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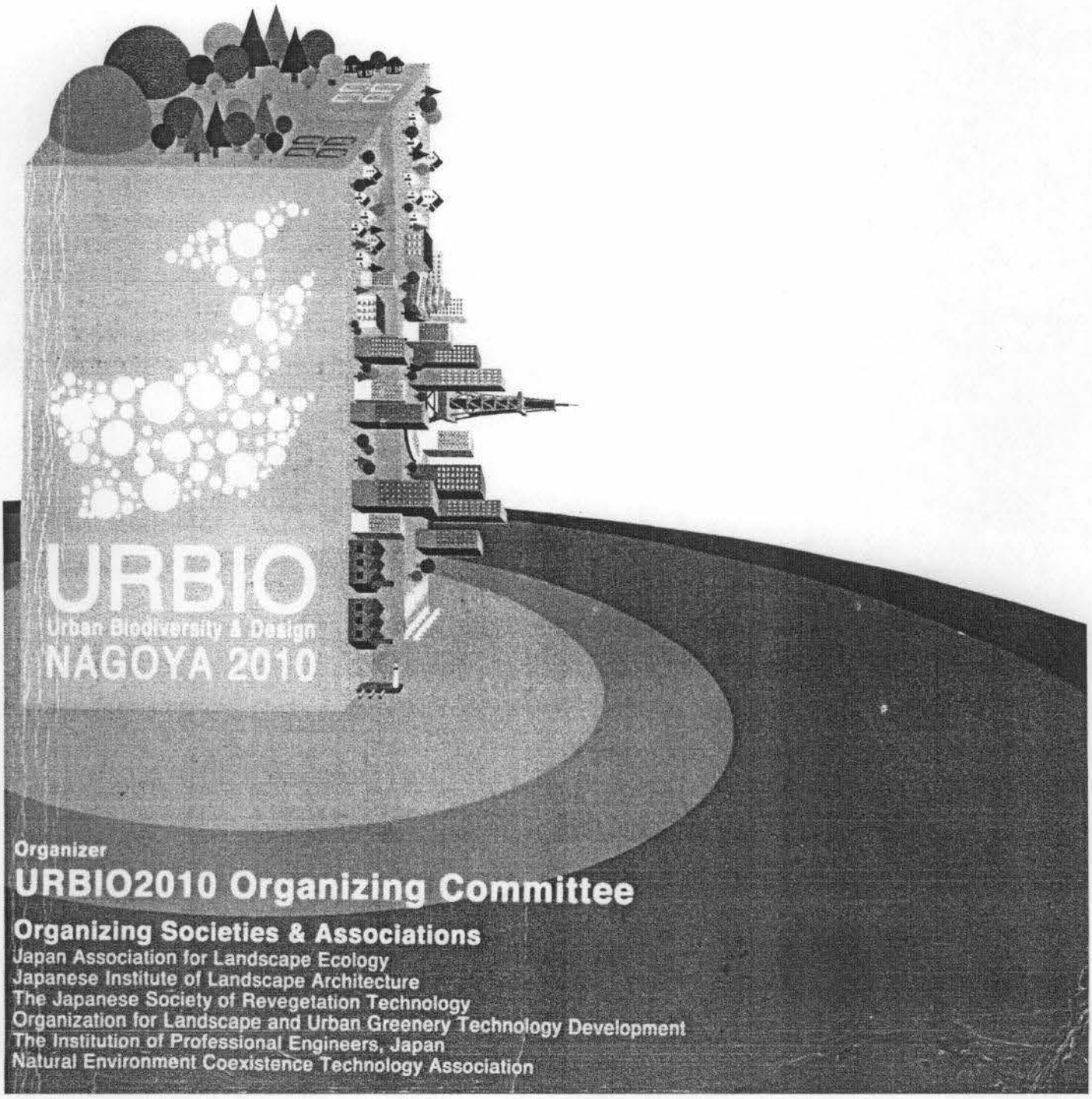
URBIO2010

