

CITIES AND BIODIVERSITY OUTLOOK

*A Global Assessment of the
Links between Urbanization,
Biodiversity and Ecosystems*

Proposal, October 2011



City of Cape Town, South Africa (© Y Chen1984i, on Flickr)



Convention on
Biological Diversity

Stockholm Resilience Centre
Research for Governance of Social-Ecological Systems



Stockholm
University

Messages



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The Convention on Biological Diversity is the first multilateral environmental agreement to adopt decisions and a Plan of Action to take the campaign for life on Earth to all levels of government. The way we live in cities increasingly defines how many species and ecosystems

will survive in 20 years and how effectively we can reduce our global footprint on biodiversity—and more of us will live in cities over the same period. The consultative process of the production of the CBO-1 will engage scientists, public officers and practitioners in the urban context to find solutions in cities and in urbanization, instead of problems. I invite all, experts as well as citizens, to contribute to that process and to send their messages to COP 11 in Hyderabad, in October 2012.

Dr. Ahmed Djoghla, Executive Secretary of the Convention on Biological Diversity



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Singapore is pleased to have contributed the Singapore Index on Cities' Biodiversity or the City Biodiversity Index as a useful planning and monitoring tool to the broad initiative to implement the 2011–2020 Strategic Plan of the Convention at the sub-national and local levels.

The use of the Index allows cities and other local authorities to support the efforts of Parties and engage their residents in setting benchmarks and evaluating progress across the range of the Aichi Targets. We are proud that results from more than 100 cities will be featured in the first edition of the Cities and Biodiversity Outlook.

Mr. Poon Hong Yuen, Chief Executive Officer of the Singapore National Parks Board

Overview

The first edition of the “Cities and Biodiversity Outlook” (CBO-1) will consist of a global assessment of the links between urbanization, biodiversity and ecosystem services. Combining science and policy, scientists from around the world will analyze how urbanization and urban growth impact biodiversity and ecosystems, delivering key messages on the conservation and the sustainable use of natural resources to decision-makers. Cities, local authorities and subnational governments will have the opportunity to showcase their practices on sustainability and biodiversity and learn from existing experiences how to incorporate those topics in their agendas and policies.

The current proposal outlines the planning, production, and dissemination of the Cities and Biodiversity Outlook (CBO-1), called for through paragraph six of Decision X/22 of the tenth meeting of the Conference of the Parties (COP 10) to the Convention on Biological Diversity (CBD), as well as its objectives, lead authors, composition of the Advisory Committee and the Inter-Agency Task-Force, and draft content outline. The Outlook is proposed in two complementary forms:

- 1) CBO-1 Synthesis a summary for policy- and decision-makers of the Convention;
- 2) CBO-1 Scientific Foundation a wider publication of its scientific basis, each with its specific messages, production, and launch/dissemination strategy but sharing the same basic goals and content.

THE CHARGE

The basis for the publication stems from the Plan of Action on Sub-National Governments, Cities and Other Local Authorities for Biodiversity (2011–2020) as endorsed by COP 10 in Nagoya, Japan, 18–29 October 2010.

Paragraph six of the decision as adopted:

“...Requests the Executive Secretary, subject to the availability of resources, to prepare an assessment of the links and opportunities between urbanization and biodiversity for the eleventh meeting of the Conference of the Parties, based on the third edition of the Global Biodiversity Outlook...”

THE URBAN CHALLENGE

By 2050, almost 3 billion additional people will inhabit the world's cities, and the world will have undergone the largest and fastest period of urban expansion in all of human history. A recent estimate reveals that the area directly impacted by new urban infrastructure within the next 40 years would roughly cover an area the size of Mongolia, with obvious impacts on natural habitat and the wildlife that depends on it. Consequently, urban growth will impact the provision of many ecosystem services and the benefits humans derive from nature, and the demands of cities will reshape most rural landscapes in the coming decades. Without adequate consideration by policy-makers of the implications of the coming urbanization, many of the goals of the Convention on Biological Diversity, as well as the Millennium Development Goals for providing clean water for consumption and sanitation and the UNFCCC goals for mitigating and adapting to climate change, are unlikely to be met. A sustainable urbanization will be necessary for achieving goals of a more sustainable planet.

