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Proceedings of the 6th Southeast Asia Biosphere Reserves Network (SeaBRnet) Meeting

Are climate change and other emerging challenges being met through successful achievement of Biosphere Reserve functions?

23-25 February 2011 Cibodas Biosphere Reserve, Indonesia

Organized by

The Indonesian MAB National Committee
UNESCO Office, Jakarta
The Ministry of Forestry, Republic of Indonesia

Supported by Japan Funds-in-Trust

United Nations Educational, Scientific and Cultural Organization

Man and the Biosphere Programme

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LIPI

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Executive Summary

The 6th Southeast Asian Biosphere Reserve Network (SeaBRnet) meeting in Cibodas Biosphere Reserve, West Java, Indonesia (23-25 February 2011) brought together experts, managers, scientists and various conservation practitioners, as well as local government officials and the private sector to address some of the most pressing challenges faced by biosphere reserves today. These included: climate change effects; issues concerning the role of indigenous peoples and their knowledge in the management of biosphere reserves; and the dearth of up-to-date information on biosphere reserve ecology, economy, and people; among others. The meeting also focused on other key issues such as: the recent and upcoming biosphere reserve nominations; the broader Man and the Biosphere (MAB) International Advisory Committee and MAB Expert meetings as well as those on the implementation of the Madrid Action Plan; and consideration of uniting the sub-regional networks to form one cohesive Asia-Pacific regional network. Finally, the participants made a field visit to the Cibodas Biosphere Reserve to better understand biosphere reserve management in an Indonesian context and share ideas concerning biosphere reserve management.

The meeting was attended by MAB representatives from Indonesia, Japan, Malaysia, Philippines, Republic of Korea, Thailand, Timor-Leste and Vietnam. Additional participants included MAB representatives from UNESCO Paris Headquarters. During the meeting participating countries and institutions exchanged experiences and information obtained through MAB related studies, surveys and projects implemented throughout the Southeast Asian region.

Monitoring and Centralized Database

Interesting long-term scientific studies have been carried out in many of the Southeast Asian Biosphere Reserves, sometimes over centuries, as in the case of Cibodas Biosphere Reserve in Indonesia. Yet, currently no centralized monitoring database exists for this region. Participants agreed that basic data are often lacking and that a centralized GIS monitoring system including quantitative information on biodiversity, socio-economic data and important physical features/zonation should urgently be established. It was agreed that the future database should be designed specifically to assess whether Biosphere Reserve functions are being fulfilled or not. Databases on forest cover history in Indonesia and mangrove assessment and management in Indonesia, Vietnam and West Africa were explored as examples fulfilling some of the necessary requirements for a potential biosphere reserve database.

Local and Indigenous Knowledge

Local and indigenous knowledge was recognized as being essential to climate change adaptation strategies and more generally to biodiversity conservation as a whole. Examples of action or participatory research from Indonesian, Thai and Central-American Biosphere Reserves demonstrated how the participation of local people in all aspects of research allows researchers and local people to interact in meaningful ways, particularly in the application of the research findings. An example of local knowledge integration in Tasik Chini Biosphere Reserve highlights the importance of identifying activities, which have traditionally ensured long-term preservation of the natural landscape. Building self-esteem amongst indigenous and local communities was also found to be extremely important.

Climate Change

Mangrove ecosystems and agricultural landscapes of the Red River Delta Biosphere Reserve, Vietnam are being used to develop integrated models to generate impact assessments and climate adaptation strategies. In Puerto Galera and Palawan Biosphere Reserves in the Philippines, gaps in science and technology are being identified as the basis for an integrated decision support system to tackle issues related to climate change. The concepts of learning cycles (cycles of action, reflection, followed by improved action) and biosphere reserve sisterhood (the sharing of experiences amongst similar biosphere reserves to ensure faster, more effective project planning and implementation) was central to reserves in both Vietnam and the Philippines. A strong collaboration between the private sector, the government and the local communities was deemed necessary to ensure that efforts to restore the natural landscape (and therefore increase our carbon stocks) are made in core, buffer and transition zones of Giam Siak Kecil-Bukit Batu Biosphere Reserve, Indonesia. In this respect, the need for more effective silvicultural practices was expressed. A commendable example of mangrove restoration in Ranong Biosphere Reserve, Thailand was presented, though it was noted that preserving existing old growth forest should remain a priority. Examples of carbon stock assessment research in Indonesian forests were also presented. This type of research was deemed important not only to compare different ecosystems in their carbon stock capacity, and for potential recommendations in terms of which species to replant for faster growth and higher carbon sequestration, but more generally to help understand the composition, structure and distribution of high value species.

Other Business: Nominations, MAB Advisory Committee, MAB Expert Meeting, Madrid Action Plan and the Asia-Pacific regional network meeting

Recent and ongoing nomination processes in Giam Siak Kecil-Bukit Batu (Indonesia), Wakatobi (Indonesia) and Crocker Range (Malaysia) provided evidence of the impressive groundwork that goes into preparing a nomination, both in terms of facilitating the involvement of local communities, local governments and other interested stakeholders, but also in terms of the documentation itself. Finally, the intended nomination of the first ever biosphere reserve in Timor Leste (Nino Konis Santana National Park) was presented. This site was shown to have the necessary pre-requisites (including biological uniqueness and willingness of the local people to be involved and welcome the nomination) to become part of the World Network of Biosphere Reserves.

The latest MAB Advisory Committee and MAB Expert meetings, concerning possible delisting of sites from the World Network of Biosphere Reserves and the designation of a new network of MAB study/support sites, were reported on. Furthermore, the interim reporting on the Madrid Action Plan implementation was discussed.

The advantages and disadvantages of hosting an only Asia-Pacific meeting as opposed or alongside the other 4 regional meetings (South East Asian Biosphere Reserve Network (SeaBRnet), East Asian Biosphere Reserve Network (EABRN), South and Central Asia MAB Network (SACAM) and Pacific MAB Network (PACMAB)) were discussed. Weaker networks could learn from strong and more active ones, yet priorities in these regions are likely to be different. Would there be a fixed secretariat or

would it rotate from one country to the other? What roles and backstopping services could be provided by the UNESCO field offices in Apia, Beijing, Jakarta, New Delhi and Tehran? Can financial resources be mobilized from the participating countries so that the networking can be based on solid footing? All these questions were raised and need following up in the coming months.

Cibodas Biosphere Reserve field visit

On the last day, following a fieldtrip focused on experiencing some of the efforts made in small-scale economic diversification and community involvement within Cibodas Biosphere Reserve (tree adoption programme, organic vegetable and rabbit farms as well as two community radios, which raise awareness for conservation and sustainable development issues), participants were able to share their impressions of the biosphere reserve and their suggestions for management. It was noted that increasing the number of species in the tree adoption programme and planting them in a random manner could speed up ecosystem recovery and result in more natural, higher-value forest. Moreover, the concept of having a community radio to discuss conservation issues and potential sustainable activities to be implemented was praised at length. Finally, limited awareness about the presence of this biosphere reserve could be increased by introducing banners on the main roads entering and exiting Cibodas Biosphere Reserve and by charging a very low/symbolic fee for entering the area. This would not only provide a small revenue, but more importantly it would raise the area's profile and instill a sense of local pride and ownership towards its precious natural resources.

Welcome Remarks

Robert Lee

UNESCO Office, Jakarta
Regional Science Bureau for Asia and the Pacific

Dear Mr. Setiawan Wangsaatmaja,
representing the Governor of West Java

Dear Mr. M. Ramli,
representing the Governor of Riau

Dear Mrs. Yetti Rusli,
representing Ministry of Forestry – Forest Protection and Nature Conservation

Dear Mr. Bambang Prasetya, representing Indonesian Institute of Science (LIPI)

Dear participants from the Members States of UNESCO Seabrnet, biosphere reserve managers from Indonesia, members of the media, Ladies and Gentlemen,

I am very honored and delighted to welcome you all on behalf of UNESCO to the 6th Southeast Asian Biosphere Reserve Network entitled, 'Are climate change and other emerging challenges being met through successful achievements of biosphere reserve functions?'

Please allow me to convey the best wishes from the Director-General of UNESCO, Ms. Irina Bokova, and warm regards from my colleagues in the UNESCO Office in Jakarta.

It has been over 20 years since the UN report, Our Common Future, called for a better way for humans to exist on this planet. The report's authors noted that conditions were improving for most of humanity – infant mortality was decreasing, life expectancy was increasing, literacy rate was increasing, children enrolled in primary school was increasing, and food production was increasing. Yet, all these development gains have also contributed to a world that is still in need of better and stronger workable solutions to society's problems. During the 20th century, the world's population nearly quadrupled from 1.6 billion people in 1900 to 6.8 billion today, and is growing at 1.4% every year. Most of this growth happened in the Asia-Pacific region with nearly four billion people and 60% of the global community.

What we have experienced through this amazing population and economic growth has been a growing irreconcilable difference between supply and demand. Almost half of the world's population face a scarcity of water, and is expected to double in 25 years. People are now using about 25% more natural resources than the planet can replace. World forests are disappearing at an annual rate of 13 million hectares (about the size of Vietnam). Seventy percent of global fish stocks are now over-exploited or fished to a level that is not sustainable.

Excess natural resource use has led to excessive greenhouse gas emissions and global climate change. Climate change is a defining issue of or time, and will dramatically transform the world in which we live. Climate change impacts on ecosystems, economies, and populations are evident across the Asia-Pacific region. Poor communities emit the least amount of carbon yet stand to suffer the most when it comes to CC. Increases in sea levels, storm surges, rainfall and other extreme weather events, drought, air and sea temperatures, cyclones, water shortages, and coastal erosion are merely the tip of the problem. Climate change is expected to increase the incidence of vector-borne diseases and heat-related illnesses. These will result in significant economic and natural resource problems such as agriculture, aquaculture, forestry, and tourism in the Asia-Pacific region.

Most of know what problems lie ahead. And many of us have ideas for addressing these

problems. But what we need are not just ideas, but places where we can test out these ideas. We need sites that act as 'living laboratories' where government and communities come together to share common solutions. We need places where scientists can work with communities to monitor whether livelihoods are being endangered by climate change effects. We need places where green schools can develop curriculum where kids can practice sustainable living and teach their parents. And we need places where businesses are encouraged to make profit and, at the same time, feel morally obligated to operate sustainably.

