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FIRST EXPERT WORKSHOP ON THE DEVELOPMENT
OF THE CITY BIODIVERSITY INDEX
Singapore City, 10-12 February 2009

REPORT OF THE FIRST EXPERT WORKSHOP ON THE DEVELOPMENT OF THE CITY BIODIVERSITY INDEX

Note by the Executive Secretary

INTRODUCTION

A. Background

1. At its ninth meeting, held in Bonn in May 2008, the Conference of the Parties to the Convention on Biological Diversity adopted decision IX/8, in paragraph 8 (r) of which it proposed that the activities supporting the national biodiversity strategy and action plan (NBSAP) processes might make use of or develop, as appropriate, regional, subregional or subnational networks to support implementation of the Convention. More specifically, through its decision IX/28, the Conference of the Parties recognized the role of cities and local authorities and the fact that the implementation of national biodiversity strategies and action plans (NBSAPs) requires close collaboration with subnational levels of government.

2. In light of the above, the Minister for National Development of Singapore and host of the World Cities Summit of June 2008, Minister Mah Bow Tan, proposed the establishment of an index to measure biodiversity in cities, at the high level segment of the ninth meeting of the Conference of the Parties in Bonn, on 27 May 2008. Following up on his announcement, the first expert workshop on the development of the City Biodiversity Index (the "Singapore Index") took place from 10 to 12 February 2009, at the Singapore Botanic Gardens, and was co-organized by the Secretariat of the Convention on Biological Diversity and the National Parks Board of Singapore.

3. The workshop was organized in close consultation with the members of the Global Partnership on Cities and Biodiversity. 1/

4. The objective of the workshop was to develop the City Biodiversity Index (CBI) to:

(a) Serve as a self-assessment tool;

(b) Assist national Governments and local authorities in benchmarking biodiversity conservation efforts in the urban context at the city level;

1/ For more information on the Global Partnership on Cities and Biodiversity, please see http://www.cbd.int/authorities/Gettinginvolved/GlobalPartnership.shtml.

/…

(c) Help evaluate progress in reducing the rate of biodiversity loss in urban ecosystems;

(d) Help measure the ecological footprint of cities,

(e) Serve as material for the development of guidelines for the preparation of a cities and biodiversity plan of action for the achievement of the three objectives of the Convention, and

(f) Make cities aware of important gaps in information about their biodiversity.

5. The workshop was held in English.

B. Attendance

6. A total of seventeen technical experts on biodiversity indicators as well as city executives and city representatives responsible for implementation and/or management of biodiversity and urban projects and programmes attended the workshop. Four city and city state governments were represented (Curitiba, Montreal, Nagoya, Singapore), experts from the London School of Economics (LSE), Stockholm Resilience Center (SRC), Institute for Housing and Environment (Germany) and National University of Singapore were present, as well as representatives of ICLEI/Local Action for Biodiversity (LAB), Partnership in Environmental Management for the Seas of East Asia (PEMSEA) and the International Union for Conservation of Nature (IUCN). From the Secretariat of the Convention on Biological Diversity, Mr. Oliver Hillel, Programme Officer for Sustainable Use, Tourism and Island Biodiversity, attended the workshop. A list of participants is available as annex V.

ITEM 1. OPENING OF THE WORKSHOP AND OVERVIEW OF THE OBJECTIVES AND PROGRAMME

7. The workshop opened at 9 a.m. on 10 February 2009 at the Singapore Botanical Gardens. Mr. Ng Lang, Chief Executive Officer of the National Parks Board, Singapore, welcomed the participants, followed by Mr Oliver Hillel, who presented a statement by the Executive Secretary of the Convention on Biological Diversity, Mr. Ahmed Djoghlaf. The full text of the statement is available at: http://www.cbd.int/doc/speech/2009/sp-2009-02-10-cbi-en.pdf.

8. Participants adopted the agenda prepared by the Executive Secretary (UNEP/CBD/EW.DCBI/1/1):

1. Opening of the workshop and overview of the objectives and programme.

2. Scope and elements of a City Biodiversity Index (positioning the Index within the framework of targets and indicators developed under the Convention on Biological Diversity).