THE MISSION

- ▶ Serve as the first and seminal global analysis of how urbanization and urban growth impact biodiversity and ecosystem dynamics in terrestrial, freshwater, and marine systems.
- ▶ Provide an overview, analysis, and response to knowledge gaps in our understanding of urbanization processes and urban social-ecological systems.
- ▶ Address how urban biodiversity and ecosystems could be used, restored, and created in innovative ways to reduce vulnerability and enhance resilience, and how cities could move from being just consumers to also generate ecosystem services and reduce footprints (redefining the function of cities).
- ▶ Serve as reference for decision- and policy-makers of the Convention on Biological Diversity and its Parties on the complementary roles of national, sub-national, and local authorities for the implementation of the Strategic Plan for Biodiversity 2011–2020 through decision X/22 of COP 10.



Community gardens, London, UK (© McTumshie, on Flickr)

The Strategy

As above, CBO-1 will consist of two publications: CBO-1 Synthesis and CBO-1 Scientific Foundation. The Synthesis aims at providing knowledge and guidance to policy makers on urbanization and biodiversity and at reinforcing the role of sub-national governments and local authorities in the implementation of the Convention. It will be an edited collaborative publication under the overall coordination of the Convention Secretariat, with Dr. Ahmed Djoghlaif as main editor. The Scientific Foundation will underpin CBO-1 Synthesis and synthesize relevant studies on links between urbanization and biodiversity, and the impacts of urbanization on ecosystem services, and will be edited by Dr. Thomas Elmqvist, from the Stockholm Resilience Centre at Stockholm University and Cornell University in Ithaca, New York, United States of America.

Both publications will have close correlations in content and messages and Dr. Thomas Elmqvist will also act as lead scientific editor for the CBO-1 Synthesis, collaborating with Ms. Elizabeth Pierson, a managing editor, who will be responsible for text production, editing, and publication design. The Secretariat of CBD will call on ICLEI and

others to provide additional case studies (for instance, on the relevance of urban parks in large cities).

The CBO-1 Synthesis will be presented at Rio+20 and submitted to the World Cities' Summit in Singapore, in June 2012, and officially launched at the second City Biodiversity Summit parallel to the eleventh meeting of the Conference of the Parties (COP 11) to the CBD, in October 2012. The CBO-1 Scientific Foundation will include in-depth analyses and undergo a careful peer-review process. Preliminary versions will be distributed at COP 11, with the final edition printed and published in 2013.

To support content development, accuracy and global scope, CBO-1 relies on a network of scientists, scientific institutions, United Nations agencies and other international organizations, specialists and decision-makers. ICLEI alone represents more than 1,200 local governments and local government organizations worldwide. To ensure synergy among the experts and the organizations within the network, the CBO-1 will be assisted by an Inter-Agency Task-force and an Advisory Committee, as well as the Global Partnership on Local and Sub-National Action for Biodiversity.

The Inter-Agency Task-Force

To support the production and to assure the global dissemination of the first edition of the Cities and Biodiversity Outlook, the Executive Secretary of CBD, Dr. Ahmed Djoghlaif has established the Inter-Agency Task-Force, which is composed of nine international organizations, in addition to the CBD.