Proceedings of the 2nd International Conference of Urban Biodiversity and Design

Nagoya, Japan, 18 - 22 May, 2010



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URBIO2010 Organizing Committee

Organizing Societies & Associations

Japan Association for Landscape Ecology
Japanese Institute of Landscape Architecture
The Japanese Society of Revegetation Technology
Organization for Landscape and Urban Greenery Technology Development
The Institution of Professional Engineers, Japan
Natural Environment Coexistence Technology Association

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Welcome Address

Distinguished guests,
Dear colleagues,

We would like to extend our hearty welcome to all of the participants to the URBIO 2010.

"We must come together and share our experience and wisdom, in order to create a new direction for humanity which (is) harmonious with nature". This is a message from the World EXPO 2005, which was held in Aichi and Nagoya. The theme of this EXPO was "Nature's Wisdom". Incidentally, EXPO2005 was called Ai-chikyuu-haku, or "Love the Earth EXPO". It is a great honour to hold the conference URBIO 2010 that takes over the spirit of "Nature's Wisdom", here in Nagoya.

We are very happy to announce that more than 430 scientists, planners and other practitioners from 35 countries (as of March 18) will gather together for the second time in a global context and discuss the current scientific and practical approaches to implement the Convention on Biological Diversity in towns and cities.

At the Second Curitiba Meeting on Cities and Biodiversity, which was held at the beginning of the International Year of Biodiversity 2010, the adopted declaration recalled "the Bonn call for Actions" and "the Erfurt Declaration", and reaffirmed the Mayor's commitment to contribute actively to implement the three objectives of the Convention on Biological Diversity, using mechanisms such as "Local Biodiversity Strategies and Action Plans (LBSAPs)". We, co-chairs of the URBIO 2010 planning committee, attended the Curitiba meeting, and fully understood the role of the URBIO conference is to contribute to the "City Biodiversity Summit 2010" and to the 10th meetings of the Conference of the Parties (COP10) of the Convention on Biological Diversity, both of which will take place this October.

In Asian countries, people traditionally have an idea that cities are not the opposite to nature, and people live together with the nature. These ideas would be valuable for the discussion toward sustainable cities in the world. The conference is expected to provide a significant opportunity for the discussion from various fields including science, technology, policy, landscape planning and design of urban areas for the purpose to realize the goal of the CBD. Additionally, we are very happy if we could draw all of the participants' attention to Asia, where cities have been developed under unique culture with nature. The spirit would hopefully be reflected to the Nagoya declaration - URBIO 2010.

It is our sincere hope that the convening of URBIO 2010 will be fruitful to all disciplines involved in research, planning, design and management of the urban green environment including biologists, ecologists, landscape architects and planners, horticulturists, urban designers and local government administrators.

We look forward that all the participants will also enjoy their own accompanying events in the friendly atmosphere of Nagoya, as well as sharing thoughts and working together to make all our cities green and prosperous places.

On behalf of the Organizing Committee of URBIO 2010, we would like to express sincere thanks to the URBIO 2010 Executive Advisor, Dr. Ahmed Djoghlaf, the Executive Secretary of the Convention on Biological Diversity, and Dr. Kunio Iwatsuki, Director of Museum of Nature and Human Activities, Hyogo, Japan.

The conference would not come true without the sincere advices from the president of URBIO, Dr. Norbert Müller and URBIO Network members. We appreciate our distinguished keynote speakers, for willingly agree to participate in URBIO 2010.

We must mention that this conference could not be prepared without the financial supports from many biodiversity conscious organizations and companies. Thank you to all the societies and associations for supporting URBIO 2010.

We would like to end our words of welcome with an earnest prayer for a great success of this conference throughout the coming four days.

Thank you very much.