And biosphere reserves are one place where that can happen. The selection of Cibodas and Indonesia are timely indeed. Indonesia is at the heart of climate change discussions, and the Indonesian Government is taking a global and regional leadership role in climate change mitigation and adaptation plans. With REDD and REDD+ and other climate change related programs, people in Indonesia are paying more and more attention to what it means to have a forest, to lose biodiversity, to have so much indigenous knowledge, and make the connection between their livelihoods and government policies.

Biosphere reserves can play a key role in working out potential solutions that people are talking about: green economies; mainstreaming environment into education; using indigenous knowledge into natural resource management; promoting biological and cultural diversity; carbon financing; efficient use of water and energy; community-based economies; among many others.

I am honored to be part of this distinguished group of policy-makers, scientists, and practitioners. I would like to thank all of you for traveling from far away places, and commiting your time and energy to this meeting.

I would like to thank MAB Indonesia for co-organizing this meeting, and to Gunung Gede Pangrango National Park and Green Radio for arranging the field trip. I would like to thank my staff for all the hard work they've put in. My special thanks go to the Ministry of Education, Culture, Sports, Science and Technology in the Government of Japan for its continued financial support to the organization of the SeaBRnet meeting since 1990.

On behalf of UNESCO, I hope you all enjoy the meeting. Thank you.

Setiawan Wangsaatmaja

Representing Governor of West Java

Your excellency,
representative of UNESCO office Jakarta

Your excellency,
Representative of Indonesia National Committee for UNESCO

Your excellency,
Representative of Riau Province

Your excellency,
Representative of LIPI

Your excellency,
Representative of Natural Resource Conservation & Forest Protection

Ladies and gentlemen, distinguished guests,

Good morning,

Welcome to Puncak, West Java. it is a great pleasure for us to be able to host the 6th Southeast Asia Biosphere Reserve Network Meeting in this pleasant atmosphere. however, i am most regretful to inform you that our governor could not attend this meeting due to another urgent matter that requires

his presence elsewhere, but he sends you his warm regards and wishes you a fruitful meeting here in Puncak.

Distinguished guests,

The world is facing a serious threat on population explosion. United Nations estimated that by the end of 2011, the world population would reach seven billion people (National Geographic, 2011). the consequences are threats to food security and freshwater availability. Indonesia has the fourth largest population number in the world, yet with uneven distribution. Java Island, one of main islands in Indonesia in which we are located right now, is inhabited by 65% of total Indonesia population, with very limited environmenta capacity especially in freshwater availability that covers only 4.5% of Indonesia freshwater potency. surely, this has been and will remain a serious threat to natural resources sustainability, particularly forest, water, and biodiversity.

West Java Province, which resides in Java Island, is the most populated province in Indonesia with 43 million people inhabiting total area of 3.6 million ha. therefore, West Java province has a deep concern in ecosystem preservation. we have in our area three national parks in Gede-Pangrango mountain, Salak-Halimun mountain, and ciremai mountain. we also have two botanical gardens in Bogor and Cibodas; a safari park as an ex-situ conservation; botanical forest; and soon to be established is West Java biodiversity garden.

One of our visions is to become green province in 2013 by implementing low carbon development. it is a commitment that requires us, the government to improve our performance in implementing natural conservation and degradation control regulations in West Java. in that context, we also develop green growth program in sinergy with green house gasses emission reduction programs.

Ladies and gentlemen,
Indonesia has committed to reduce national green house gasses emission up to 26% by 2020. in West Java province, the commitment is embodied in various development programs, one of them is achieving 31% protected area in 2010 from 45% targetted protected area in 2018. in the process, we noted that development plan should be first and foremost rely on environmental carrying and supporting capacity based on ecological boundary. a deeper role of local, provincial and central government therefore is essential to cope with trans-boundaries issues.

Ladies and gentlemen,
climate change has come to us in an alarming rate, leaving us with no choice but to adapt and to do it together with the rest of the global population. i would like to quote al gore in his book "our choice" (2009): the choice is awesome and potentially eternal. it is in the hands of the present generation: a decision we cannot escape, and a choice to be mourned or celebrated through all the generation that follow". accordingly, the biosphere reserve concept that promotes biodiversity conservation in sustainable development is a right chioce. in Indonesia and particularly West Java, the issue is exceptionally urgent with the tremendous population pressure, therefore a concept which brings together economic growth, local community participation, and environmental conservation is essential.

Distinguished guests, ladies and gentlemen,
i sincerely hope that this network meeting would bring the members together to share knowledge and to come up with solution for climate change mitigation.

Thank you.

on behalf of
West Java Governor

Ahmad Heryawan

M. Ramli

Representing Governor of Riau

Assalamu' alaikum Wr.Wb
Good morning, peace and prosperity to all of us

The honorable Governor of West Java;

The honorable Deputy of Bioscience-Indonesian Academy of Sciences;

The honorable General Director of Forest Protection and Natural Conservation, Forestry Ministry of Indonesia;

Distinguished Indonesian National Committee UNESCO;

Distinguished Representatives of UNESCO Jakarta;

Distinguished Representatives of Southeast Asia Biosphere Reserve Network;

Distinguished guests.

Ladies and gentlemen

Let us offer our praise and gratitude to the Almighty God, Allah Subhanahu Wa Ta 'ala for it is with His mercy that, Alhamdullillah, on this good moment, He is still giving us a good health and occasion to attend the 6th Southeast Asia Biosphere Reserve Network Meeting in Cipanas, West Java.

Furthermore, on behalf of the Administration of Riau Province, I would like to express my most sincere thanks for the opportunity given to me to deliver a speech in front of you all on the policy of Biosphere Reserve Management in Riau Province.

Distinguished guests, ladies and gentlemen,

Riau Province has a number of comparative advantages compared to other provinces in Sumatera Region even in Indonesia since Riau has abundant natural resource wealth. Riau, moreover, has a strategic position in the international shipping line, Malacca Strait, and very close to two neighboring countries, Malaysia and Singapore.

In terms of investment opportunity, Riau Province offers a promising climate and prospect of investment development due to its natural resource potency namely forestry, plantation, mining and agriculture.

Ladies and gentlemen

Talking about the implementation of sustainable development especially in managing and protecting forest resources in a sustainable way, the Administration of Riau Province has strong commitments and has done real efforts among others:

1. Allocation of forest area more than 40% in the proposed spatial use plan of Riau Province 2007-2026 in order to maintain Riau's environmental carrying capacity.
2. Strengthening protected areas, securing watersheds, maintaining the forest ratio through the green scenario of the spatial use plan of Riau.
3. Supporting the establishment of the new Zamrud National Park in Siak Regency and the expansion of Teso Nilo National Park area in Pelalawan Regency.
4. Combating illegal logging.
5. Fostering the roles of local people in the environment protection through local wisdoms.
6. Endorsing carbon stock conservation through REDD (Reducing Emission from Deforestation and Degradation) and the creation of Riau's Climate Change Information Center.

Distinguished meeting participants, ladies and gentlemen

Another strategic policy and very closely-related with the meeting today is the existence

of the Biosphere Reserve of Giam Siak Kecil Bukit Batu.

The establishment of Giam Siak Kecil Bukit Batu as a new biosphere reserve in the 21st Session of the International Coordinating Council of the Man and Biosphere Program (ICC/MAB) UNESCO on May 26th 2009 in Jeju, the Republic of Korea is very positive.

It is important to inform you that the new biosphere reserve is a main habitat for rare and protected biodiversity as well as a peat ecosystem area which functions as a carbon sink. Thereby, the biosphere reserve plays role in mitigating climate change.

On top of that, the establishment of the biosphere reserve is a recognition of the international World for efforts done by the Government of Indonesia and the Government of Riau Province in conserving environment.

Ladies and gentlemen

We hope that the existence of Giam Siak Kecil Bukit Batu will become the World's Heritage and a research center on the integration of the sustainable management of natural resource and the surrounding people (or Man and Biosphere).

This is very essential because the success of a biosphere reserve management is not only seen from the succes of the environmental protection but also from that of the management in improving the social-economic condition of local people around the biosphere reserve.

If local people inside and around the biosphere reserve remain poor, the goal of biosphere reserve management is surely difficult to achieve.

Therefore, to support the management of Giam Siak Kecil Bukit Batu Biosphere Reserve, the Administration of Riau Province has set up action plans as follows:

1. Establishing the Managing Coordination Board of Giam Siak Kecil Bukit Batu Biosphere Reserve which is under the Governor of Riau. Since the biosphere reserve management must be based on 'Man and Biosphere', the tasks of the multistakeholder board (government, prívate sector, academicians and NGOs) consist of three namely;
    a. Core area development: prioritized for conservation, education and research.
    b. Buffer zone development: focused on environmentally-friendly and sustainable plantation forest management.
    c. Transition area development: aimed at local people's economic development and empowerment.
2. Establishing Giam Siak Kecil Wildlife Reserve
3. Forest Protection and Fire Prevention
4. Forest restoration with endemic species
5. Public awareness about Giam Siak Kecil Bukit Batu Biosphere Reserve
6. Inventory of villages in the transition zone as part of the economic empowerment of the local people
7. Research cooperation in the biosphere reserve between the Administration of Riau Province and Man and Biosphere Program, Indonesian Academy of Sciences, Riau Natural Resource Conservation Board, NGOs and other stakeholders.
8. Building a research center in order to conserve the biodiversity in the biosphere reserve.

Ladies and gentleman,

Before closing my speech, I would like to invite all participants of this meeting to take part in the South-South Cooperation Meeting scheduled in September 2011, in Pekanbaru City-Riau.

This meeting is the continuation of the South-South Cooperation Meeting in Kinshasa-Congo, attended by the Riau's delegation on

December 8th -12th 2010.
The South-South Cooperation Meetings both held in Kinshasa and in Pekanbaru are hoped to result in closer international cooperations which are able to support the development of biosphere reserve management and natural resource conservation, on the basis of Man and Biosphere Approach, in Indonesia and Riau Province, in particular.