MEMBERS

CBD	Ahmed Djoghlaif, Executive Secretary
UNEP-WCMC	Damon Stanwell-Smith, Senior Programme Officer, Ecosystem Assessment
ICLEI	Kobie Brand, Global Coordinator for Biodiversity
UNESCO	Gretchen Kalonji, Assistant Director General for Natural Sciences
UN-HABITAT	Rafael Tuts, Chief of the Urban Environment and Planning Branch
IUCN	Hans Friederich, Regional Director for Europe
UNU-ISP	Srikantha Herath, Senior Academic Programme Officer
UN-DESA	Mohan Peck, Senior Sustainable Development Officer and Keneti Faulalo, Interregional Adviser on SIDS
FAO	Julien Custot, Facilitator
Satoyama Initiative	Mrs. Anne McDonald, Director, Operating Unit Ishikawa/Kanazawa, UNU-IAS



Green wall, Bonn, Germany (© samdessordi, on Flickr)



Barigui Park—Curitiba, Brazil (© whl.travel, on Flickr)

The Advisory Committee

The preparation of the CBO-1 will be guided by an Advisory Committee. The Stockholm Resilience Centre and the Secretariat of CBD have invited scientists and experts from various groups and organizations, based on their unique experience on issues related to biodiversity, urbanization, ecosystem services and/or environmental policy.

The role of the committee is to contribute to the production plan and content development of CBO-1, reviewing the annotated outlines in order to ensure scientific and technical aspects of the texts, as well as the global scope of the assessment.

MEMBERS

Ahmed Djoghlaif	Executive Secretary, CBD
Bärbel Dieckmann	President of the Honorary Supervisory Board, Welthungerhilfe
Carlos Alberto Richa	Governor of the State of Paraná, Brazil
Haripriya Gundimeda	Professor, Indian Institute of Technology Bombay
Jean-Pierre Revéret	Professor, UQAM
Kazuhiko Takeuchi	Vice Rector, UNU-ISP
Lena Chan	Deputy Director, Singapore National Parks Board
Norbert Müller	President, URBIO
Robert McInnes	Ramsar STRP
Stephen Granger	Manager of Environmental Resources, City of Cape Town, South Africa
Ted Trzyna	President, InterEnvironment Institute
Thomas Elmqvist	Theme leader, Stockholm Resilience Centre

Comparative Outline of CBO-1

	CBO-1 Synthesis	CBO-1 Scientific Foundation
Scope	Solutions and tools—organized around 10 key messages, focus on tools for implementation of CBD, role of biodiversity for human well-being and innovative uses of ecosystems for addressing urban challenges	Scientific analyses and assessments—conditions and trends of urbanization, urban ecosystem services, scenarios, typologies of urbanization, governance challenges, urban landscapes as social-ecological systems
Content and language	Reviews and synthesis of existing information for policy and practice	Reviews and synthesis of existing information, as well as presentation of new original analyses and data
Organization no. of pages	~10 key messages organized in 5 sections with ~5 pages each ~50–60 pages total	4 sections and 9–10 chapters, ~200–300 pages total
Text produced by	Coordinating lead authors, Advisory Committee members, SCBD staff, other individual authors (ca. 10 in total)	Coordinating lead authors, lead authors, and contributing authors (ca. 40 in total)
Case studies, examples	10–15 short cases with rich illustrations focusing on practical solutions	5–6 long case studies, focusing on in-depth understanding of urban biodiversity and links to ecosystem services and governance of urban social-ecological systems
Review process	Internal (Advisory Committee and Inter-Agency Task-Force) and external (Global Partnership, parties to the CBD and international organizations)	Internal (Coordinating Lead Authors) and external (wider scientific peer review)
Timeline	Final hard copy printed: August, 2012	Published online: October 2012; final hard copy published: 2013
Main Editor	Dr. Ahmed Djoghla	Prof. Thomas Elmqvist
Technical Editor	Ms. Elizabeth Pierson	
Support—illustrations, graphics, etc.	SCBD and SRC	SCBD and SRC
Published by	CBD	Publisher

CBO-1 Synthesis Outline

Foreword

Acknowledgements

Executive Summary

Introduction

The Urban Challenge—a global outlook at urbanization, biodiversity and ecosystems, challenges and opportunities.

Urbanization and land use, biodiversity and ecosystem services and design, urbanization and water, ecosystem appropriation by cities.

Urban landscapes as social-ecological systems.

Urbanization, resilience, and global sustainability.