井上忠佳

Tadayoshi Inoue
Co-Chair of the Organizing Committee of URBIO2010
Soken Incorporated, (Registered Landscape Architect and Professional Engineer)

森本幸裕

Yukihiro Morimoto
Co-Chair of the Organizing Committee of URBIO2010
Professor of Graduate School of Global Environmental Studies, Kyoto University

Welcome Address

I am truly glad that URBIO2010 is being held in Nagoya this year, which is an internationally important year for biological diversity.

I am looking forward to all of the wisdom that will be assembled here regarding the conservation and revitalization of urban biodiversity through everyone's presentations over a wide range of research and activities here at URBIO2010.

The importance of cities and local authorities in achieving the goals of the Convention on Biological Diversity was acknowledged in a decision adopted at COP 9 held in Germany in 2008.

As you have already been informed, at COP 10 which is scheduled to take place in October this year, the City of Nagoya will jointly host the City Biodiversity Summit 2010 with the Aichi Prefectural Government. Our expectation is to have 500 participants from 200 organizations including local governments and international organizations from around the world.

The results of URBIO2008 which I attended in Erfurt, the forerunner of URBIO2010, were proposed at the Mayors Conference held by cities including Bonn, which took place during the same period as COP 9.

At the City Biodiversity Summit, I would like to inform the world's cities and local authorities of the results of the URBIO2010 academic study in order to promote more effective local action concerning biodiversity.

The City of Nagoya formulated the 2050 Nagoya Strategy for Biodiversity in March this year. Our productive lives are supported by a large variety of organic life and ecosystems, and the goal of this strategy is to realize Nagoya as a city where these lives are maintained. We hope to make use of the academic results of URBIO2010 in our strategy.

I would like to express my sincerest appreciation for the tireless efforts of everyone who worked toward hosting URBIO2010 and expanding and developing it beyond the scope of its predecessor URBIO2008, and I offer my best wishes for the continued development of URBIO.

山田雅雄

Masao Yamada (Deputy Mayor)
City of Nagoya, Japan

Welcome Address

It is my pleasure to present a welcome address in the opening ceremony and to send hearty welcome to all the participants of well-organized URBIO 2010 Nagoya.

Historically, Japanese people lived on the Japanese Archipelago performing a harmonious co-existence between nature and humankind in an ideal way. Biodiversity around residential areas was carefully watched and maintained by our ancestors, although they did not have such a concept as conservation of nature. It is said that Yedo city, with a million of population already 300 years ago, was very clean comparing with Paris and London, nearly the same size at that time. It was the principle concept of Japanese that everything on the earth was the blessing from heaven, and the citizens of Yedo at that time reused even the excrements as a valuable fertilizer. Japanese Archipelago was developed under such a general concept, and backyard of residential areas was managed perfectly as we name them *satoyama*. Based on a recent change of life-style of the people, *satoyama* forest zone was abandoned and seriously devastated. In urban areas, so-called secondary nature of such a zone is fairy well managed by the voluntary activities of the citizens with some aids from the local governments. We can see the basic attitude of Japanese people to face the nature and biodiversity by such an activity.

Recently, everything is evaluated under the standard on material-energy basis, and its value is compared by monetary standard. They have a tendency to look down of those with less monetary value. The elements of biodiversity with higher monetary price are respectfully treated but those without any monetary value is carelessly given up. Crisis to biodiversity is observed everywhere on the earth, and this is particularly distinct in densely populated areas. It is important and urgently necessary to observe urban biodiversity in such a condition of our earth. In this sense, this Conference is organized in very good timing.

Biological diversity of urban area is to be discussed in this URBIO 2010 Nagoya, and it is expected that the principle concept of the Convention of Biological Diversity will be remembered during the discussion to promote the sustainable use of urban biodiversity. I hope this meeting will yield successful investigation and discussion in this Conference, in addition for the visitors to enjoy the brief stay in this beautiful City of Nagoya.

