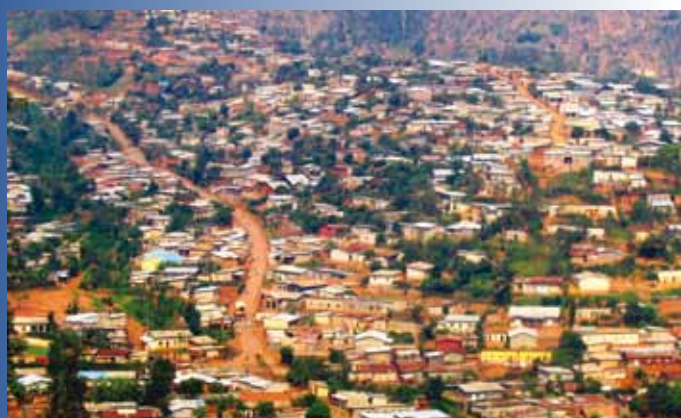
IEA Training Manual

Volume Two

Themes

Climate Change Vulnerability and Impact Assessment in Cities



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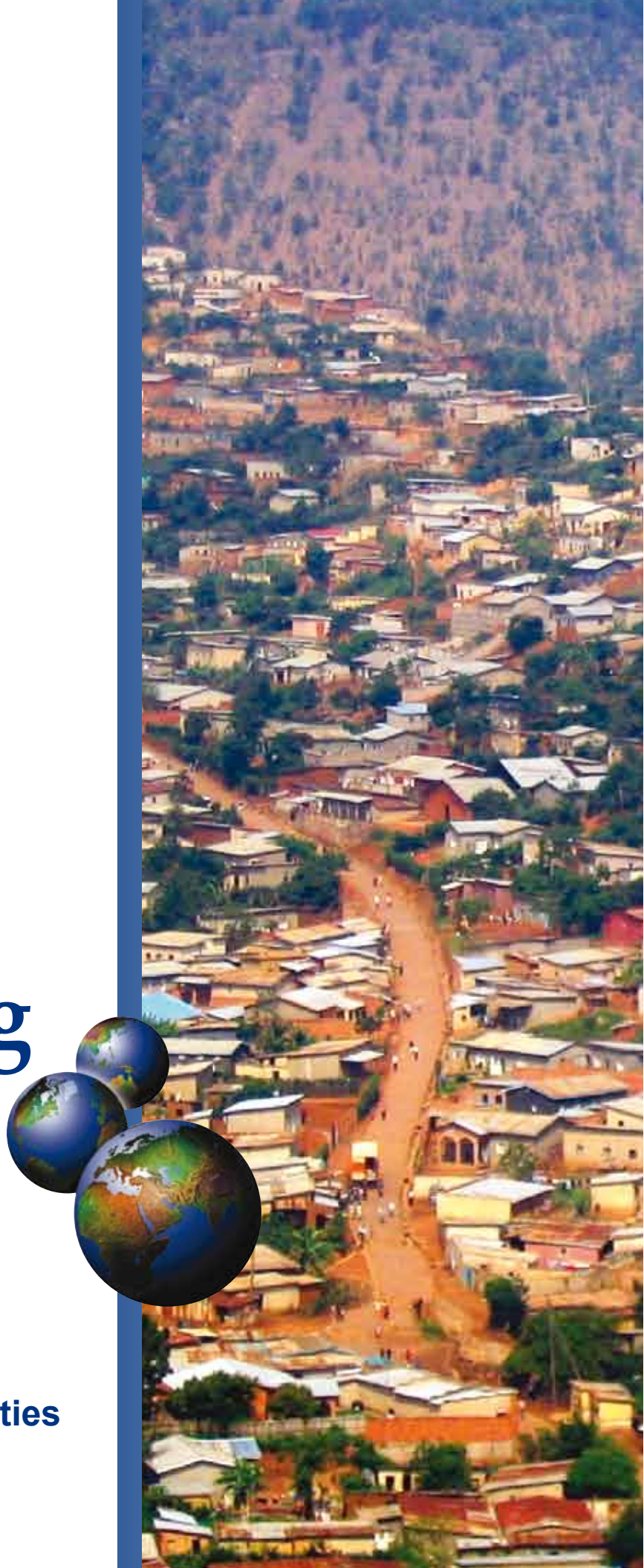

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Chapter I:

Introduction

1. Background

The Methodology for the Preparation of GEO Cities Reports[1], based on that used for the preparation of the Global Environment Outlook (GEO) series, was originally published at the beginning of 2003. This Methodology aimed to support capacity building in the development of city-level integrated environmental assessments, in which the linkages between environmental problems and urban development dynamics are analyzed.