How could further urbanization and urban transformation be redirected so that cities can be harnessed as generators of innovation and solutions to issues of global sustainability?

I Key messages

- 01 Urbanization is one of the most important drivers behind biodiversity loss and ecosystem change.
- 02 Cities are often rich in biodiversity.
- 03 Urban biodiversity and ecosystems generate multiple benefits essential to human well-being.

Section I

Conditions and Trends

I.I *Current trends in global urbanization and urban transitions in developed and developing countries during the last century*

What is the level of biodiversity within cities? Do different types of urban form affect biodiversity within cities? Urbanization in global hotspot areas, invasive and exotic species. What land-use policies most affect conditions and trends of biodiversity within cities? How have non-land-use policies affected biodiversity within cities?

What are the experiences in the developed and developing world? Biodiversity and slums. What are urban ecosystem services, how are they generated and where? Urban biodiversity and links to ecosystem services. What are the benefits? Monetary and non-monetary valuation. Urban ecological restoration and ecosystem services, impacts on health and human well-being. Municipal watershed and ecosystem services governance.

I.II *Examples and analyses at the urban landscape scale*

The 120 cities analysis of land-use and ecosystem change (www.urbanplanetatlas.org/gue/).

CBO-1 Synthesis Outline *(continued)*

II Key messages

- 04 Cities can generate ecosystem services and at the same time reduce their consumption of ecosystem based resources.
- 05 Urban design with innovative uses of ecosystems has a critical role in reducing carbon emissions and adapting to climate change.
- 06 The economic and non-economic values of urban ecosystems are enormously high.
- 07 Feeding an urbanized world will depend on urban and peri-urban agriculture.

III Key messages

- 08 Cities are hubs of financial, social and human capital with a large potential to generate innovations and governance tools for sustainable urban development.
- 09 Urban landscapes offer unique opportunities for learning and education about sustainable development.

Section II

Scenarios

Scenarios of future urbanization and likely impacts on biodiversity and ecosystem services.

Meta-analysis of global patterns of urbanization, global urban expansion scenarios through 2030. How will the spatial pattern, rate, and magnitude of urbanization change in the next 30 to 50 years? What are the implications of future urbanization on biodiversity and ecosystem services?

Biodiversity and slum development. How can urbanization “save land for nature” elsewhere?

Restoration of urban ecosystems. Urbanization, food and water, food flows, world food prices, urban poverty, urban food production and biodiversity, water availability.

Section III

Policy options and responses

What can we do to enhance human well-being through sustainably managing and restoring urban biodiversity and ecosystem services, particularly in developing countries?

Formal and informal institutions, property rights, urban planning, building adaptive capacity through urban commons, protected areas.

Monitoring and evaluation: testing the City Biodiversity Index.

Solutions for sustainable cities.



Rocinha Slum, Rio de Janeiro, Brazil (© anjči, on Flickr)

Section IV

Implementation of the Aichi Targets at the local level

Support to the Plan of Action on Sub-National Governments, Cities and Other Local Authorities for Biodiversity (2011–2020) to the CBD.

Initiatives: CBD—from global plan of action to local implementation

Sub-National and Local BSAPS, the Global Partnership on Sub-National Governments, Cities and Other Local Authorities for Biodiversity, ICLEI Cities Biodiversity Center, the City Biodiversity Index, URBIS, TEEB, UN-HABITAT, the Satoyama Initiative, cooperation with Ramsar Convention on Wetlands.

Stakeholders: local authorities, business, NGOs, children and youth

Awareness-raising tools: UN Decade on Biodiversity, International Day for Biological Diversity, 1000 days for the Planet, The Green Wave campaign.