Finally, these are few important things that I can convey on this happy occasion. May the Almighty God bestow His blessing upon us all so that we can maintain our commitment and efforts.

Thank you for your attention,
Wabillahittaufiq Wal Hidayah
Wassalamu'alaikum Wr.Wb.
Cipanas Bogor, February 23rd 2011

Governor Of Riau

H.M. Rusli Zainal

Yetti Rusli

Representing Ministry of Forestry - PHKA

Ladies and Gentlemen,

Thank you, a very good morning to all of you. On behalf of the Government of Indonesia, I would like to express my warm welcome to all participants of the Sixth South East Asia Biosphere Reserves Network (SeaBRnet) Meeting in Cipanas, West Java, Indonesia. I personally would like to express my sincere appreciation to the Organizer Committee for selecting Indonesia to host a meeting of SeaBRnet. I will also be grateful, if this meeting could provide us recommendation to enhance a balanced relationship between man and nature.

Indonesia has been considered as a globally important biosphere which potentially provides wide range of benefits for people and its environment. With regard to biodiversity richness, the government of Indonesia has undertaken significant efforts to protect its biodiversity through the establishment of 490 (four hundred and ninety) units of terrestrial protected area and 76 (seventysix) units of marine protected area. Total area coverage about 36 (thirtysix) million ha.
In additon to that, we also have some of our National Park assigned as Biosphere reserves. Biosphere reserves in Indonesia are established to promote and demonstrate a balanced relationship between humans and the biosphere. There are 6 (six) biosphere reserves in Indonesia, namely Siberut, Ujung Kulon, Cibodas, Tanjung Puting, Lore Lindu and Komodo. Many programs have been developed for the implementation of the Seville Strategy.

Ladies and gentlemen,

As we all aware, the six of Biosphere Reserves in Indonesia are protected areas and functions as a core zones. For decades our protected areas (PAs) resources have been an important source of national economic development. It is recorded that around 48 (fortyeight) million people inhabit in and surroundings to the forest area and all of them are poor. Land tenure is significant problems that need to be addressed. As our commitment to attain the first of the MDGs, Indonesia is continually committed to address poverty in an integrated and comprehensive manner including addressing poor communities living in and next to forest areas. There is a link between poverty and forest condition. While in some cases, forest destruction generates financial resources to reduce poverty, in other cases environmental degradation becomes a determinant of poverty.

In line with the mandate of the Convention on Biological Diversity and the 2010 target to significantly reduce the loss of biodiversity

and contribute to poverty reduction and the pursuit of sustainable development, Indonesia views that the concept of biosphere reserves in the framework of national legislation should be an alternative management to promote nature-friendly land use, and also have a role in supporting the long term viability of protected areas.

Over the years, the Government of Indonesia has been promoting people's access and participation in forestry development, which has substantially increased the benefits of forestry for many poor communities. In our case, however, improving people's access and participation does not imply a transfer of land rights. We have also taken a significant action and demonstrated progress through policy and field level implementation and shared lessons learnt on Effectiveness Management Protected Areas. Therefore, we could better manage the forest and adapting new challenges in forestry and at the same time maintains forests for sustainability of its resources and provide better acess to local communities for improving their livelihood.

Ladies and Gentlemen,

Related to the climate change issues, Indonesia has developed regulation for the implementation of national REDD framework consisting of five main aspects: namely, Reference Emission Level (national, provincial and district levels), Strategy (regulations and activities within the framework developed), Monitoring and evaluation (forest cover and carbon stock), Market and funding, and Responsibilities and benefits distribution. In this regard, Indonesia developed a National Council on Climate Change, and in particular to REDD, developed a, so called, Working Group of Forestry Climate Change and formulate regulation on development Demonstration Activities and at present is preparing the regulation on how to develop REDD activities.

In this regard, I would like to make an appeal to participants and other stakeholders to enhance the function biosphere reserves through develop activities of mitigating the effect of climate change and of integrating local and traditional knowledge in climate change adaptation, either by providing direct tecnical assistance or by developing the science and technology related to the implementation of conservation and management program of biosphere reserves. If we succed to manage and preserve the biodiversity wisely, we can then give our share to the improvement of a balanced environment.

Ladies and Gentlemen,
We believe that this meeting for the successful achievement of biosphere reserves functions become a very effective way to increase public awareness, promoting cooperation within stakeholders, and at the same time, sharing knowledge and hope could be as a way to seek resources for the management of biosphere reserves.

Finally, I would like to thanked to UNESCO Indonesia Program, Indonesian Man and Biosphere Program National Committee and other stakeholders to choose Cibodas Biosphere Reserves as a place for meeting to discussed and sharing information on the research and conservation efforts of biosphere reserves. We do hope that all guests will enjoy the beauty of Gunung Gede Pangrango National Park, and gain a better understanding of our rich and colorful biodiversity here in Indonesia.

Thank you and Wassalaamu'alaikum Warohmatullahi Wabarokatuh,
Direktur Jenderal
Darori

Bambang Prasetya

(MAB - LIPI)

Assalamu'alaikum wr.wb.

Yours Excellencies

The Governor of Riau

Head of Environment Agency representing

Governor of West Java

Deputy Director and Head of Environment Science, UNESCO Jakarta Office

Staff Expert Forestry Minister on Environment and Climate Change

The Chairman, Honorable Delegates of the SeaBRnet Meeting

Ladies and Gentlemen

Firstly, I would like to tank UNESCO Jakarta Office, Director General of PHKA, Ministry of Forestry, Government of West Java and MAB Indonesia that organized the 6th SeaBRnet meeting in Cibodas Biosphere Reserve. This meeting is very important to share experience between Southeast Asia Country in the management of Biosphere Reserve.

The big issues facing Indonesia in the future are the problems of critical lands, water and loss of biodiversity, closely related to the quality of forest ecosystems. One of the objectives of establishing the National MAB Committee is to participate in solving the above-mentioned problems. The mission of the MAB Program is to balance the apparent contrasting objectives of conservation of biodiversity, promotion of socio-economic development and maintenance of cultural values. In short the mission of the MAB Program is to promote and demonstrate the balanced relationships between people and nature through bioregional approaches, leading to the improvement of the welfare of the Indonesian people.

The big schema of the MAB program in Indonesia is biosphere reserve development for sustainable development. Biosphere reserve is a concept of site management to harmonize the needs for conservation of both land and coastal ecosystem with the need for economic development in the basis of research on the utilization of natural resources, including cultural resources recognized by UNESCO MAB program in order to promote a balanced relationship between human and the nature.
Principally, the concept of biosfer reserve is applied to bring the conservation of biological diversity into line with sustainable development for achieving a balanced relationship between human and the nature. In its development the concept has been adopted by many countries to manage their conservation areas and the surroundings.

Basic principle in the biosphere reserve management is landscape management, collaborative management and management based on research and scientific analysis. Biosphere Reserve is field cooperation between Ministry of Forestry that have authority of conservation area, Indonesian Institute of Science (LIPI) as scientific authority and Local Government that is owner and responsible of the buffer zone and transition area. The three institutions are main stakeholder which manages and develops biosphere reserve in Indonesia. If the three institutions work together, biosphere reserve concept will be good implemented in Indonesia

One of the LIPI mandates is to undertake research, study and monitoring of big problems of the nation. The data obtained have to be accurate, actual and in line with the dynamics of the community and should be applicable as inputs for government policy decisions whose results can be implemented.

Indonesia has seven biosphere reserves comprising Cibodas Biosphere Reseve, Tanjung Puting Biosphere Reserve, Lore Lindu Biosphere Rerserve, Komodo Biosphere Rerserve, Leuser Biosphere Reserve, Siberut Island Biosphere Reserve, and Giam Siak Kecil Bukit batu Biosphere Reserve. All biosphere reserve has conservation area status as its core areas and representing 5 major bioregions from 7 bioregions that Indonesia has. In 1977 for the first phase, MAB-UNESCO endorsed four national parks (NP), i.e. Gede Pangrango NP as representation of bioregion Java and Bali, Tanjung Puting NP as representation of bioregion Kalimantan, Lore Lindu NP as representation of bioregion Sulawesi and Komodo NP as representation of bioregion Lesser Sunda Islands. Later the Gunung Leuser NP as representation of bioregion Sumatera and the Siberut Island which includes the Siberut NP as representation of bioregion oceanic islands of Sumatera were endorsed in 1981. In 1989 UNESCO also designated the Komodo NP as the World Natural Heritage Site.

In the era of globalization, local, national and international cooperation is a necessity to improve the welfare of Indonesian people, alleviation of poverty and maintenance of health and the quality of environment are not only the responsibility of the national and local governments but also the duty of NGOs and community.

The main priority of MAB program is to emphasis the implementation of biosphere reserve concept for achieving sustainable development. Biosphere reserves are used as a place to test and build a sustainable way of life through integrated programs of natural resources management and biodiversity conservation, with the objective to contribute in reducing poverty and increasing the living standard, especially of rural communities. In addition, the implementation of the biosphere reserve concept is also aimed to help reducing the loss of biodiversity, facilitating scientific development and bulding the capacity in the context of providing services neccessary for ecological sustainability.

And finally, biosphere reserve existence is a proof of Indonesian's commitment in sustainable development. And we eagerly look forward to UNESCO's support.