Kunio Iwatsuki (Prof. Dr.)
Executive Advisor for URBIO2010 Advisory Board
Museum of Nature and Human Activities, Hyogo

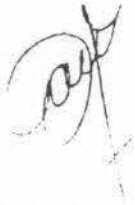
Welcome Address

Policies and strategies to save biodiversity need to be based on sound science. Too often, decision makers, both at national and local levels, do not have access to solid data. That is why, since the inception of the Convention on Biological Diversity (CBD)'s cities initiative, we have supported URBIO and similar scientific initiatives to backup the plan of action to be proposed for adoption this October at the tenth meeting of the Conference of the Parties to the Convention on Biological Diversity (COP 10) in Nagoya, Japan.

URBIO is a privileged platform for academia and specialists to discuss concrete recommendations to policy makers with economists, urban planners, developers, infrastructure specialists. Designing the city of the future will make the most significant difference in the battle for life on Earth. This design cannot be restricted to urban structures and systems: it must encompass the production systems that supply cities, often tens of thousands of miles away from consumption centres. Ultimately, it must change the consumption habits of *homo urbanus*.

URBIO is a key milestone in the roadmap towards COP 10 and the Nagoya City Summit, as it consolidates years of global research on urban biodiversity and its implications for design, planning and development.

We look forward to the input from URBIO during the Nagoya City Biodiversity Summit 2010, where this input will be used to help define the CBD's post-2010 strategic plan.



Ahmed Djoghlaf (Dr.)
Executive Advisor for URBIO2010 Advisory Board
Executive Secretary of the Convention on Biological Diversity

Welcome Address from the President of URBIO - International Network for Education and Research

Honorable Guests,
Dear Delegates,

During the first "URban and BIOdiversity and Design" Conference which was held in Erfurt (Germany) in May 2008, 400 scientists, planners and other practitioners from around 50 countries summarized for the first time in a global context the current scientific and practical approaches of "*Implementing the Convention on Biological Diversity in towns and cities*". The participants of this URBIO Conference expressed promise to support further CBD initiatives on "Cities and Biodiversity" through:

- sharing their knowledge and commitment through this conference and in the future,
- establishing a global "URBIO" network for education and research into urban biodiversity,
- promoting urban biodiversity through continuing dialogue with the CBD, especially linking future URBIO conferences with future COP meetings.

I am honoured and it is with the greatest pleasure that I welcome all of you to the second URBIO Conference, "*Urban Biodiversity in the Ecological Network*" in this wonderful city Nagoya, which is also hosting the tenth Conference of the Parties (COP 10) in October, this year. It is fitting, from several points of view, that the URBIO conference and the Conference of the Parties are being held in Aichi/Nagoya:

1. Japan is one of the countries on earth with the most densely populated areas and the fastest growing cities.
2. The concept of "Satoyama" has provided the Japanese people with a long tradition of sustainable land use and living in harmony with nature. During the conference we will learn more about this early concept of sustainability and how to apply it in urban areas.
3. The traditional "Japanese garden" is famous throughout the world as a model of how design can connect the development of human cultures to nature. The nearby UNESCO World Heritage Site of Kyoto is an impressive demonstration of how biodiversity and cities can co-exist.
4. First entire research activities in urban ecology have their origin in Japan and Germany in the same period. Since the early 1970s Makoto Numata started the "Interdisciplinary Studies of Urban Ecosystems in the Metropolis of Tokyo" - while Herbert Sukopp conducted "The City as a subject for ecological research" in the Metropolis of Berlin. Both scientists worked in close collaboration and since 1971 they played an important part in the inauguration and development of the first Urban UNESCO "Man and Biosphere" Programs (11 and 13) and the institutionalization of urban ecology as an own branch within ecology and an important science for sustainable city planning.
5. The first National Biodiversity Strategy of Japan, which was published already in 1997, was one of the first of the contracting CBD parties to focus on the importance of urban biodiversity to hold the global loss of biodiversity. Japan has one of the most comprehensive and detailed environmental laws and policies for urban areas for example the "Urban Green Space Conservation Act" and the "City Parks Law". In addition the third National Biodiversity Strategy of Japan (2007) is highlighting the

importance of ecological networks for biodiversity - the main theme of this URBIO conference.