3. Development and implementation of the City Biodiversity Index.

4. Conclusion and the way forward: next steps and responsibilities.

5. Closure of the workshop.

9. Dr. Lena Chan of the Singapore National Parks Board and Mr Oliver Hillel of the Secretariat of the Convention on Biological Diversity acted as Co-chairs of the workshop.

ITEM 2. SCOPE AND ELEMENTS OF A CITY BIODIVERSITY INDEX (POSITIONING THE INDEX WITHIN THE FRAMEWORK OF TARGETS AND INDICATORS DEVELOPED UNDER THE CONVENTION ON BIOLOGICAL DIVERSITY)

10. The National Parks Board of Singapore and the Secretariat of the Convention on Biological Diversity provided background information on the implementation of the Convention by local authorities, the 2010 biodiversity target and decisions of the Conference of the Parties concerning cities and local authorities.

11. Mr. Peter Werner of the Institute of Housing and Environment, Darmstadt, Germany, explained the basic theory of urban biodiversity and the findings of German researchers on the topic.

12. Dr. Nancy Holman of the London School of Economics gave a presentation focusing on the social and political implications of the use of indexes in decision-making in city governments. She highlighted lessons learned in examining the application of environmental indexes as management tools in four European cities.

13. Prof. Thomas Elmqvist of the Stockholm Resilience Centre (SRC), Stockholm University, Sweden, shared results of the SRC Urban Social Ecological Atlas project in ten cities. He also highlighted some positive and negative trends in urban biodiversity, and explained the difficulties in applying indicators to ecosystem services and resilience monitoring.

14. Mr. Andre Mader of ICLEI/LAB, South Africa, explained ICLEI's activities and its global urban biodiversity initiative "Local Action for Biodiversity (LAB)".

15. Ms Elisa Calcaterra of the IUCN Countdown 2010 Secretariat explained the principal objective of the "European Capital of Nature and Biodiversity-Award for Cities and Municipalities in Europe 2009-2011" project, and actions and means involved in the project. She circulated a summary of the project, which is reproduced as annex I below.

16. In addition, Dr. Ryo Kohsaka of Nagoya City, Japan, outlined the current use of indicators in the local context and introduced the development of local biodiversity strategies in Japan.

17. Dr. Lena Chan, Co-Chair of the workshop, proposed the scope and objectives of the workshop for adoption by the participants, introduced the workshop methodology, and presented a comparative analysis of other indices such as the 2005 Environmental Sustainability Index, the 2008 Environmental Performance Index and the Living Planet Index.

ITEM 3. DEVELOPMENT AND IMPLEMENTATION OF THE CITY BIODIVERSITY INDEX

18. The participants agreed that the City Biodiversity Index (CBI) should address three key issues which form the central components:

(a) What indigenous biodiversity is found in the city? (Biodiversity in the City);

(b) What ecosystem services are provided by the biodiversity in the city? (Ecosystem Services Provided by the Biodiversity in the City); and

(c) What actions and provisions are taken by the city to maintain or enhance the biodiversity in the city? (Governance and Management of Biodiversity).

19. The participants were divided into three groups, each discussing the indicators and variables for of the three components. They met in plenary at the end of each day to share their deliberations and to standardize the methodology of the three groups.

20. Participants in the first group proposed that the "Biodiversity in the City" component would be measured through five indicators, as follows:

(a) Percentage of natural/semi-natural areas;

(b) Diversity of ecosystems in the city;

(c) Measure of fragmentation in the city;

(d) Percentage of protected areas in the city; and

(e) Proportion of native species as opposed to invasive alien species.

21. In the second group, participants suggested that the "Ecosystem Services Provided by Biodiversity in the City" component should be measured through the following indicators:

(a) Freshwater services;

(b) Carbon sequestration; and

(c) Recreation and educational services.

22. The third group proposed the "Governance and Management of Biodiversity" component could be measured through five indicators:

(a) Biodiversity programmes and/or projects;

(b) Rules, regulations and policy;

(c) Institutional capacity;

(d) Participation and partnership; and

(e) Education and awareness-raising.

23. A field trip to the Tree-Top Walk at the Central Catchment Nature Reserve and Sungei Buloh Wetland Reserve was arranged by the National Parks Board on 11 February 2009.

24. The participants made good progress in determining the key components, indicators and variables. To assist cities in the testing of the Singapore Index, a task force will prepare substantive guidelines on how to prepare the Singapore Index.