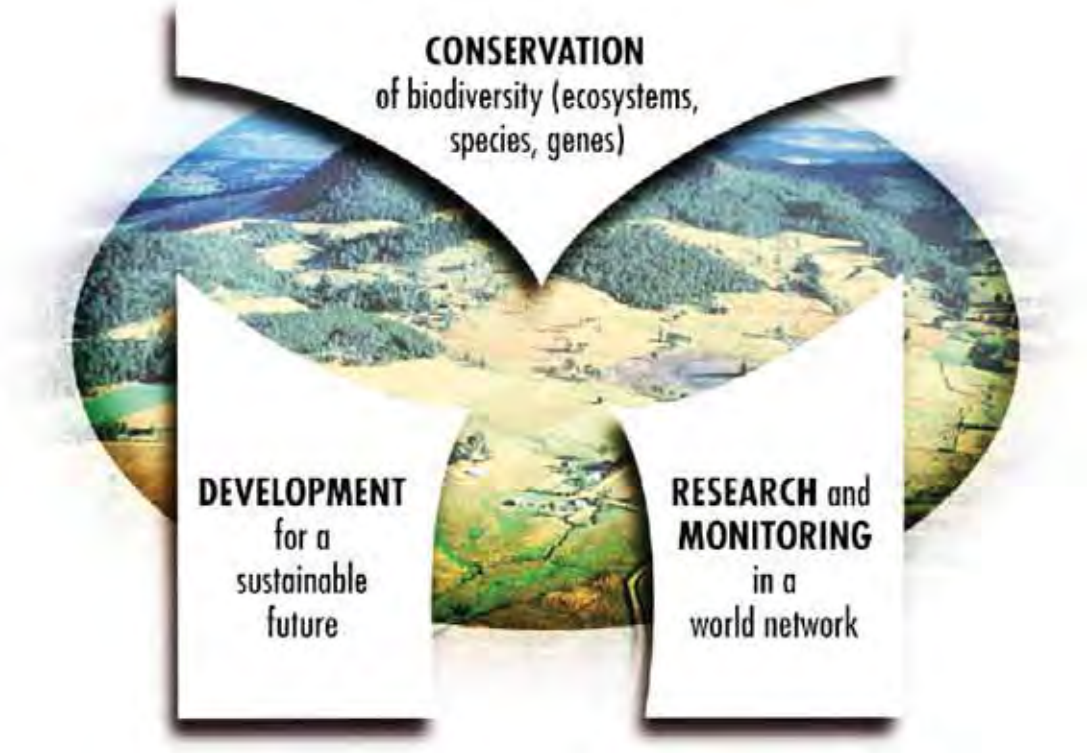
With "Bismillahirohmanirrhohim", I open the 6th SeaBRnet meeting in Cibodas Biosphere Reserve. I hope this meeting will be success and give an excellent idea for sustainable development and especially for the people in Biosphere Reserve area.

Introduction

Robert Lee

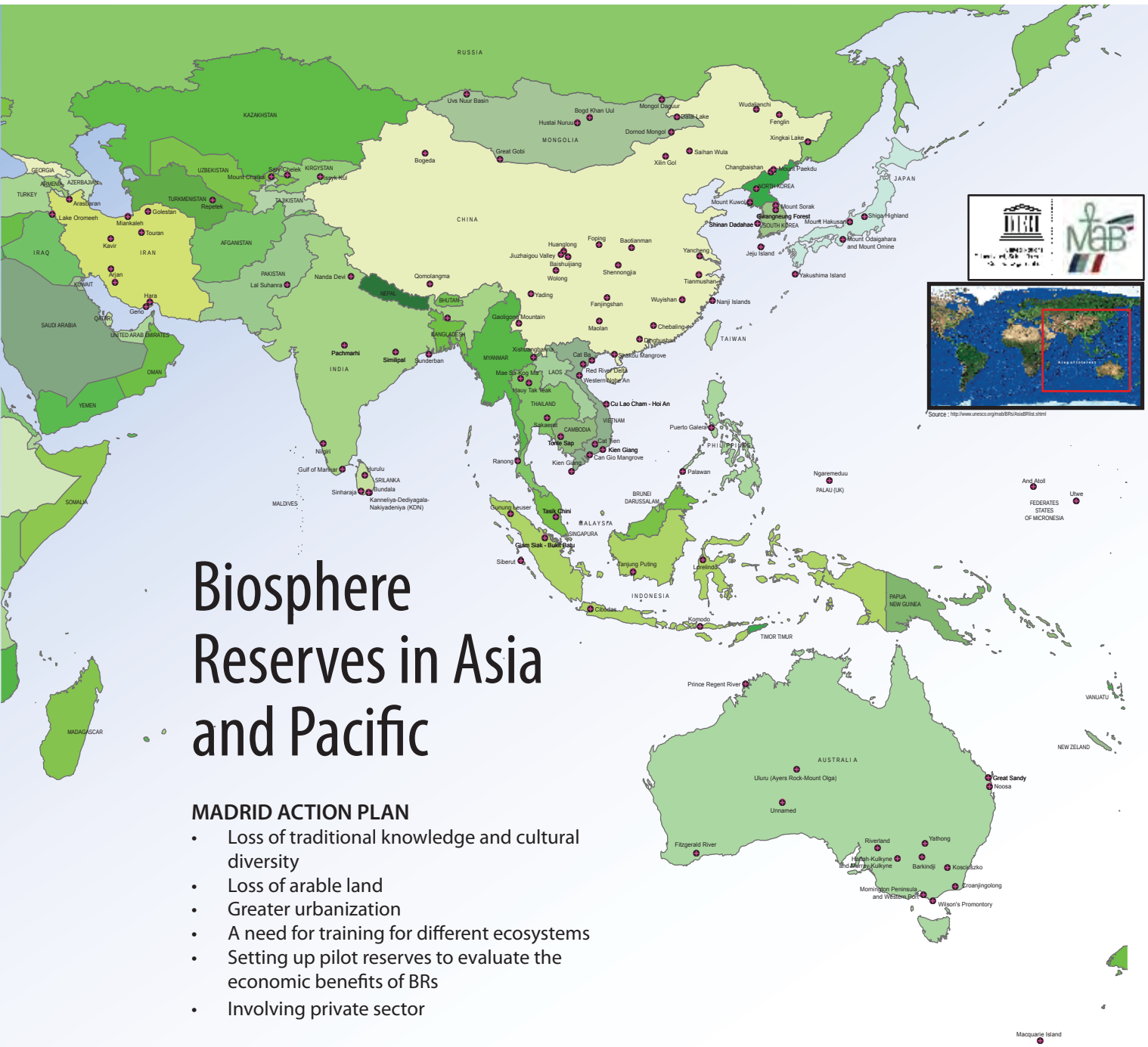
UNESCO Office, Jakarta
Regional Science Bureau for Asia and the Pacific

Biosphere Reserves



SEVILLE STRATEGY

Goals	Objectives
Biosphere reserves as models of land management and of approaches to SD	Secure the support/involvement of local people
	Ensure better harmonization/interaction among different BR zones
	Integrate BRs into regional planning
Use BRs for research, monitoring, education, and training	Improve knowledge of interactions between humans and BRs
	Improve monitoring activities
	Improve education, public awareness, and involvement
	Improve training for specialists and managers
Implement the BR concept	Integrate the functions of BRs
	Strengthen the World Network of BRs



Biosphere Reserves in Asia and Pacific

MADRID ACTION PLAN

- Loss of traditional knowledge and cultural diversity
- Loss of arable land
- Greater urbanization
- A need for training for different ecosystems
- Setting up pilot reserves to evaluate the economic benefits of BRs
- Involving private sector

SINCE THEN?

- A total of 564 BRs in 109 countries around the world – World Network of BR (WNBR)
- 1995: East Asian BR network (EABRN)
- 1998: Southeast Asian BR Network (SeaBRNet)
- 2002: South and Central Asia Network (SACAM)
- 2006: Pacific MAB Network (PacMAB)
- Activities and programs

With more than 100 biosphere reserves in Asia and the Pacific, we think that we can have a serious impact on climate change, environmental sustainability, poverty alleviation, and education in the region.

KEY QUESTIONS

1. Achievements of BRs
2. Climate Change
3. Effectiveness of BRs in catalyzing new initiatives for Sustainable Development

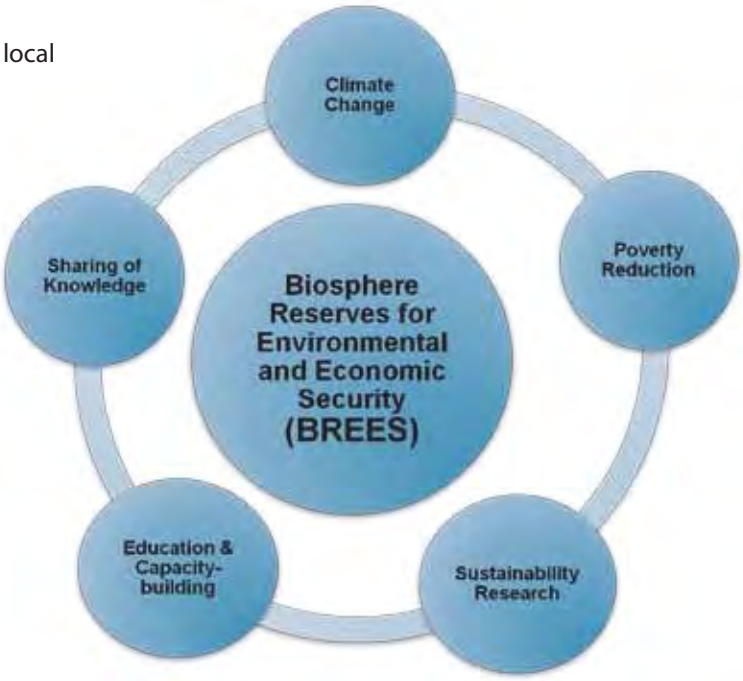
MAIN FINDINGS

1. A powerful concept that needs to expand beyond its achievements
2. Significant lack of understanding about what BRs are and are meant to do.
3. Lack of branding
4. Insufficient monitoring and evaluation
5. Discrepancies between goals of BR and local legislation