I want to congratulate the URBIO 2010 Organizing Board for the wonderful and exciting program and the very interesting excursions it has devised. I would like to express my deep appreciation to all those who have worked very hard in preparing the conference. My special thanks go to all the Societies, Associations and Sponsors which supported this conference. Without their generous promotion and engagement this URBIO conference would not have been possible.

I am sure that the results of this conference will make a very important scientific contribution and support to the "Plan of Action on Cities, Local Authorities and Biodiversity", which will be discussed during COP 10 here, in less than six months.

Norbert Müller (Prof. Dr.)
Advisor for URBIO2010 Advisory Board
University of Applied Sciences Erfurt and Head Office URBIO, Erfurt
(GERMANY)

Network URBIO
Urban Biodiversity & Design

Programs

May 18 Tuesday [*Meijo University Mei-Eki Satellite Office*]

13:00 – 17:00 Registration
17:00 – 19:00 Informal Reception

May 19 Wednesday [*WINC AICHI*]

9:00 – 16:50 Registration [*Small Hall 2*]
11:00 – 16:50 Posters [*9th Floor*]
9:20 – 10:20 Welcome Notes [*Small Hall 2*]
Mr. Tadayoshi Inoue (URBIO2010 Co-Chair, Japan)
Mr. Masao Yamada (Deputy Mayor, City of Nagoya, Japan)
Dr. Kunio Iwatsuki (Director of Museum of Nature and Human Activities, Japan)
Dr. Ahmed Djoghlaf (Executive Secretary of the Convention on Biological Diversity, Canada, Video Message)
Dr. Norbert Müller (URBIO Network, University of Applied Sciences Erfurt, Germany)
10:30 – 11:00 Introduction Keynote (Dr. Yukihiro Morimoto, Japan) [*Small Hall 2*]
11:10 – 11:40 Keynote Topic 1 (Dr. Maria Ignatieva, New Zealand) [*Small Hall 2*]
13:00 – 15:00 Parallel Sessions (Oral) [*11th and 12th Floors*]
15:10 – 16:00 Poster Session 1 (Core Time) [*9th Floor*]
16:00 – 16:50 Poster Session 2 (Core Time) [*9th Floor*]

May 20 Thursday [*WINC AICHI*]

9:00 – 11:50 Posters [*9th Floor*]
9:00 – 9:30 Keynote Topic 2 (Dr. Charles H. Nilon, U.S.A.) [*Small Hall 2*]
9:40 – 10:10 Keynote Topic 3 (Dr. Kwi-Gon Kim, Korea) [*Small Hall 2*]
10:20 – 11:50 Parallel Sessions (Oral) [*11th and 12th Floors, Small Hall 2*]
13:00 – Mid-Conference Excursion

May 21 Friday [*WINC AICHI*]

9:00 – 14:20 Posters [*9th Floor*]
9:00 – 9:30 Keynote Topic 4 (Mr. Peter Werner, Germany) [*WINC Hall*]
9:40 – 10:10 Keynote Topic 5 (Dr. Hadi Susilo Arifin, Indonesia) [*WINC Hall*]
10:20 – 11:50 Parallel Sessions (Oral) [*11th and 12th Floors, WINC Hall*]
11:50 – 13:00 Lunch (Meeting for URBIO2010 Declaration)
13:00 – 13:30 Keynote Topic 6 (Dr. Thomas Elmqvist, Sweden) [*WINC Hall*]
13:40 – 14:20 Special Poster Session (Core Time) [*9th Floor*]
* Mainly discussed in Japanese and partly in English
14:20 – 15:50 Workshop [WINC Hall], Parallel Sessions (Oral) [*11th and 12th Floors*]
16:00 – 16:40 General Meeting / Concluding Remarks [*WINC Hall*]
18:00 – 20:00 Conference Dinner [*Meitetsu Grand Hotel*]

