelines, basic laws (e.g., minimum emission and ambient standards) and budgetary decisions are controlled by the federal government. State authorities usually control water pollution management. In São Paulo state, the state company for environmental protection (CETESB), considered one of the most effective in the Third World, plays a key role in industrial pollution control in the SPMR as well as the development of supplemental environmental standards; the state company for drinking water supply and sewerage (SABESP) coordinates water protection and sanitation planning. The state development bank and public works agencies also affect environmental affairs in the SPMR. The role of municipalities focuses on solid waste management, zoning, parks and recreation, and control of noise pollution. In the popular sector, the media and environmental organizations are increasingly effective constituencies lobbying for improved management.

5. The 60,000 industries in São Paulo state produce about 20 million tons of waste annually, of which 1 million tons are considered toxic (17).

The **instruments** that are available for urban environmental management include legislation and regulation, economic and fiscal measures, planning, and direct investment. São Paulo State has set environmental standards, embodied in air and water regulations, linked to the economic costs of pollution; licensing is also used as a regulatory tool for environmental control. Economic measures include fines, pricing of some natural resources, user charges for the provision of key environmental infrastructure and services, and, most recently, water pollution emissions charges. Industrial zoning is a form of planning actively implemented in São Paulo, though it is not frequently used to limit the environmental impact of projects. Water rationing is used in the SPMR during the dry season when demand outstrips supply. Direct public investment has been important for, *inter alia*, water supply, flood control, industrial pollution control, sewage, and production of clean (alcohol) fuel.

Environmental **coordination** and decision-making are problematic in the SPMR. Coordination between sectoral agencies and between city governments is a serious problem within the region. Among other things, it adversely affects infrastructure and services for sanitation and waste management. Since the return to democracy, public involvement in environmental decision making has increased with more vocal nongovernmental organizations, political parties and the media making demands for improved quality of life in the metropolis. However, formal mechanisms for participation are still being developed.

The current system of urban environmental control is hampered by several constraints on managerial effectiveness. These are: (a) limited capacity to enforce regulations; (b) uneven enforcement of laws; (c) use of a narrow range of policy instruments; (d) the complexity of environmental laws and regulations; (e) lack of cost recovery for environmental services; (f) poor intergovernmental and interministerial coordination; and (g) limited public participation in the design and implementation of interventions.

A number of initiatives are being undertaken that will improve environmental management within the SPMR. The city is implementing a master plan with environmental macrozoning, environmental preservation areas, historical protection zones, and improved public transportation (19). At the metropolitan level, World Bank-financed projects seek to improve poor peoples' access to health services and rail transport; the latter is expected to lead to important reductions in air pollution, traffic congestion, and road accidents. At the state level, SABESP is undertaking large flood-control investments and programs to clean up the Tiete River (with major support from the Inter-American Development Bank and Japan) and the Guarapiranga Reservoir (with World Bank financing), CETESB is working with the federal government on air pollution control programs, and the State Secretariat for the Environment is promoting intermunicipal solid waste management, a regional environmental code, and a unified system of environmental licensing for manufacturing and mining enterprises (6).

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VI. URBAN ENVIRONMENTAL CONSULTATIONS: OUTCOMES

This chapter provides brief summaries of four recent urban environmental consultations that have taken place in developing countries. The consultations were part of the World Cities and the Environment: Five Cities Consultation Project, an activity supported by a consortium of Canadian funding agencies and assisted by the UMP.⁶ The project was managed by the Center for Urban and Community Studies, University of Toronto.⁷ For each city consultation, information is provided on the key stakeholders who were involved, the process that was followed, and the outcome, that is, the priority issues that emerged, and any follow up that occurred.

Accra⁸

The **stakeholders** who were involved in the consultation included: government authorities (the Accra Metropolitan Authority, Management Services Division, Town and Country Planning Department, Committee for the Defense of the Revolution, Tourist Development Corporation, Environmental Protection Council, Ministries of Energy, Roads & Highways, Social Welfare, Health, and Local Government), technical services and utilities (the AMA Waste Management Department, Metro Roads, Ghana Water Supply and Sewerage Corporation, AESC Hydro), NGOs (Global 2000, Grassroots Man, Green Forum, Friends of the Earth, Christian Council of Ghana, June 4 Movement, World Vision International, Water Aid), community groups (Nima 441 Association, Parks and Gardens), and business groups (Rotary Club, Ghana Chamber of Commerce, Association of Ghanaian Industries, Ghanaian Hotel Association, Prepared Food Sellers Association).

The **process** was sponsored by the Canadian World Cities and the Environment: Five Cities Consultation Project. A private consulting firm in Accra (Environmental Management Associates, Ltd.) was hired to organize the consultations. The process involved: preparation of a questionnaire on environmental problems, issues, priorities, and key themes; structured interviews with the stakeholders, using the questionnaire; and organization of a one-day final forum. The forum was held on May 15, 1991, at the offices of the AMA, presided over by the AMA Chairman. About 50 participants were divided into four groups (government decision makers, government advisors, Industry representatives, and NGO/Environmental organizations) to discuss priorities; they were then brought together in a plenary session to seek a consensus.