MAIN RECOMMENDATIONS

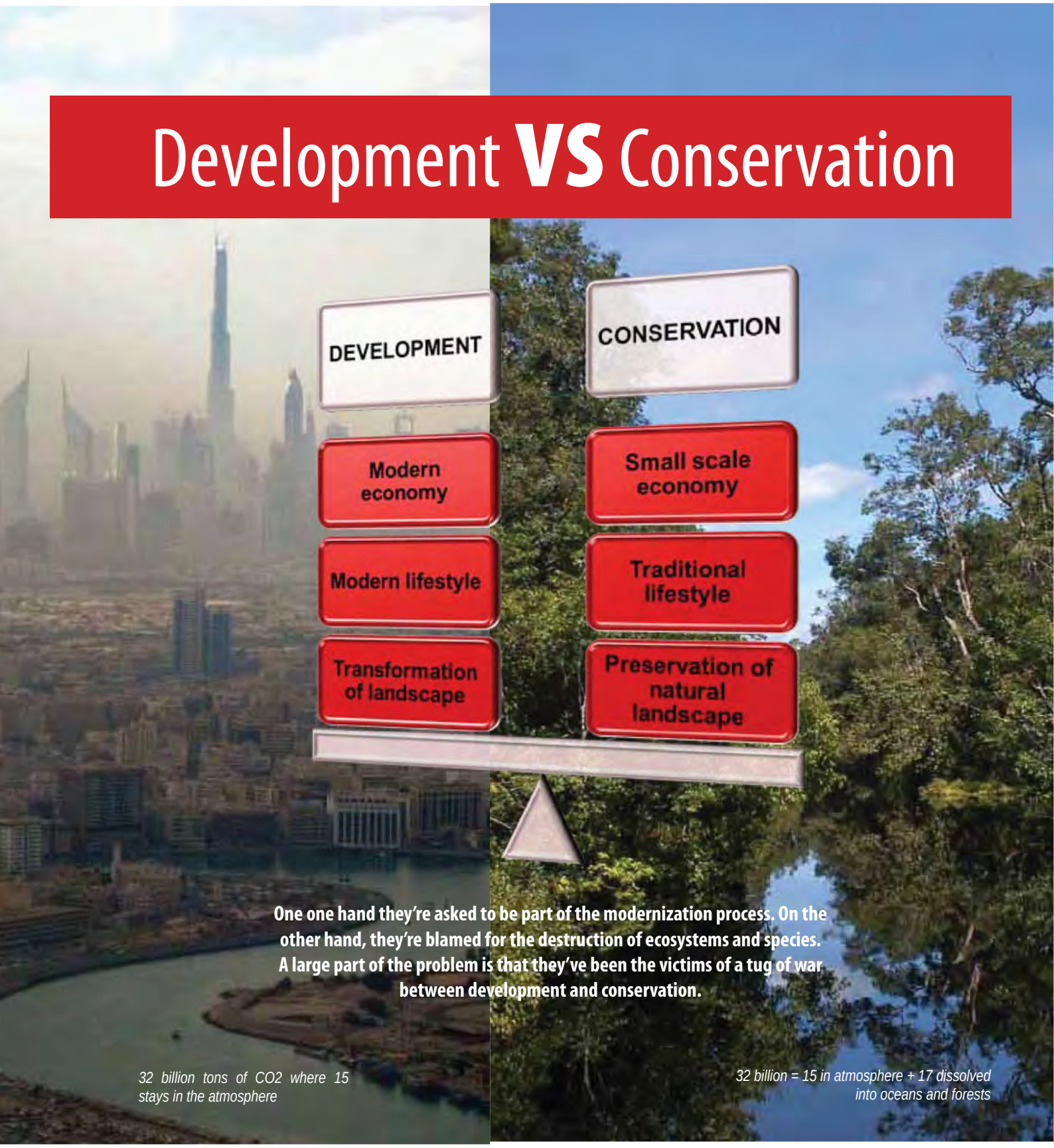
1. Systematic monitoring and evaluation
2. Align BR goals and local legislation
3. Prepare guidelines on multi-stakeholder management
4. Pilot projects in BRs specifically on climate change
5. Focus on poverty alleviation and rural development
6. Communication, branding, and alignment
7. Development of a multi-faceted regional program

It has these main components. With seed funding from the Ministry of Education, Culture, Sports, Science and Technology of the Japanese government, we are working to develop this regional program.



GLOBAL POVERTY
Rural communities that make up a majority of the population that live in or around BRs are mostly poor. Asia represents more than 2/3 of the world's poor. ¼ people in Asia live on less than $1 a day.

Development **VS** Conservation



One one hand they're asked to be part of the modernization process. On the other hand, they're blamed for the destruction of ecosystems and species. A large part of the problem is that they've been the victims of a tug of war between development and conservation.

32 billion tons of CO2 where 15 stays in the atmosphere

32 billion = 15 in atmosphere + 17 dissolved into oceans and forests

Maintenance of healthy oceans and forests is what prevents even a worse situation

..best way to address deforestation?'
Address poverty' (Wangan Maatha

The poor have already expressed alarms about deteriorating living conditions and risks to their livelihoods. Further ecological disruptions will have a major impact

Maintain and Expand Carbon Sinks

What are needed are: large natural landscapes that maintain and expand carbon sinks

Maintain Ecosystems & Environmental Services

Maintenance of ecosystems and environmental services

Maintain Ecosystems & Environmental Services

CC adaptation and mitigation plans into development plans

Poverty Reduction & Social Services in Rural Areas

Poverty alleviation and provision of basic services to rural communitie

Education for Sustainable Development (ESD)

Education for sustainable development

Maintain Traditional Cultural Systems

Maintenance of traditional cultural systems and livelihoods

Sharing Knowledge

Sharing of knowledge within and between communities

Biosphere Reserves for Environmental and Economic Society (BREES) Objective

1. CC mitigation & adaptation capacity
2. CC mitigation & adaptation practices & policies
3. Environmental, economic, & social security
4. Learning alliances through the BR network.

Micro-financing for CC and Po

BREES focuses on financial services for the rural poor because it gets at the root problems of environmental problems and poverty. Micro-finance has a strong potential to alleviate poverty, promote social equity, and maintain cultural traditions and livelihoods.

Environmentally & Economically Sustainable Ventures

The idea for this scheme is to promote only environmentally and economically sustainable ventures through rural poverty development.

Education & Capacity Building

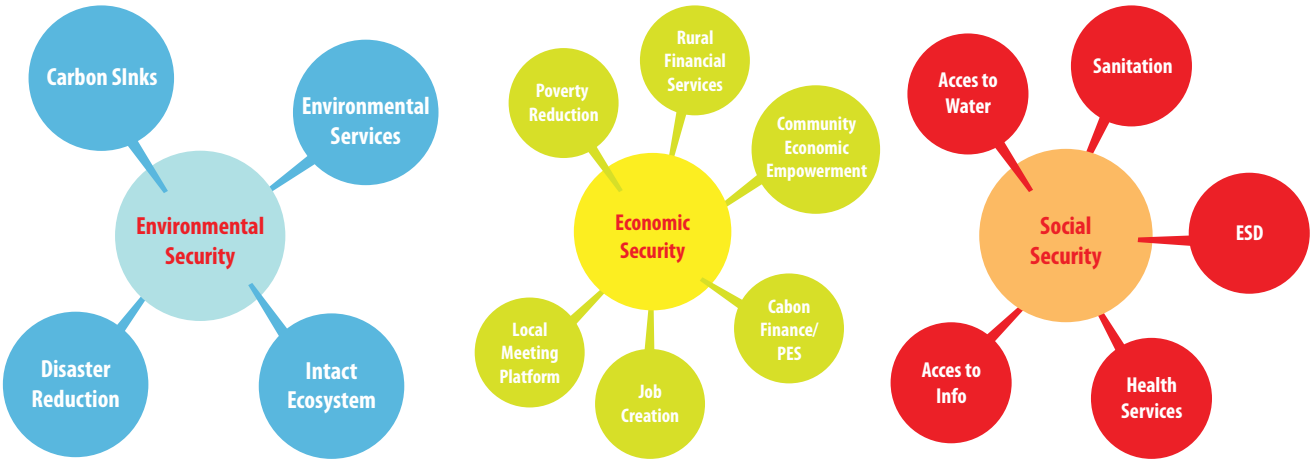
Capacity building and education are critically important to ensure the sustainability of the program. Local capacity to develop business plans, sharpen business skills, monitor the environment and their communities is a foundation of the program. Furthermore, promoting ESD through curriculum development, promoting green schools, scholarships for science are part of this approach.

Results from this program would have governance and policy implications including: carbon financing agreements; Payment for Environmental Services (PES) agreements; land tenure issues; and other environmental policies.

Of course, with activities and successes and failures, these need to be communicated and exchanged so that we can all learn from our successes and mistakes.

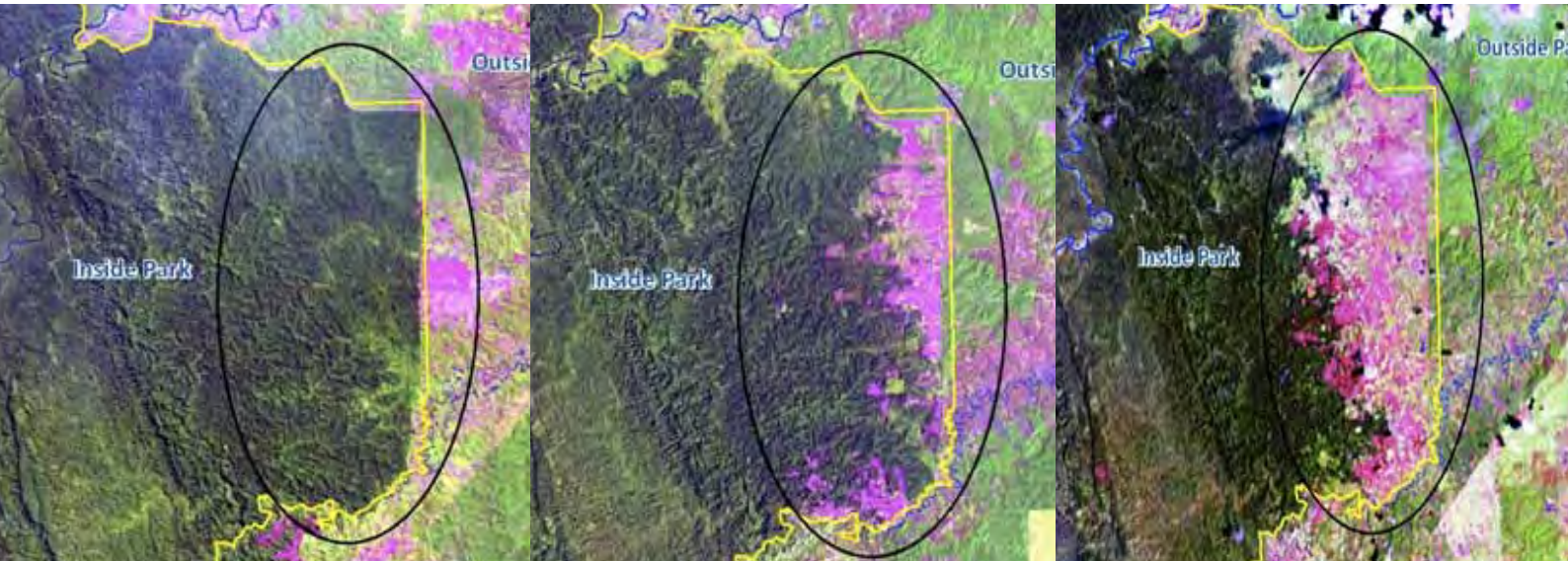
We have made very good progress in our first year. There has been a resounding positive response to the BREES concept. In discussions and workshops, local stakeholders have expressed an urgent need for a landscape approach to climate change, sustainable development, and social services.
Although we are still carrying out the feasibility study, pilot sites have tentatively been selected in target countries.