ITEM 4. CONCLUSION AND THE WAY FORWARD: NEXT STEPS AND RESPONSIBILITIES

25. Participants determined the timeline of the implementation of the Singapore Index. The next steps in implementing the Index are presented in annex III below.

26. Participants were invited to test the applicability of the Singapore Index, and to report on results at the second Expert Workshop on CBI, planned to take place sometime between March 2010 and June 2010. Montreal, Curitiba, Nagoya, Singapore, the 21 LAB pioneer cities and IUCN Countdown 2010 project to monitor the performance of 12 European cities on biodiversity (see project document as appendix) agreed to test the Singapore Index until March 2010.

27. Participants also selected relevant upcoming events for cities and local authorities. These events are listed in the Singapore Index roadmap to the tenth meeting of the Conference of the Parties, contained in annex IV below.

28. The representative of the City of Montreal reminded participants that there is an initiative by Environment Canada (in which Montreal was playing a leading role) to encourage cities to enhance their sustainable management of biodiversity, and to develop or implement specific strategies on the topic. The representative of Montreal offered to assist in the strategic goal of strengthening relations between national and local government levels regarding biodiversity; that could also become a topic of discussion at upcoming events, such as the ICLEI Council and the Urban Nature Forum in Edmonton.

29. The representative of Curitiba announced that the Brazilian Ministry of Foreign Affairs was ready to chair an inter-ministerial task force (with Environment and the Ministry for Cities) to set up a planning workshop for the Global Partnership on Cities and Biodiversity in September/October 2009, in Curitiba, in preparation for the tenth meeting of the Conference of the Parties to the Convention on Biological Diversity.

ITEM 5. CLOSURE OF THE WORKSHOP

30. The workshop was closed at 5.45 p.m. on 12 February 2009.

Annex I

PROMOTING THE PROTECTION OF NATURE AND BIODIVERSITY IN URBAN AREAS: EUROPEAN CAPITAL OF NATURE AND BIODIVERSITY -AWARD FOR CITIES AND MUNICIPALITIES IN EUROPE

2009-2011

Project summary

Prepared by: Elisa Calcaterra, IUCN, Countdown 2010 Secretariat, elisa.calcaterra@iucn.org

The principal objective of the project is to increase nature and biodiversity protection in urban areas by local authorities. The project will help to fulfil the objectives of the European Biodiversity Strategy and the Fauna-Flora-Habitat Directive (and all related Directives).

Specific objectives of the project are:

- To support and motivate initiatives of local authorities regarding nature protection and conservation of biodiversity in Europe through the organization of a competition for local communities
- To improve the successful German competition model and to transfer the experience to four other European countries (Spain, Slovakia, Hungary and Poland) as a pilot phase for a European Award
- To elaborate a concept for a European wide competition "European Capital of nature and Biodiversity"
- To support local authorities to fulfil legal compliance regarding nature and biodiversity protection
- To inform local authorities about their possibilities regarding nature and biodiversity protection
- To promote the extension and accessibility of green areas. Natural and anthropogenic green areas and their protection will have an immense importance in relation to the mitigation of negative impacts of climate change in the cities (microclimatic function of green areas)
- **To establish a common monitoring system on biodiversity and to monitor biodiversity development in communities participating in the awards**
- To inform and sensitize citizens regarding nature protection and conservation of biodiversity and the importance of their collaboration

Actions and means involved:

All project actions will take place within the territory of the EU27 Member States – especially within Germany, Spain, Slovakia, Poland and Hungary.

- Elaboration of a Train- the Trainer concept and realization of two workshops to enable the project partners to organize the competition in their respective countries (structure, procedure, competition material, external communication etc.).
- Elaboration of a Capacity-Building programme for communities on the importance of biodiversity, relevant policies, possible activities on local level, positive examples, management instruments, monitoring, funding sources
- Elaboration of national competition concept (Capital of Nature and Biodiversity) for Spain, Slovakia, Hungary and Poland.