In recent years, as part of the process of improving the GEO Cities Methodology, and responding to important natural events, it was decided to supplement the GEO Cities Methodology with a module addressing vulnerability and adaptation to climate change, to increase the capacity of cities to analyze and prepare for future climate impacts.

This new module analyzes the results of recent research on climate change, its impact on cities and options for responding. Its primary aim is to foster debate and present methodologies for evaluating the level of vulnerability and the adaptation capacity of urban centres.

This module aims to strengthen awareness on possible impacts of climate change, while providing decision makers with a range of instruments to evaluate those impacts. It also provides examples of adaptation policies that could be applied by government institutions and other sectors of society.

2. Objectives of this module

The objectives of this module are to complement the GEO Cities Methodology to assist government and other institutions that are supporting climate change adaptation either from a technical or a policy perspective. It is aimed at broadening technical and institutional capabilities in the context of climate change, as outlined in the Bali Strategic Plan for Technology Support and Capacity Building. The GEO Cities Methodology should be used as a basic reference guide for integrated environmental assessments in cities.[2]

The module focuses on vulnerability and adaptation to climate change and their link to sustainable development. It also includes general aspects related to mitigation of climate change, to the extent they relate to climate change adaptation issues.

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1 Version 3 of UNEP, *Methodology for the Preparation of GEO Cities Reports* (2009), available at www.unep.org/ieacp/cities.

2 ibid.

It presents a synthesis of the main indicators and existing methodologies on vulnerability and adaptation to climate change that are relevant to the local context. Additionally, it includes a compilation of case studies, exercises and examples on various themes.

This type of project is fundamental for scientific assessment: to bring the findings of science to bear on decision making, in a policy relevant manner, thus meeting the needs of decision makers to strengthen strategies for adaptation to climate change and related processes of sustainable development, with emphasis on capacity development and communication of results from adaptation programmes. This should also support National Communications on Climate Change and National Adaptation Programmes of Action (NAPAs).

In this module, the city is considered as an "urban ecosystem"[3]. In other words, the city is studied from the perspective of natural resources management, which takes in account ecosystem services, and therefore includes surrounding rural areas. Any city, especially one including high-density built-up areas, has a high degree of interdependency with peri-urban and surrounding rural areas, which provide a range of ecosystem services (water, food, flood regulation, garbage disposal services, recreational values, etc.) consumed by the urban area.

The training module aims to be relevant to different urban circumstances, by considering climate change vulnerabilities in the context of other factors like geographical location, level of socio-economic development, and institutional development. For instance, there are major distinctions between cities located at:

- Mega-deltas and other low-lying riparian and coastal areas;
- High altitudes;
- Arid and semi-arid zones;
- Temperate or polar zones (high latitudes).

Additionally, when defining vulnerability levels and capacity for adaptation, the module also considers the economic and social factors that influence the city's environment and the interrelations among different economic and social variables.

Policy makers must address severe climate-related phenomena, such as weather-related disasters, that occur suddenly and unexpectedly. An adaptation policy can diminish vulnerability, especially for the most vulnerable social sectors, and reduce the costs and pressures of responding to extreme events.

[3] Urban ecosystems apply the ecosystem approach to urban areas. Urban ecosystems are dynamic ecosystems that have similar interactions and behaviours as natural ecosystems. Unlike natural ecosystems, however, urban ecosystems are a hybrid of natural and man-made elements whose interactions are affected not only by the natural environment, but also by culture, personal behaviour, politics, economics and social organization (*UNEP-IETC - The Ecosystems Approach to Urban Environmental Management, 2003*).

Additionally, it should be kept in mind that it is not always possible to obtain information and precise data to local scale. Therefore, the evaluation of vulnerability and impacts at this level must take into account the uncertainties derived from applying low-resolution data (e.g., at the national or regional level) to the city in question.

The methodology presented in the module offers the possibility to:

- Evaluate climate change impacts on different cities and their implications for human well-being; and
- Consider policy options and response actions in the face of threats from climate change in urban areas.