The immediate **outcome** of the consultative process was a consensus on priority problem areas and options. The priority problems were: inadequate waste management and sanitation; poor water supply and drainage; lack of housing and other social amenities; and inefficient urban transportation. The key management options identified were: (a) planning regulations that are

6. The consortium consisted of the Canadian International Development Agency/Federation of Canadian Municipalities, Canadian Department of External Affairs, and Canada Mortgage Housing Corporation.

7. Results of the *World Cities and the Environment: Five Cities Consultation Project* are available from the Center for Urban and Community Studies, University of Toronto.

8. Source: Environmental Management Associates (Accra). "Urban Environmental Priorities in Accra: Towards a Strategy for Action," in *World Cities and the Environment: Five Cities Consultation Project*. Toronto: Center for Urban and Community Studies, University of Toronto, 1991.

backed by the enforcement of strong legal sanctions; (b) institutional restructuring and strengthening to improve the performance of agencies involved in urban management; and (c) environmental education. More detailed recommendations were made on each of these points as part of an initial strategy for environmental management. A longer-term outcome of this consultation is that the results could be used by the UNCHS (Habitat) Sustainable Cities Program that is now in the process of translating consultation results into an urban environmental action plan for Accra.

Jakarta⁹

The **stakeholders** in the consultative process included: government agencies (Coordinating Team for Jabotabek Development, Jabotabek Urban Planning Coordination Office, DKI Jakarta Development Planning Board, DKI Jakarta agencies, bureaus, and departments of city planning, population and environment, traffic and transportation, parks, public works, cleansing, forestry, agriculture, Jakarta Kampung Improvement Project, Agency for the Assessment and Implementation of Technology (BPPT), Ministries of Home Affairs, Population and Environment, Economic and Development Affairs, Public Works), utilities (PAM Jaya), research groups (Jakarta Urban and Environmental Research Centre, National Institute of Oceanography, University of Indonesia), NGOs (Institute for Development Studies), and external support agencies (MEIP, UMP, City of Rotterdam).

The consultative **process** was jointly sponsored by the UNDP/World Bank Metropolitan Environmental Improvement Program (MEIP), the Canadian World Cities and the Environment: Five Cities Consultation Project, and the UMP; the consultations were organized by the MEIP National Program Coordinator—a senior municipal official temporarily detached from public service. Several seminars and workshops were held prior to the consultations to gather information for the data questionnaire and environmental profile. Different sets of stakeholders then took part in thematic workshops to discuss problems and priorities for water resources, air pollution, housing and the natural environment, hazardous waste, and environment and industrial development. A final forum was held June 12-14, 1991, at the University of Indonesia. In the three-day seminar, the first two days were devoted to a review of the implementation of the Clean River Program; the final day was dedicated to a discussion of Jakarta's overall environmental problems and strategic issues.

The immediate **outcome** was the achievement of consensus on priority urban environmental problems and strategic options. The priorities were: solid waste, water supply, air pollution, housing quality, public transport, public utilities, public buildings, and green space. The key options were: improved efficiency of water use; implementation of a sewerage and drainage master plan; industrial discharge control; provision of flood control infrastructure; automotive emissions controls; improved public transport; enhanced environmental education; use of neighborhood groups for solid waste collection and enforcement of pollution controls; improved participation in urban planning; development of an information system to monitor progress; and use of public/private partnerships to implement strategies. These priorities and options are now being included in MEIP-

9. Source: Suhadi Hadiwinoto. "The Consultation Process and Environmental Priorities in Jakarta," in *World Cities and the Environment: Five Cities Consultation Project*. Toronto: Center for Urban and Community Studies, University of Toronto, 1991.

supported activities in Jakarta (particularly through existing World Bank-supported projects) and will also be addressed by a UNCHS (Habitat) sustainable cities project.

Katowice¹⁰

The key groups of **stakeholders** involved in the consultations were: government agencies (city departments, Voivodeship Ecology Department, Sanitary Epidemiologic Station, State Forests Board, Water Supply and Sewerage Enterprise); municipal politicians; industries (private firms, state enterprises); NGOs; community groups; academics (Silesian University, Silesian Theological Seminary, Institute of Meteorology and Water Economy); and professionals (Polish Town Planners, Upper Silesian Economic Society Board).

The consultation **process** was sponsored by the Canadian World Cities and the Environment: Five Cities Consultation Project. A private consulting firm (PROCON Consulting Engineers) was engaged in Katowice to organize the consultation process. It consisted of: identification of stakeholders; meetings with sets of people in the groups mentioned above; and organization of a final public forum. The forum was a one-day workshop held on May 17, 1991, with the participation of about 30 representatives of the stakeholders listed above.