May 22 Saturday [*Meijo University Tenpaku Campus*]

14:00 – 16:30 Joint Symposium with the Japanese Institute of Landscape Architecture

May 23 – 24 Sunday – Monday **Post-Conference Excursion**

Keynote Topic 5

Landscape ecology and urban biodiversity in tropical countries

Hadi Susilo Arifin[1], Nakagoshi, Nobukazu[2]

1) Professor in the Landscape Management Laboratory, Department of Landscape Architecture, Faculty of Agriculture, Bogor Agricultural University (IPB), INDONESIA
2) Professor in the Graduate School for International Development and Cooperation (IDEC), Hiroshima University, JAPAN
E-mail: hsarifin@ipb.ac.id

Introduction

Indonesia is archipelago country stretching from the west to the east. Landscapes, land uses and land covers are changing rapidly in response to a variety of economic, demographic and policy factors, especially after economic and political crises. Landscape changes due to changes in agricultural activities toward industrialization, urbanization, and commercial agricultural land have become serious matters in the most populated island, Java.

The urban landscape depends on the surrounding area, such as suburban, rural, and bio-regional landscapes that are shown on ecological watershed units. The uniqueness of urban biodiversity is influenced by the ecological networks among land uses in rural, suburban and urban landscapes. Therefore, ecological landscape management among rural, suburban, urban and regional scales should be integrated in the planning based on the landscape unit, a landscape with a variety of physiographic characteristics within a watershed, from the upper stream to the downstream. Biodiversity conservation is an object related to environmental services, which concerns to watershed functions, GHG emissions, landscape beauty. In another word, rich biodiversity of flora and fauna related to carbon storage in trees and soil. High biodiversity such as an Agro-forestry forms of land use reduces foot-print intensity by higher total bioproductivity (van Noordwijk, 2006). Biocapacity (supply) and ecological footprint (demand); over-shoot: gap between supply and demand (Fig.1). Integration or segregation of land use planning and management in agro-forestry landscape is driven by water resource, biodiversity, livelihoods, economy, land use planning, culture, and governance (Fig.2)

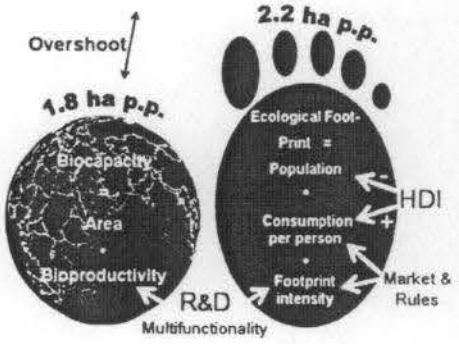


Fig.1: Overshoot: gap between supply (biocapacity) and demand (ecological foot print)

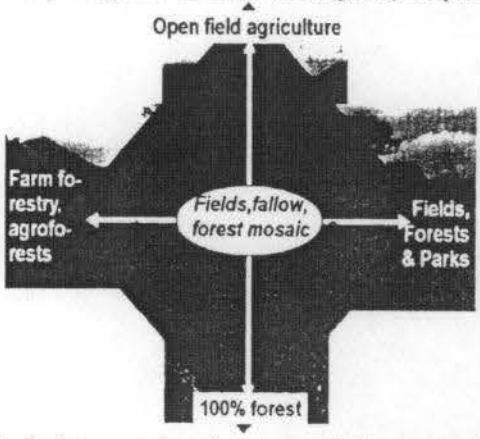


Fig.2: Integrated and segregated planning and management in landscape agroforestry system.

Urban Biodiversity and Green/Eco-City

The rapidly growing world population is exerting great pressure on the land, waters, and energy resources that are essential to productive tropical agriculture-rural communities and its bio-resources. By 2030, more than 60 percent of the world

population will live in cities, up from almost half now and just a third in 1950. The growth poses huge problems ranging from clean water supplies to trash collection. Already, one of every three urban dwellers lives in a slum in the present time. Let us create green cities. Adding to this fact is that the United Nation goal of halving poverty by 2015 would not be met unless city planning becomes less haphazard.