Finally, we have stimulated signficant financial and political support for the program. We ar hoping to formalize partnerships with other UN agencies such as UNEP and FAO as well as with non-UN agencies such as MercyCorps. And we think that our fundraising target will be met for Phase II of the program.



If the program is well designed and implemented, it can contribute to environmental security

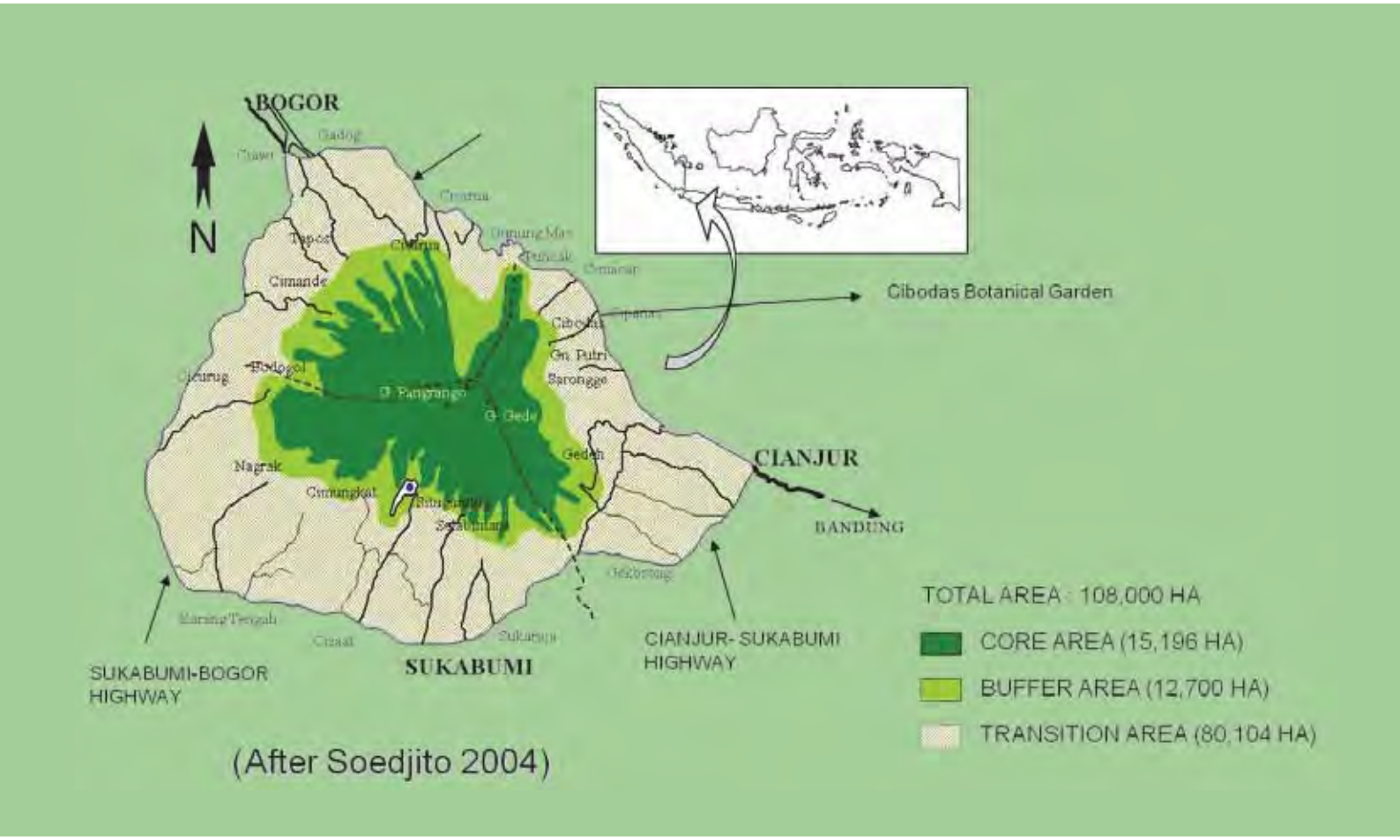
Monitoring, Research and Centralized Databases



Two Hundred Years of Research and Monitoring in Cibodas Biosphere Reserve

Kuswata Kartawinata

Senior Research Associate
Botany Department, Field Museum, Chicago, Illinois, USA &
Herbarium Bogoriense, Research Center in Biology, Indonesian Institute of Sciences (LIPI), Bogor

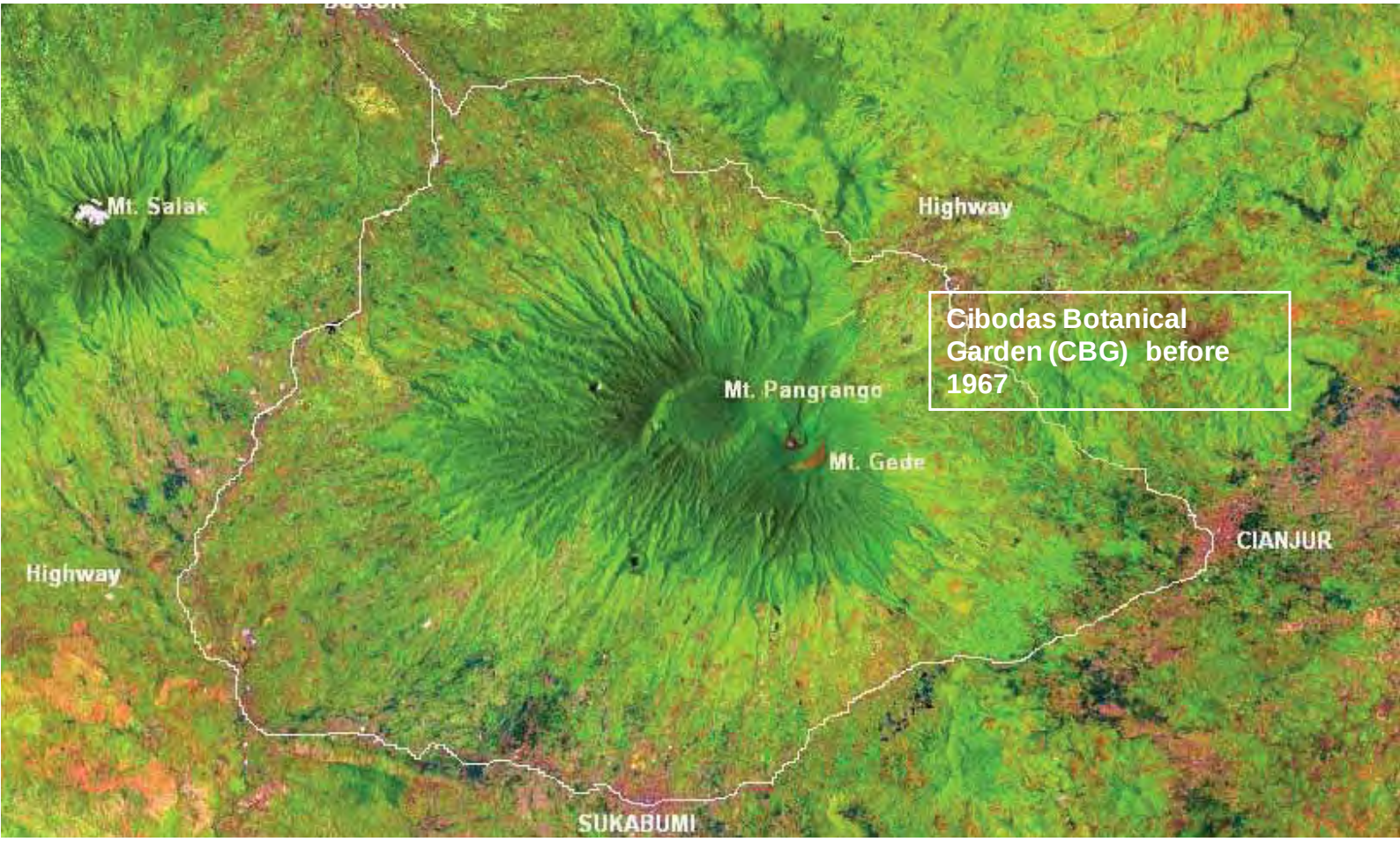


Subalpine forest (Leptospermum flavescens) & meadow

Subalpine meadow (Anaphalis javanica & Tripogon exiguus

Subalpine scrub (Vaccinium varingiaefolium) & forest

Montane forest, lowland forest & man-made vegetation



Vegetation diversity

(Kartawinata 2011)

CLIMATE	ELEVATION (M)	VEGETATION TYPE
EVERGREEN Schmidt & Ferguson index Q = 0-33.3 Rainfall Types: A,B, Annual rainfall: 2000-4300 mm	500-1000 m	Man-made vegetation: Tea plantation Timber plantation Crop garden Rice field, etc.
	500- 3019 m	Secondary vegetation
	700- 3019 m	Natural vegetation
	700-1000 m	1. Lowland forest Leading species: Schima wallichii, Neesia altissima, Luvunga sarmentosa
	1000-1500 m	2. Lower montane forest: Leading species: Schima wallichii, Castanopsis javanica, Acronychia laurifolia,
	1500-2400 m	3. Upper montane forest: Leading species: Schima wallichii,Acronodia punctata, Dacrycarpus imbricatus,
	2400-3019 m	4. Subalpine forest: Leptospermum flavescens, Myrsine affinis, Eurya obovata
	2400-3019 m	5. .Subalpine scrub: Vaccinium varingiaefolium- Selliguea feei
	2400-3019 m	6. Subalpine meadows: 6.1. Anaphalis javanica-Isachne pangerangensis community type 6.2. Anaphalis javanica- Tripogon exiguus community type.