The short-term **outcome** of the process was an identification of priority problems and a consensus about strategic options. The key problems were: pollution linked to inefficient industrial processes (coal mining, iron and steel, power generation); inadequate solid waste management (unsanitary facilities, industrial waste buildup); air pollution (from industries and coal-fired domestic heating); and poor water supply and treatment (shortages, surface and groundwater contamination, industrial wastewater). The strategic options were: industrial restructuring; environmental education; implementation and enforcement of a legal framework for environmental protection; introduction of new, cleaner technologies; decentralized management; and improved infrastructure. In the longer term, the consultations were helpful for the work of the UNCHS (Habitat) SCP in Katowice and they led to formation of a group that has updated the city's environmental profile.

São Paulo¹¹

A large number of **stakeholders** were involved in this consultation. They included: government agencies at the municipal level (traffic engineering company, secretariats of housing, planning, health and hygiene, culture, public works, and public roads), state level (energy company, companies for environmental protection, water and sewage, and planning, water and electric energy department, secretariats for energy and sanitation, and environment), and national level (national association of municipalities and environment); legal/legislative system (Environmental and Consumers' Defense Committee, City Council Commission for Urban Policy, State Environmental Attorney,

10. Source: Zdislaw Schmidt. "Urban Environmental Priorities in Katowice, Poland," in *World Cities and the Environment: Five Cities Consultation Project*. Toronto: Center for Urban and Community Studies, University of Toronto, 1991.

11. Source: José Pedro de Oliveira and Celso N.E. Oliveira. "Urban Environmental Priorities in São Paulo: Towards a Strategy for Action," in *World Cities and the Environment: Five Cities Consultation Project*. Toronto: Center for Urban and Community Studies, University of Toronto, 1991.

State Congress); research groups (São Paulo University, National Institute for Traffic Safety, State Technology Research Institute, Urban Violence Center); the private sector (State Small Enterprise Association, State Business Federation, State Manufacturing Association, PNBE, Business Social Service, Small and Medium Manufacturing Union, Construction Industry Union); labor unions (CGT, CUT); professional associations (Associations of Landscape Architects and Sanitary Engineers, Brazilian Architects Institute, Engineering Institute); NGOs (NGO Forum for UNCED, CEDEC, ANTP); and community groups (Defenda São Paulo, FUNC, COHAB, Vila Guilherme Neighborhood Association).

The consultation **process** was supported by the Canadian World Cities and the Environment: Five Cities Consultation Project and organized by two consultants from the University of São Paulo. It involved: identification of institutions to be contacted (in consultation with Mayor's office); contact with stakeholders via individual interviews, roundtable discussions and mailed questionnaires; analysis of results; and preparation of the final forum. The process was managed by two staff members from the University of São Paulo who regularly work on urban issues. The final forum, attended by over 120 people, was held on May 31, 1991, and chaired by São Paulo's Mayor. It consisted of: (a) an opening series of statements; (b) presentation of results from initial consultations and discussion; (c) debate and identification of points of consensus; and (d) final discussions and conclusion.

The initial **outcome** of the process was a general consensus on priority areas for action and strategic options. The priorities were: urban and housing development (lack of community services, inadequate infrastructure for low-income areas, settlement in environmentally sensitive areas); land use and green space (limited green space, legislation fails to protect environmental quality); public health and basic sanitation (inadequate sewage treatment, poorly protected sources of drinking water, flood risks); energy and transport (high levels of air pollutants, congestion); failure to integrate environmental concerns in economic development activities; and lack of waste management (municipal, hazardous, medical, nuclear). The strategic options included: increasing the role of urban environment in public management; integrating environmental issues and zoning into the planning process; creating a Municipal Council of the Environment to coordinate regional environmental activities; environmental education; decentralized public administration; establishment of a legal framework to regulate harmful products; improved jurisdictional boundaries; and provision of minimal levels of environmental quality for all citizens. One longer-term consequence of the consultation was support for the mayor to seek investments to protect the Guarapiranga Reservoir; this protection is now included in a World Bank-financed urban water basin management project.

ANNEX 1: LIST OF LOCAL CONSULTANTS AND INSTITUTIONS

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JAKARTA

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Dr. Ewa Mieczkowska

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Research Scientist, Institute of Material Economy

Zdislaw Schmidt

Director, PROCON Consulting Engineers; member, Katowice City Council

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Arlindo Philippi

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University of São Paulo

SINGRAULI

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Tata Energy Research Institute, New Delhi

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Hedi Larbi

Cofounder, Engineering Company for Economic and Social Development (SIDES)

Ahmed Basti

Senior Engineer, SIDES

Mohamed Hentati

Director, Prevention and Control Department, NEPA

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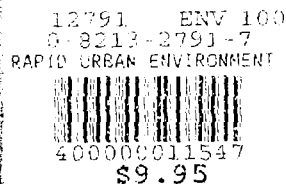
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