- **Elaboration of a common monitoring system (key set) for the presented initiatives.**
- Organization of a national workshop in each participating country to present the competition concept to potential partners in order to request their collaboration.
- Elaboration of competition material in the respective language of the country.
- Establishment of national websites and establishment of a European website (European Forum).
- Presentation of the competition in Germany, Spain, Hungary, Slovakia and Poland and activation of a "Hot Line" in each country to assist municipalities. Local authorities will be invited to present their applications during six months.
- Realization of capacity-building workshops for communities in each participating country based on the capacity-building programme elaborated by ICLEI.
- Evaluation of received applications en each participating country by a national jury (European expert included) and selection of the winners. Documentation of positive examples.
- Award ceremonies in Germany (2010) and Spain, Slovakia, Hungary and Poland (2010 and 2011) and publication of positive examples.
- Elaboration of a draft concept (structure, criteria, evaluation mechanism, communication) for the European wide Award. Evaluation of possible interrelation /synergies with sustainability awards for municipalities
- **Elaboration of monitoring reports on development of nature and biodiversity in urban areas.**

Under action 9 (coordinated by IUCN), the project will undertake monitoring and evaluation of the initiatives taken by local authorities. Local authorities will have to apply a basic biodiversity monitoring system, with few common key indicators, with the support from IUCN's Countdown 2010 initiative. Monitoring results will be communicated every year. This information will be published in the European Forum.

The objective of the monitoring will be to assess the effectiveness of the biodiversity conservation approach adopted by local authorities. The biodiversity monitoring will also provide an indication on how the ecosystems of these cities are being affected by a multitude of stress factors on the environment.

The monitoring programme will be implemented in the following manner:

- A set of biodiversity indicators will be identified for the purpose of monitoring. The indicators will be status, trend and response indicators. Examples of indicators include: Habitat diversity (number and relative proportion of different types of habitats present), proportion of area under green spaces, species diversity index, abundance invasive species, population of common bird and butterfly species, environmental legislation. This would be defined in year 1 along with the definition of a baseline.
- In order to involve the local community in the monitoring work, meetings and training will be organized to enhance their awareness, enthusiasm and skill-set to monitor biodiversity.
- A network will be established to collect data from different monitoring stations, in which the municipality will act as the nodal agency and an annual assessment will be carried out to monitor progress in relation to the baseline.
- Periodical compilation and analysis of the monitoring data.
- Consultation meetings with the local community and experts to discuss the results of the biodiversity monitoring, and to frame strategies for future implementation.
- Communication of the monitoring results to the project management agency.
    - A regular trend analysis of the biodiversity components in each site, clearly exhibiting the changes in biodiversity components over time.
    - A Monitoring Report on the basis of the first monitoring results of participating municipalities in Germany, Spain, Hungary, Poland and Slovakia.
    - Monitoring system for the European Award "European Capital of Nature and Biodiversity" tested in pilot awards and ready for further implementation

Annex II

MATRIX ON THE CITY BIODIVERSITY INDEX ("THE SINGAPORE INDEX")

Background Information on City:

- Total area
- Human Population size
- GDP
- Energy Use
- Rainfall

COMPONENTS	INDICATORS	VARIABLES	SCORE	MAXIMUM
1. Biodiversity in the City	**(I.1)** natural/semi-natural areas	- Natural/semi-natural areas as a percentage of the total area of the city		
	(I.2) Diversity of ecosystems as defined by the CBD	- A simple number that measures the diversity of habitats (number present now = index value of 100)		
	(I.3) Fragmentation	- Mean patch size (see next column on proposed steps) (Note: need a formula/ clear methodology/ definition of patch) of all a) natural and semi-natural areas (L1) b) ecosystems (L2)	*[Proposed Steps:* *1) Count all patches larger than 0.5 ha* *Definition of a patch: anything separated by more than 100 m from its neighbours)* *2) Calculate mean patch size* *3) Plot histogram of all patches – number versus area in bands (less t han or equal to 100 ha; 101-200 ha; 201-300 ha, 301-400 ha; 401-500 ha; 501-1,000 ha; 1,001-2,000 ha; 2,001-3,000 ha; more t han 3,000 ha)* *4) Calculate average ratio of circumference to area]*	

<table>
<tr><th>COMPONENTS</th><th>INDICATORS</th><th>VARIABLES</th><th>SCORE</th><th>MAXIMUM</th></tr>
<tr><td rowspan="2"></td><td></td><td></td><td></td><td></td></tr>
<tr><td>(I4) Biodiversity within different land-use categories</td><td>Step 1:
Areas of the different land-use categories (in km^2)

Terrestrial:
A: Impermeable built-up area – bare

B_1: Greenery on impermeable surfaces – roof gardens, green alleys etc., roadside trees

B_2: Anthropogenic green space – golf courses, lawns, urban parks, “roadside naturescapes”

C_1: Managed (“semi-natural”) greenery – parks with significant % of native species

C_2: “Natural” greenery – relatively “unmanaged”, protected areas, etc.