IV Key messages

10 Sustainable urbanization is necessary for a sustainable planet.

Section V

Synthesis and recommendations

Interactive visualization of the assessment on the web

Appendixes

References and Bibliography



Edmonton, Canada (© Matthew P Sharp, on Flickr)

CBO-1 Synthesis Proposed Case Studies

LIST OF THEME BOXES

Theme	City, Country
Large parks in/near cities	New York, USA (Central Park)
	Montreal, Canada (Mont Royal)
	London, UK (Hyde Park)
	Paris, France (Bois de Boulogne)
	Vancouver, Canada (Stanley Park)
	Dublin, Ireland (Phoenix Park)
	Brussels, Belgium (Jardin Royal)
	Singapore, Singapore (The Botanical Gardens)
	São Paulo, Brazil
	Melbourne, Australia
Cities with high biodiversity	Rome, Italy
	UNESCO World Heritage Parks
	Erfurt, Germany
	Cape Town, South Africa
	Rio de Janeiro, Brazil
Green spaces and health, and sustainable green space design	Berlin, Germany
	Stockholm, Sweden
	Vienna, Austria
	Curitiba, Brazil
	Victoria, Australia (Parks Victoria)
Urban ecological restoration	Bavaria, Germany (Bavaria Green spaces)
	Christchurch, New Zealand
	Portland, Oregon, USA
Biodiversity and slums	Chicago, USA
Urban agriculture	Rio de Janeiro, Brazil
	Bangalore, India
	Cape Town, South Africa
Urbanization, biodiversity and water	Havana, Cuba
	Bogota, Colombia
	Montreal, Canada
	Vancouver, Canada (more than 200 community gardens)
	Victoria, Seychelles (Ramsar)
Green policies and urban planning	Jerusalem, Israel



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LIST OF BOXES ON TOOLS AND INITIATIVES

ICLEI

City Biodiversity Index

TEEB

URBIS

URBIO

Sub-National and Local Biodiversity Strategies and Action Plans (BSAPs)

Plan of Action on Sub-National Governments, Cities and Other Local Authorities on Biodiversity (2011–2020)

Strategic Plan for Biodiversity 2011–2020 and Aichi Targets

United Nations on Decade on Biodiversity

International Day for Biological Diversity

Global Partnership on Local and Sub-National Action for Biodiversity

Advisory Committee on Cities and Biodiversity

Advisory Committee on Sub-National Governments

Comparative Message Content of CBO-1

Key Messages of CBO-1 Synthesis	Chapter in CBO-1 Scientific Foundation
01 Urbanization is one of the most important drivers behind biodiversity loss and ecosystem change.	1, 2, 3
02 Cities are often rich in biodiversity.	3, 5, 6
03 Urban biodiversity and ecosystems generate multiple benefits essential to human well-being.	4, 7
04 Cities can generate ecosystem services and at the same time reduce their consumption of ecosystem-based resources.	8, 9
05 Urban design with innovative uses of ecosystems has a critical role in reducing carbon emissions and adapting to climate change.	7, 8, 9
06 The economic and non-economic values of urban ecosystems are enormously high.	4, 10
07 Feeding an urbanized world will depend on urban and peri-urban agriculture.	8, 9
08 Cities are hubs of financial, social and human capital with a large potential to generate innovations and governance tools for sustainable urban development.	10
09 Urban landscapes offer unique opportunities for learning and education about sustainable development.	12
10 Sustainable urbanization is necessary for a sustainable planet.	8, 9, 10, 11



Mont-Royal Park, Montreal, Canada (© abdallahh, on Flickr)

CBO-1 Scientific Foundation Outline

INTRODUCTION

While there is growing awareness that cities affect almost every ecosystem on earth, significantly contribute to the loss of biodiversity, and are increasingly vulnerable to environmental change, there has so far not been any global assessment of urbanization's environmental impact. While many studies have examined particular cities or a particular facet of the environment, there has been little attempt to assess the prospects for ecosystem services on an urbanized planet.

The aim of this assessment is to:

- ▶ Serve as the first comprehensive global analysis of how urbanization and urban growth impact biodiversity and ecosystem dynamics in terrestrial, freshwater, and marine systems;
- ▶ Provide an overview, analysis, and response to knowledge gaps in our understanding of urbanization processes and urban social-ecological systems;
- ▶ Address how urban biodiversity and ecosystems could be used, restored, and created in innovative ways to reduce vulnerability and enhance resilience, and how cities could move from being just consumers to also generate ecosystem services and reduce footprints (redefining the function of cities).