Green city is a term used for sustainable city or ecological city. Activists mark June 5, the date of the first environmental summit in Stockholm in 1972, as the UN World Environment Day. The 2005 theme is 'Greener Planning for Cities', many of them hit by air pollution, fouled rivers and poor sanitation. In San Francisco, the main host of the 2005 event, mayors from more than 50 cities including Shanghai, Kabul, Buenos Aires, Sydney, Phnom Penh, Jakarta, Rome and Istanbul planned to sign up for a scheme setting new green standards for cities. Cities would be ranked from zero to four stars according to compliance with a set of 21 targets. And around the world, from Australia to Zimbabwe, activists staged rallies, cleaned up litter, organized poetry competitions or planted trees.

The Green City theme is related to Urban Environmental Management and ISO 14001 at the level of a City. The development and implementation of the EMS at the level of a city is a complex task involving a myriad range of tasks and actors. UNEP's International Environmental Technology Centre recommends three steps in extrapolating the ISO 14001 to the level of city (Srinivas, 2006). Step 1 (Promotion of Eco-office): Reduction of energy use; Reduction of water use; Reduction of solid wastes; Promotion of recycling; Green Procurement; Step 2 (Promotion of Eco-Project): Using e-friendly materials; Using e-friendly equipment; Accelerate use of recycled materials; Green public engineering works; Develop green technology; Promote greening; Step 3 (Green City Planning): Set green guidelines for public works; Set green guidelines for housing; Enhance public transportation; Capacity building; Apply EMS to the whole city.

Biodiversity and Carbon Relationships

In order to establish green procurement, promote greening and set green guidelines, species diversity or biodiversity plays an important role in sustaining an ecosystem at present and in future. Forest conversion to intensive agriculture and monoculture plantations, urbanization and industrialization leads to a loss of biodiversity in any landscape. The rich biodiversity in natural or managed systems does not provide tangible benefits - a reason why local people may not be interested in conservation initiatives.

Payment for environmental services (PES) scheme are being proposed and tested in different contexts as a way to involve the local people in conservation practice (Nurhariyanto et al., 2010). The Rapid Agro-Biodiversity Appraisal (RABA) is a diagnostic tool designed to appraise perceptions of different stakeholders related to conservation in a target area and to assess the feasibility of a PES mechanism (Kuncoro et al., 2006). The Quick Biodiversity Survey (QBS) of indicator plant animal groups may provide sufficient information necessary for a RABA.

The UN Framework Convention on Climate Change (UNFCCC) regulates the Clean Development Mechanism (CDM) that includes, under specific rules, afforestation, and reforestation activities. To reducing emissions from deforestation and degradation in developing countries (REDD), voluntary market mechanisms, not part of the commitments to emission reduction that UNFCCC countries have pledged, target various combination of landscape level restoration and protection of tree cover and carbon (van Noordwijk, 2010).

Bogor Urban Landscape

Based on regional planning, Bogor Municipality would be developed as developing center of Wilayah VII (Bogor Regency context), supports 1.5 million population in 2009 (Jabodetabek Region context); as buffer zone of Jakarta and recreation resort for Jakarta citizens

(Indonesia context); as a center for International Conference (International context). Therefore, Bogor is proposed for trading and services city, industrial city, settlement resorts city, scientific tourism city, and education city.

Bogor has diverse land utilization, i.e. irrigated rice fields, dry fields, plantation estates, forests, lakes and fish ponds, *pekarangan*, settlements, and others (CBD, recreation resorts, industry and cemeteries). Urban agriculture activities produce rice, corn, soybean, cassava, sweet potato, peanut, yam, tomato, long bean and chilli. Some researches were hold in the landscape ecological unit of Ciliwung watershed (Fig. 3). This watershed covered Bogor District, Bogor Municipality, Depok Municipality, and Jakarta (a part of Jabodetabek Region).