Inland waters:
D_1 Reservoirs – area and %
D_2 Naturalistic lakes and ponds – area and %
D_3 Rivers and Streams – length</td><td>
<table>
<tr><td>STEP 3a</td><td>X</td><td>Y</td><td rowspan="2">X.Y</td><td rowspan="2">Weighting ?</td></tr>
<tr><td></td><td>% Area</td><td>No. of Species</td></tr>
<tr><td>A</td><td>20</td><td>2</td><td>0.4</td><td>?</td></tr>
<tr><td>B1</td><td>20</td><td>4</td><td>0.8</td><td>?</td></tr>
<tr><td>B2</td><td>20</td><td>8</td><td>1.6</td><td>?</td></tr>
<tr><td>C1</td><td>20</td><td>10</td><td>2</td><td>?</td></tr>
<tr><td>C2</td><td>20</td><td>20</td><td>4</td><td>?</td></tr>
<tr><td>Total</td><td>100</td><td>?</td><td>8.8</td><td>?</td></tr>
</table>
STEP 3 b (Similar table as above for inland waters)
</td><td></td></tr>
<tr><td></td><td>Step 2:

No. of native species in the whole city</td><td></td><td></td></tr>
</table>

COMPONENTS	INDICATORS	VARIABLES	SCORE	MAXIMUM
		3 core groups - **(I.5)** plants - **(I.6)** birds - **(I.7)** butterflies Three other taxonomic groups (For example: Amphibians, Fish (Riverine), Reptiles, Hard Corals, Seagrasses, Carabid beetles) - **(I.8)** xx - **(I.9)** xx - **(I.10)** xx *Step 2a* No. of species per land use categories *Step 3* Combining the data in a matrix for weighting (see next column)		
	(I.11) Protected areas	Natural protected areas as a percentage of the total area of the city		
	(I.12) Native species and invasive species	- No. of total invasive species (at time t=100, additionally cities can provide information based on selected taxonomic groups) - No. of native species.		

COMPONENTS	INDICATORS	VARIABLES	SCORE	MAXIMUM
2. Ecosystem services provided by biodiversity in the city	1) Freshwater Services	**(I.13)** - replacement costs of water catchment services per capita either: a) within the city b) total water		
	2) Carbon Sequestration	**(I.14)** CO_2-Seq /person/year		
	3) Recreation and educational services	**(I.15)** - No. of visits/ person/ year **(I.16)** - Accessible park area/ person **(I.17)** - Educational visits / child < 16 years / year		
	4) Environmental Services - air pollution reduction - cooling effect - erosion control - coastal protection - [Valuation of real estate] (Choice to select)			
3. Governance and Management of Biodiversity in the City	Biodiversity Programmes and/or Projects	- **(I.18)** Amount spent on biodiversity projects (as %) of the city's budget/municipal spending. - **(I.19)** Amount spent (as %) of city size and population. ** Amount either as separate projects or as part of cross-		

COMPONENTS	INDICATORS	VARIABLES	SCORE	MAXIMUM
		departmental projects - **(I.20)** No. of official permanent organizations or institutions dedicated to biodiversity - **(Do you have programmes/projects to control the unsustainable/illegal use of biodiversity in your city?)		
	Rules, Regulations & Policy	- **(I.21)** Do you have an LBSAP[#], policy or equivalent? If yes is it: - A) aligned with national strategies and plans; - B) does it operate within an institutional framework? [#]**Are CBD targets, sustainable use considered/accounted for?** - C) Existence of regulations & its implementation - [Existence of incentives and disincentives] - [Existence of multi-stakeholder consultation systems] - D) Is your city procurement policy biodiversity friendly? (At least 2 products/ sectors to qualify for a "yes")		