Section I

Urbanization—a global perspective

- Chapter 1: A global outlook on urbanization and resilience, challenges and opportunities

Section II

Conditions and Trends

- Chapter 2: Urbanization and trends in biodiversity, ecosystems and ecosystem functions (global perspective)
- Chapter 3: Patterns and trends in urban biodiversity (within city)
- Chapter 4: Urban ecosystem services
- Chapter 5: The 120 cities project—changes in growth, land use, biodiversity, and ecosystem services
- Chapter 6: Shrinking cities
- Chapter 7: Urban ecological restoration



E. de Charles de Gaule - Montpellier, France (© Chez Julius Livre 1, on Flickr)

Section III

Scenarios and future opportunities

- Chapter 8: Typologies of urbanization, effects on land use, biodiversity and ecosystem services
- Chapter 9: Food and water in a future urbanized world
- Chapter 10: Integrating monetary and non-monetary values of urban ecosystems in future urban development

Section IV

Responses: Governance, institutions and learning

- Chapter 11: Urban governance of biodiversity and ecosystems
- Chapter 12: Urban landscapes as learning arenas for sustainable management of biodiversity and ecosystem services
- Chapter 13: Urban ecosystem services and equity

Section V

Applications

- Chapter 14: Indicators for management of biodiversity and ecosystem services a scientific evaluation of City Biodiversity Index

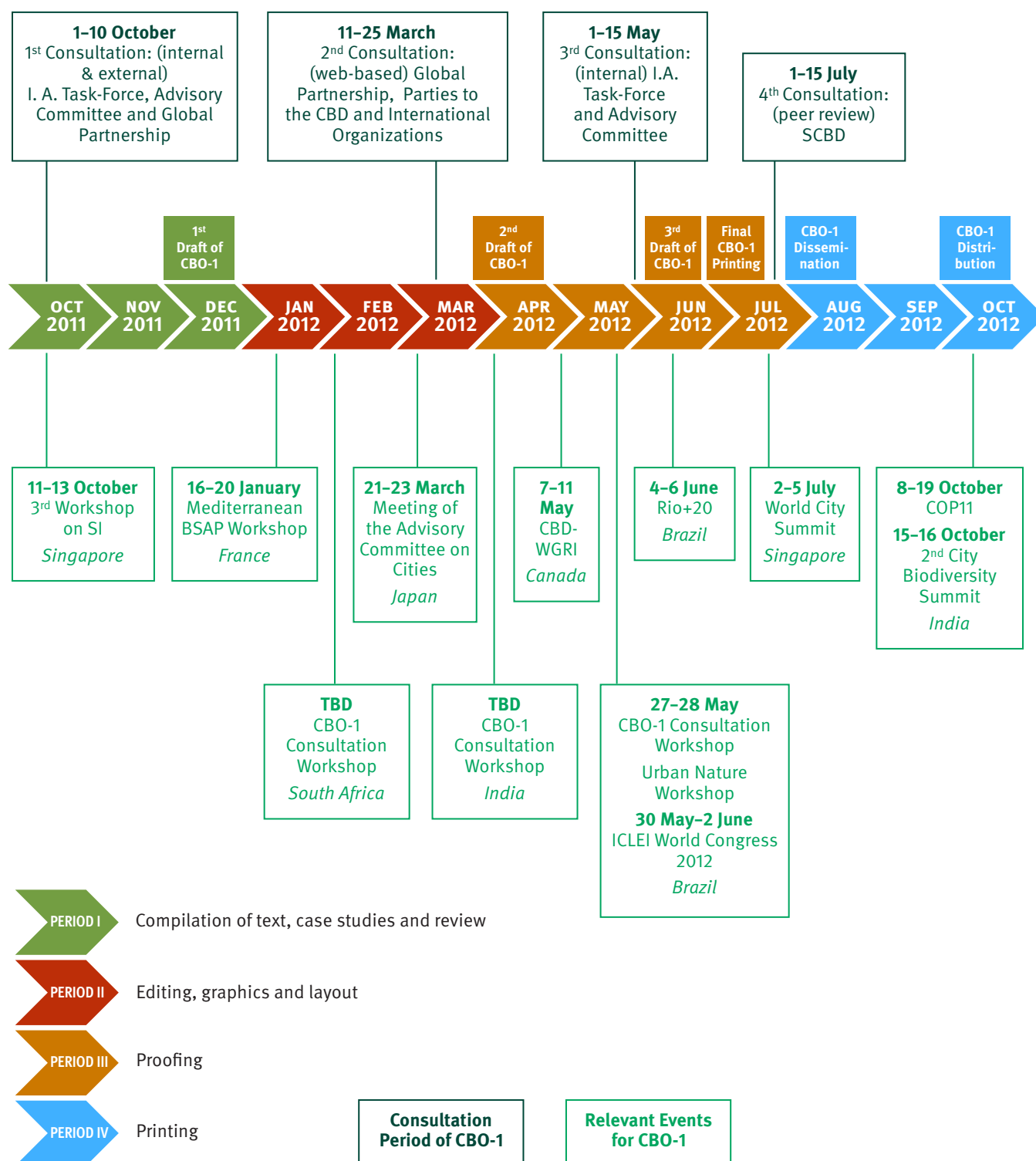
In depth social-ecological analyses of urban landscapes:

- Bangalore, India
- Stockholm, Sweden
- Cape Town, South Africa
- Melbourne, Australia
- Rio de Janeiro, Brazil
- Urban Satoyama Landscapes, Japan



Urban Fauna, Curitiba, Brazil (© Chantal Wagner, on Flickr)

CBO-1 Synthesis Consultation Plan



CBO-1 Scientific Foundation Production Plan

Period I: 15 August 2011 to 31 March 2012

Compilation of text, case studies, internal review, etc.

- ▶ Detailed annotated production plan;
- ▶ Contacting authors;
- ▶ Official announcement of CBO-1 project at Global Partnership meeting in Bonn;
- ▶ Develop a web tool to assist in the production;
- ▶ Send proposal to publisher;
- ▶ Hire a postdoc to help with analyses;
- ▶ Receive contributions from individual authors; review and edit for content;
- ▶ 1st draft sent to be reviewed by Advisory Committee.

Period II: April to July 2012

Revisions, illustrations

- ▶ Revision of texts, amendments, etc; Finalize text of author contributions;
- ▶ Suggest how many and what types of illustrations should be included;
- ▶ A second draft version for submission to publisher and external review.

Period III: July to October 2012

Proofing

- ▶ Proof PDF documents;
- ▶ Deliver PDF to be displayed online; External review through publisher.

Period IV: November 2012 to July 2013

Production

- ▶ Revision and finalizing of text after external review;
- ▶ Proofing, layout, printing.



Roof garden, Singapore City, Singapore (© Purple_man, on Flickr)



By 2050, almost 3 billion additional people will inhabit the world's cities, and the world will have undergone the largest and fastest period of urban expansion in all of human history. It has become more and more clear that a sustainable urbanization will be necessary for achieving goals of a more sustainable planet. Despite this, there has so far not been any global assessment of urbanization's environmental impact. While many studies have examined particular cities or a particular facet of the environment, there has been little attempt to assess the prospects for ecosystem services on an urbanized planet. The aim of this assessment is to serve as the first comprehensive global analysis of how urbanization and urban growth impact biodiversity and ecosystem dynamics and how cities may use innovative ways to reduce vulnerability and enhance resilience. CBO-1 will also illustrate how cities can move from being just consumers to also generate ecosystem services and reduce footprints. Please join us in this endeavor!

Dr. Thomas Elmqvist, SU-SRC, Theme Leader

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