Species diversity

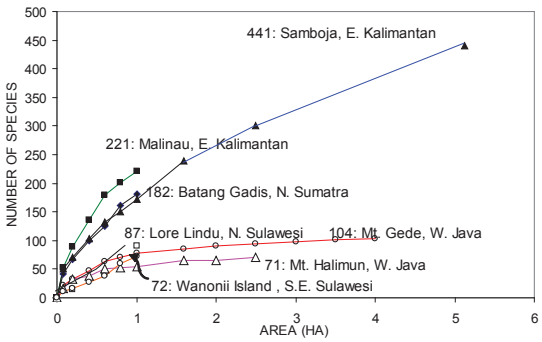
(Andrew 1985, Dammerman 1929, Docters van Leeuwen 1933, Kartawinata 2011, Sunarno & Rugayah 1992, Steenis et al. 1972)

PLANT		ANIMAL	
Flowering plant	1103 species	Bird	162 species
Rare & Endemic	31 species	Mammal	43 species
Allien	63 species	Reptile	42 species
		Pollinator Insect (summit region)	+/- 50 species

Species richness and areas

Species-area curve of montane forests at Mt. Gede-Pangrango compared to those at Mt. Halimun montane forest and various lowland forests

The sources of data are Kartawinata et al. (2004) for Batang Gadis; Kartawinata et al.(2009) for Malinau and Mt. Gede; Purwaningsih & Yusuf (2005) for Lore Lindu; and Simbolon & Mirmanto (1997) for Mt. Halimun.



Early exploration & research in Cibodas BR (1777-1950)

The history of exploration and research in Cibodas BR (Mt. Gede-Pangrango) can not be separated from the history of Bogor Botanical Garden (BBG) and Cibodas Botanical Garden (CBG)

- Before 1950 BBG & CBG [Steenis & Steenis Kruseman (1953); Steenis et.al (1972, 2006); Went 1945)]:
  - Mecca for international tropical biologists
  - Center of transnational tropical biology
  - Heaven and world center for tropical botanical research
  - CBG-Mt Gede-Pangrango
    - » 500 international & Dutch scientists and explorers
    - » 300 international publications
  - The following deliberation presents selected scientists and their activities between 1777 and 2010.

1777: C.P. THUNBERG(Swedish physician and botanist, student of Linnaeus – father of plant & animal taxonomist),

- 1778: Dutch community in Batavia (Jakarta) established Bataviasche Kunst en Wetenschappen Society of Batavia)
  - supporting European explorers & naturalists
- 1787-1788: F. NOROÑA (Spanish physician and botanist supporrted by Governor General Alting --- Altingia excelsa (rasamala).
- 1799: L.A. DESCHAMPS (French naturalist & medical doctor): held up to explore Jawa, supported by E Java Governor – van Overstraten.
- 1805: L.T. LESCHENAULT DE LA TOUR (French botanist) supported by Governor General Engelhard Engelhardia.

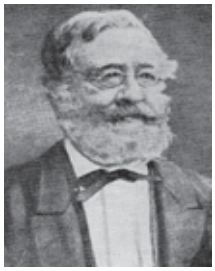
18 May 1817:'s Lands Plantentuin (Bogor Botanic Garden).

- CGC REINWARDT
  Director: (1817-1922)
- De Natuurkundige Commissie (Natural Science Commission)
- Uncover the natural richness of Dutch East Indies (Indonesia):
  - » exploration & research on botani, zoology, geology, geography, etc.
  - » 106 guidelines and instructions

- CL BLUME
  Director (1822-1826)
  - » Bijdragen tot de flora van Nederlandsch Indië (1825-1827)
  - » Flora Javae (1828-1851)

Introduction of alien crops & fruits

JE TEYSMANN



- Curator, then Director (1830-1868) Bogor Botanic Garden
- Library,
- Cultivation experiment of European vegetables (tomato, potato, eggplant, carrot, cabbage, lettuce) and fruits (apple, pear, strawberry) at:
  - » Ciawi (490 m asl.),
  - » Cisarua (800 m),
  - » Cipanas (1070 m),
  - » Cibodas BG (1400 m) &
  - » summit of Mt..Pangrango (3019 m)

FW JUNGHUHN (1835-1864),

- Naturalist, physician, artist & army officer,
- The most complete contribution on vegetaton, natural history of plants, altitudinal zonation of flora
- *Topographische und natuurwissenschaftliche durch Java* (1845)
- Java, zijne gedaante, zijn plantentooi en inwendige bouw (1850-1854, ed. 2: 1853-1854)
- *Plantae Junghuhnianae* (1851-1856)
- Plantation system through enrichment planting of forest (= ?TPTI, Selective cutting and planting)
- Administrator of quinine plantation in Lembang, Bandung, West Java

RHCC SCHEFFER:

- Director of Bogor Botanical Garden (1868-1880)
- Intesified systematic botanical exploration and research
- New herbarium building
- Design the layout of the Cibodas Botanical Garden

M TREUB:

- Director, s'Landsplantentuin (1880—1909):
- Director of Agriculture (1905-1909)
- Science for advancing civilization
- Plant morphology, ecology, taxonomy, experimental botany
- Founder : Foreigner's Laboratory (Treub Laboratory) for general botani
  - » World famous scientists visits
  - » Discovery of plant physiology
  - » Glory of tropical botany
  - » Bogor was Mecca of botany
- Bogor BG & Cibodas BG: Center of transnational tropical biology
- Flora Buitenzorg (Jakarta-Mt. Pangrango): failed but
  - » JJ Smith: Orchids of Java (1905)
  - » SH Koorders: Exkursion flora von Java (1911-1913) ; Flora von Tjibodas (1918-1923)
  - » CA Backer, Flora van Batavia (1907)
  - » CA Backer & B v d Brink: Flora of Java (1963-1968)

1852: Establishment of Cibodas Botanical Garden (CBG)

- tropical mountain & temperate plants
- Extension of CBG to cover 1200 ha of mountain forest and alpine vegetation up to Mt. Pangrango summit (3019 m alt)
- Intensifyng the glory of research in tropical botany
- Center of transnational tropical biology
- World center for tropical botanical research
- Heaven for tropical botanical research
- CBG & Mt. Gede-Pangrango
  - » 1817- 1950: > 500 world botanists did research here
  - » >500 international publications on botany
- 1920 -Construction of visitor's laboratory – world scientist contribution; reconstructed by UNESCO IN 1950
- Some significant discovery & achievements:
  - » J.M Janse (1897): Mycorrhiza on Myrica javanica at Mt, Gede
  - » Haberlandt: stomata for respiration in humid air
  - » M. Fleischer (1900-1922) Die Musci der Flora von Buitenzorg
  - » SH Koorders (1918-1923)
  - » Flora von Tjibodas
  - » FW Went (1931) , Soziologie der Epiphyten eines tropschen urwaldes
  - » W.M. Docters van Leeuwen (1933): Biology of plant & animals on higher elevation of Gede-Pangranggo
  - » A. Hoogerwerf (1949), De avifauna van Tjibodas en omgeving (Java), etc.

WM DOCTERS VAN LEEUWEN

- Director of Botanical Garden [1918-1932)
  - » Entomology, botany & general biology
  - » Established Fishery Researh laboratry (1919)
  - » Research on biology of plants and animals at Mt. Gede-Pangrango (1918-1932)
- Research station at Kandang Badak
  - » Meteorological Station
  - » Plant phenology (19 plant species)
  - » Pollination (36 plant species by 13 animal taxa : birds, insects, etc.
  - » Mountain flora
  - » Seed dispersal (20 plant species by 20 animal species)
- 1933. Biology of plants and animals occurring in the higher parts of Mount Pangrango-Gede in West java. (Verhand. Kon. Akademie van Wetenschappen, Afd. Natuutkunde XXXI.. Noord-Hollandsche Uitgevers-Maatschappij, Amsterdam).
- 1929. 4th Pacific Science Congress, Batavia

Good for climate change monitoring : 1933-2010

1926: F. Kramer: Gap Dynamic experiment-selective logging

International scientists:

- 1856, AFW Schimper (Germany): vegetation, flora & ecology of
- Gede craters in his book Pflanzengeographie…
- 1861, Sir Alfred Wallace (UK): natural history & geography of temperate plants confirming Darwin's theory
- 1871, TR Resvoll (Norway): crater vegetation
- 1878, O. Beccari, (Italy): flora & fauna of Gede-Pangrango summits
- 1895, J. Massart, (Belgium): qualitative vegetation studies
- 1905, A Ernst (Switzerland) vegetation of meadows on summits
- 1909, K. Domin (Checkoslovakia): vegetation succession
- 1919, T. Nakai (Japan): botanical exploration & taxonomy
- 1924, W, Seifriez (USA): altitudinal zonation of lichens and mosses.

- 1926, K.S. Rouppert (Poland): plant physiology
- 1930, F. Fagerlind (Sweden): Plant morphology, development, anatomy

Plant Ecology:

- 1959, W. Meijer (Herbarium Bogoriense): forest phytosociology (1500 m alt.)
- 1975-1977: I. Yamada (Institute of S.E. Asian Studies, Japan): structure & floristic studies of montane to subalpine forests (1600-3000 m alt.)
- 1975, Kartawinata & Rollett (MAB Indonesia & UNESCO Jakarta): regional training course on vegetation study (1600-2000 m alt.)
- 1975-1976, Rollett et al. (UNESCO & MAB Indonesia, Jakarta): structure & floristic studies (1600-2000 m alt.)
- 1987 A. Srijanto, (IPB, Bogor); Dynamics in gaps after thunder storms
- 1991, Kusmana & Istomo (IPB, Bogor); forest phytosociology (1600 m)
- 1999, R. Abdulhadi et al. (Puslit Biologi LIPI,Bogor): effects of fire
- 2009, Helmi et al. (University of Indonesia, Depok & Herbarium Bogoriense): structure & floristic studiesof lowland forest (800 m)
- 2009, Sadili et al. (Herbarium Bogoriense): phytosociology of subalpine meadows at summit areas
- 1980 -2010: Undergraduate and graduate student theses (IPB, UNSOED, UNPAK, ITB, etc.)