COMPONENTS	INDICATORS	VARIABLES	SCORE	MAXIMUM
		*LBSAP – Local Biodiversity Strategy and Action Plan		
	Institutional Capacity	- **(I.22)** Is there an organizational structure present? If yes, qualify by the ratio of permanent employees per city population - **(I.23)** Is there an inter-agency coordination mechanism for biodiversity input? If yes, how many (or what proportion of) departments does it involve?		
	Participation & Partnership (contribution and ability to access)	- **(I.24)** Is there an ongoing formal/informal consultation process? - **(I.25)** Number of formal partnerships (city government with other sectors).		
	Education & Awareness-raising	- **(I.26)** Number of people reached (as % of total city population)		

Annex III

SINGAPORE INDEX: NEXT STEPS (12 FEBRUARY 2009)

No.	Next Steps	Deadline
1.	**DRAFT REPORT OF THE CBI WORKSHOP**	23 February 2009
2.	Comments on the draft report	2 March 2009
3.	Conference Call - Cities' feedback on data availability - Singapore's progress on draft guidelines	mid March 2009
4.	Guidelines on the Singapore CBI - Reporting format to include templates for Biodiversity Profile - Methodology - Definitions - Scoring system *Task force to include Nancy Holman, Peter Werner, Thomas Elmqvist, Andre Mader, Elisa Calcaterra, Oliver Hillel and Lena Chan (Coordinator)	15 May 2009
5.	Testing the Singapore Index (a) Assessment of availability of data (b) Testing by cities: 1. Curitiba, 2. Montreal, 3. Nagoya, 4. Singapore 5. LAB Cities 6. IUCN European Cities Project (for selected cities with population > 100,000)	15 April 2009 May - December 2009

Annex IV

SINGAPORE INDEX ROADMAP TO THE TENTH MEETING OF THE CONFERENCE OF THE PARTIES TO THE CONVENTION ON BIOLOGICAL DIVERSITY

TIMELINE	MILESTONES
June 2009, Edmonton	Urban Nature Workshop • Canadian Cities Initiative • ICLEI/LAB • CBD
June 2009, Edmonton	ICLEI World Congress
September 2009, Hong Kong and Shen Zhen	2009 Global Mayors Forum • ICLEI, WBCSD, CityNet
September/ October 2009, Curitiba	Curitiba Planning Event • Official event of the Global Partnership on Cities and Biodiversity
March/ June 2010,* *(Venue to be determined)* * To consider postponement to June 2010 to consider results from EU cities	2nd Expert Workshop on the Development of the Singapore Index • Evaluation of the progress on the testing of the Singapore Index
Spring 2010, Isle of Vilm	International Expert Workshop on City Biodiversity (Federal Agency for Nature Conservation, Germany)
May/ June 2010, Nairobi	14th Meeting of the SBSTTA
September 2010, Mexico	UCLG's World Congress
October 2010, Nagoya	Nagoya Biodiversity Summit
October 2010, Nagoya	Tenth meeting of the Conference of the Parties to the Conference on Biological Diversity

Annex V

LIST OF PARTICIPANTS

S/N	Name	Organization
1	Prof. Thomas Elmqvist	Stockholm Resilience Center, Stockholm University, Sweden
2	Mr. Peter Werner	Institute of Housing and Environment, Darmstadt, Germany
3	Dr. Nancy Holman	London School of Economics, England
4	Mr. Oliver Hillel	CBD Secretariat, Canada
5	Dr. Ryo Kohsaka	Nagoya City, Japan
6	Mr. Seiichi Kawada	Nagoya City, Japan
7	Mr. Alfredo Trindade	Technical expert/manager from the City of Curitiba, Brazil
8	Ms. Michele Picard	City of Montreal, Canada
9	Mr. Daniel Hodder	City of Montreal, Canada
10	Prof. Peter Ng	National University of Singapore, Singapore
11	Prof. Richard Corlett	National University of Singapore, Singapore
12	Dr. Tan Puay Yok	National Parks Board, Singapore
13	Dr. Geoffrey Davison	National Parks Board, Singapore
14	Dr. Chua Thia Eng	PEMSEA, Philippines
15	Ms. Elisa Calcaterra	IUCN/Countdown 2010, Belgium
16	Mr. Andre Mader	ICLEI/LAB, South Africa
17	Dr. Lena Chan	National Parks Board, Singapore