This module—and the GEO Cities Methodology itself—are based on the approach used for Global Environment Outlook (GEO) reports, and apply the DPSIR (Drivers-Pressures-State-Impacts-Responses) framework to analyze how urbanization influences the environment. It considers factors that put pressure on natural resources and urban ecosystems, determines the state of the environment and its trend, analyzes its impact on the quality of life in cities, and puts forward specific responses that could be applied by local government and society.[4]

Upon successful completion of this module, the user will be prepared to analyze climate change and vulnerability as a part of integrated environmental assessments (IEAs) at city level. Specifically, they will be able to:

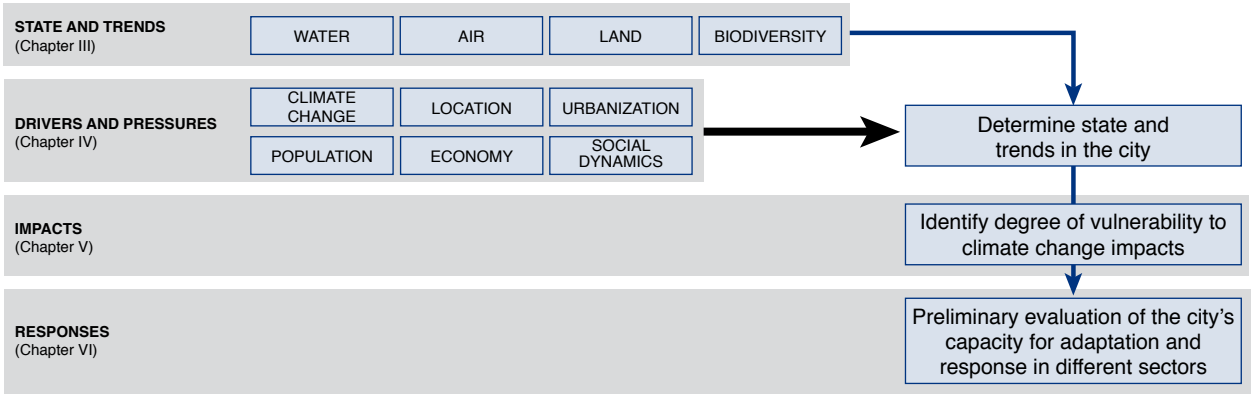
- Conduct and interpret vulnerability assessments by understanding the key components of risk, vulnerability and capacity;
- Identify impacts of future climate change and climate variability on human well-being and the environment;
- Identify key areas in which adaptation to climate change goes hand-in-hand with other development priorities and with building resilience in natural and human systems;
- Identify and develop basic elements of an implementation plan for adaptation options.

Building on the general IEA framework, the following are key questions to be answered through integrated climate change and vulnerability assessments in cities:

- Chapter III: What is the state of the city's environment, with emphasis on aspects relating to climate change vulnerabilities?
- Chapter IV: How will climate change exert pressures on the city's environment, and what are other drivers and pressures of environmental change with which climate change is likely to interact?
- Chapter V: What are the likely socio-economic impacts of climate change on cities?
- Chapter VI: What adaptation responses can address the possible impacts of climate change while helping build the resilience of cities?

[4] UNEP, *Methodology for the Preparation of GEO Cities Reports*, Version 3 (2008) available at www.unep.org/ieacp/cities.

Figure 1.1: Overview of this Module



Exercise 1.1: Context, Goals and Process of the Assessment

Are you using this training module in the context of a particular assessment your city is conducting? If so, it is useful to start by reviewing the context, goals and process of the particular assessment you are carrying out.[5]

- Have specific goals been established for this assessment?
- Is there a specific reason why the assessment is being carried out at this particular point in time (e.g., political impetus, response to recent disaster events, availability of donor funding)?
- What degree of confidence do the participants have that the assessment will lead to sustained action in the city? (assess on scale of 0-5)
- Are there any specific policies and plans in which the outcomes of this assessment are likely to be used:
  - Separate environment or climate change plan (at national, provincial or city level)?
  - General development plans (at national, provincial or city levels)?
  - Sectoral plans (e.g., water management plan, transportation plan)?
  - Regulations or zoning?
  - Other?
- Have any of the following been secured?
  - Funding to complete the assessment process
  - Funding for implementation of the outcomes of the assessment
  - Political commitment to act on the outcomes of the assessment