Fig. 3: Bogor land use in the unit of the middle stream of Ciliwung Watershed.

Bogor in the landscape level has highly habitat diversity. From the structure of green network, Bogor is surrounded by 4 mountains and tropical rain forests, i.e. Salak Mount, Gede Mount, Pangrango Mount, and Pancar Mount (Fig. 4). Some urban forests are available in or close to the city, e.g. Forda forest, IPB Darmaga forest, Cibinong forest, LIPI Ecopark and urban greenery of Sentul City. Through the corridors, i.e. river greenways, highway greenbelts, green railways among the mosaic landscapes, much wildlife of avian, insect, mammal, reptile, amphibian, and fish's species migrate from one habitat to the others. Through greenways, the connectivity of green space was discussed in the theoretical and practical process of many cases representing effective networking systems of social, cultural, aesthetic and mental aspects in the large and densely inhabited urban areas (Tashiro, 2009).

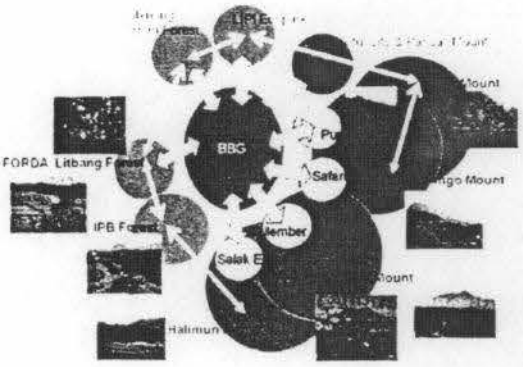


Fig. 4: Ecological network among Bogor City and its vicinity.

Satellite City of Sentul

Sentul City is a township development with an area of c.a. 3,000 ha that is located 5 km from the city of Bogor. This city was established in 1994. It is 300 - 600 m above sea level and is a hilly area surrounded by mountains, forests and water falls. The average daily air temperature is min 22°C and max 30°C. This city has 65% green area (Utama, 2009).

In bringing renewal to Sentul City, the City of Enovation has 4 pillars of development in order to navigate the developing and building of Sentul City to be more comprehensive and rapid in accordance to the today's demands and the future. One pillar is eco-city concept, which is expressed by plant biodiversity approach for garden along 6.2 km the main road. With an area of 27 ha, there are 6,518 trees that consists of 49 species. This is not including small trees, shrubs, bushes, herbs, lianas and grasses. Indonesia World Record Museum (MURI) has awarded Sentul City street garden as The Largest Street Garden for Township Development in November 2008. On August 2007, in collaboration with Indonesia Tree Planting Foundation (YTPI), the Go Green program is launched

with the planting of 15,000 trees. This shows the active participation in increasing the quality of the area in Sentul City (Utama, 2009).

To strengthen the Eco City and Education City pillars, on July 21, 2009, Sentul City have signed an MOU with Bogor Agricultural University (IPB) to cooperate in four fields, which are: Development of Eco City Concept, Developing Green Implementation in Buildings, Developing Environment Management Method, Developing IPB Education Facility in Sentul City. The first step we have been conducting inventory of the urban biodiversity by land use unit. Various land uses, such as CBD, settlement and housing complexes, recreation resorts, parks, golf courses, forest and catchment areas. Based on the maintained landscape data, i.e. parks, garden, green belt and settlement, it is known that the area for greenery open space is 29,66 ha. We found high biodiversity of 76 species of trees; with total number of individual trees are 32,876. Environmental Impact Assessment results stated that in Sentul City was found 7 amphibian species, 23 avian species, 6 mammal species, 7 reptile species, and 7 fish species.

Conclusion

There is no doubt that the importance of biodiversity in urban areas should be kept in mind. So why not by starting in the city to reestablish biodiversity in the literal sense? (Rekittke, 2009). It would not disturb anybody, if animals and plants of the natural habitat begin to recolonise these three-dimensional extremes.

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