Flora:

- 1972, 2005, C.G.G.J. van Steenis et al. (Rijksherbarium Leiden & Herbarium Bogoriense). Mountain Flora of Java
- 1992, B. Sunarno & Rugayah (Herbarium Bogoriense-LIPI). Flora of Gunung Gede-Pangrango National Park.

Floristic Inventory:

- 1987-1994, Gunung Gede-Pangrango National Park: plant inventory
- 2000, Ismail et al. (Conservation International Indonesia, Jakarta): floristic diversity at Bodogol

Faunistic Inventory:

- 1971, D. Liem (Zoological Museum Bogor): Studies on frogs and toads.
- 1985, P. Andrew (): Anotated checklist of birds
- 1987-1994, Gunung Gede-Pangrango National Park: animal inventory
- 1980, Y. Abbas (IPB). Bird inventory and habitat studies.
- 1985, Kodar. Inventory and population studies of rats

Socio-economic studies:

- 1986, J. Kartasubrata (IPB Bogor): Community participation in buffer zone management.
- 1991, D. Darusman (IPB Bogor): intangible use of national park
- 1994, E.K. Aliqodra (IPB, Bogor): Impact of GGPNP onlocal community
- 2001, S. Andriani (IPB, Bogor): Economic carrying capacity of buffer zone for local community
- 2001, L. Arshanti (IPB, Bogor): Community's perception on buffer zone
- 2001, M.R. Hervianti (IPB Bogor): Economic roles of food plants in buffer zone.
- 2001, N. Susanti (IPB Bogor): Factors affecting farmers in land use decision making in buffer zone.

Monitoring:

- 1988, R. Abdulhadi et al. (Herbarium Bogoriense): 30 years floristic & structural changes in montane forest (in MAB Indonesia-UNESCO Plot at 1600-2000 m alt.)

- 2007, Rahayoe,J.S. et al. (Herbarium Bogoriense): Climate change -Biomass & carbon stock in lowland forest at Bodogol (800 m alt) – see tomorrow agenda
- 2010 (?). D. Widyatmoko Climate change - Biomass & carbon stock in four ecosystems - see tomorrow agenda
- 2000- GGPNP: Alien species

Potential sites:

- 1987, A. Srijanto, (IPB, Bogor); Dynamics in gaps after thunder storms
- 1933, Docters van Leeuwen ('sLandsplantentuin, Bogor). Biology of plants and animals occurring in the higher parts of Mount Pangrango-Gedeh

Plant species diversity

CGGJ van Steenis:
Mountain flora of Java (1937-1972)

- Most Data & information were collected from Mt. Gede-Pangrango
  - » Description and color illustration of 456 spesies
  - » Ecology of mountain ecosystems
- 1st Ed. (1972); 2nd Ed. (2005)
- Indonesian version (2006)

Biology and ecology of natural vegetation – a synthesis

CONTENTS

Forest Cover Monitoring to Support Sustainable Land Use

Moray McLeish

Director
Project POTICO
World Resources Institute, Indonesia Office

WORLD RESOURCES INSTITUTE

Why ?

- Commitment to protecting the environment and improving peoples
- lives
- Focus on global, long term problems
- Economically sound, practical solutions

How?

- Facilitation
- Research
- Working with partners to put ideas into action

The graph shows the area of land under oil palm cultivation in Indonesia over the last 30 years, and a prediction.

The curve showing global demand for palm oil looks similar.

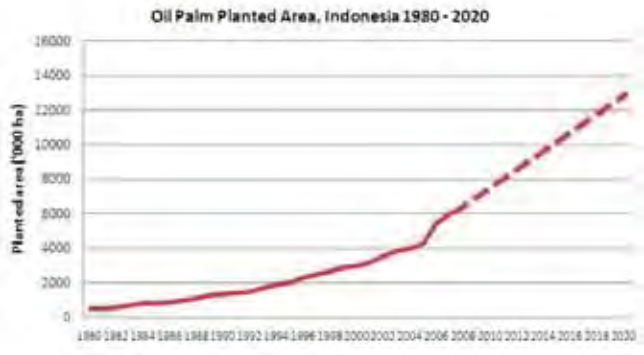
FAO predicts that global production of palm oil will increase from 33 million metric tons in 2005 to approximately 54 million metric tons in 2020. That an increase of 65%.

The world – both developed and developing – wants and needs palm oil. We cant change that.

So the question then becomes; How can we help the producers of palm oil – both companies and countries – to meet this demand, without contributing to deforestation, biodiversity loss and climate change.

As you all know success will require planning for both conservation and economic functions, at the landscape level.

Carbon rich land converted to oil palm plantation



Indonesia is a Biodiversity Hotspot

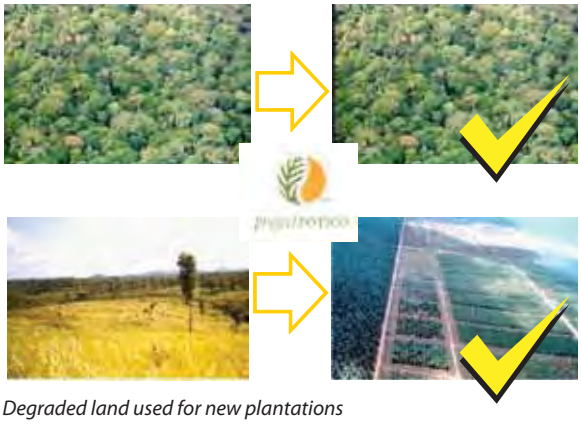
It's also a Deforestation Hotspot

Source: UNEP-WCMC; UMD-SDSU; WRI; Hansen et al. 2008

Current Pressure

- On the government to seize the opportunity to supply the world with palm oil, boosting the national economy
- Pressue on regional governments to create rural employment in their provinces
- And pressure on palm oil producers to demonstrate to their buyers that they are not contributing to deforestation and biodeiversity loss
- How can these pressures all be managed, and all these objectives be achieved?

The Future



Degraded land used for new plantations

We would like to see something like this.

Forests remain as forests

And degraded land is used for agricultural expansion

This is what the project I manage, project POTICO, is all about: directing palm oil expansion onto degraded land and conserving forests for people, climate and biodiversity.

Financial Incentives?

RSPO
Roundtable on Sustainable Palm Oil

Voluntary Sustainability Standards

"before expanding a planter must identify……."

1. All primary forest
2. High Conservation Values HCV) and Management areas
3. Peat Soils
4. Local Peoples Land

→ Exclude these from clearance

→ Provide for maintenance or enhancement of all HCVs

What is incentivising and assisting palm oil companies to achieve this vision of the future

- Voluntary sustainability standards such as RSPO: if companies meet their rules their palm oil gets a certificate which may give it a higher value on the market

- RSPO states that before expanding, a planter must identify and create a management plan for

    - All primary forest
    - HCV areas
    - Peat soils
    - Local peoples land
    - But how can RSPO and the buyers who look for that certificate really know that the company is implementing this plan, and how can the planters themselves demonstrate that they are (people don't always take their word for it)
    - There is a big problem of trust.

In simple terms, we need to know

- Is deforestation happening?
- Where?
- On whose watch?

To build that trust, the same information has to be available to everyone.

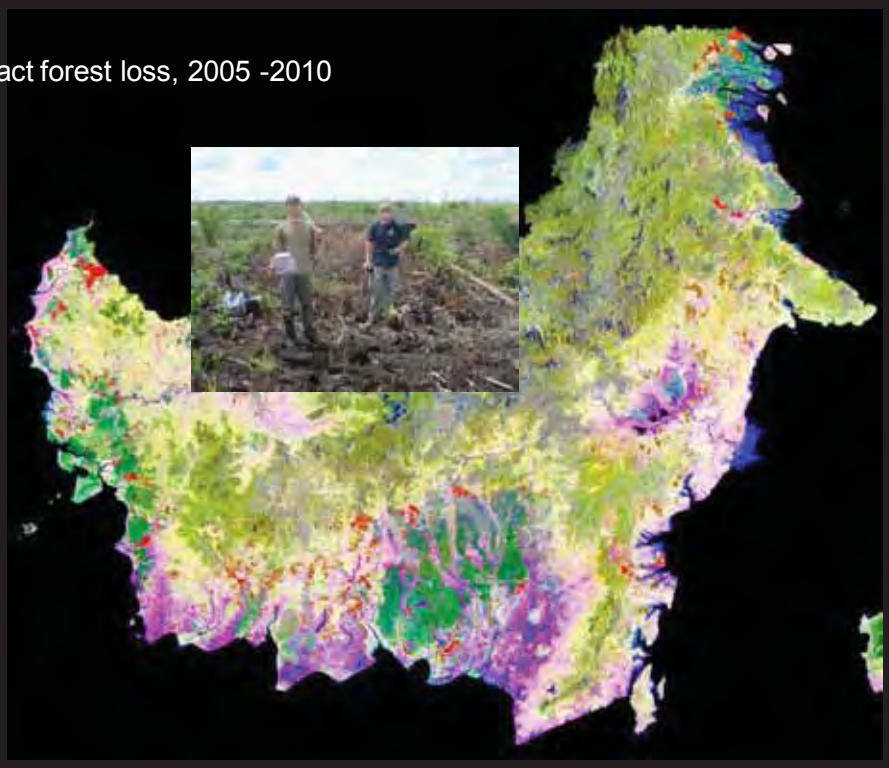
The Forest Cover Monitoring system is a public website that provides

- Objective, accurate data on forest cover change and plantation establishment (annual basis 2000-2010, then in 'real time'
- Oil palm concession maps and boundaries
- Facility to upload concession information (shapefile) and assess forest cover change
- Forest clearing alert tool – identifying new deforestation hotspots

- *Visit 400 randomly selected points in Kalimantan – to verify land cover.*
- *Collecting information on vegetation – current and signs of history of vegatation cover. and soil.*

Building a forest cover monitoring system

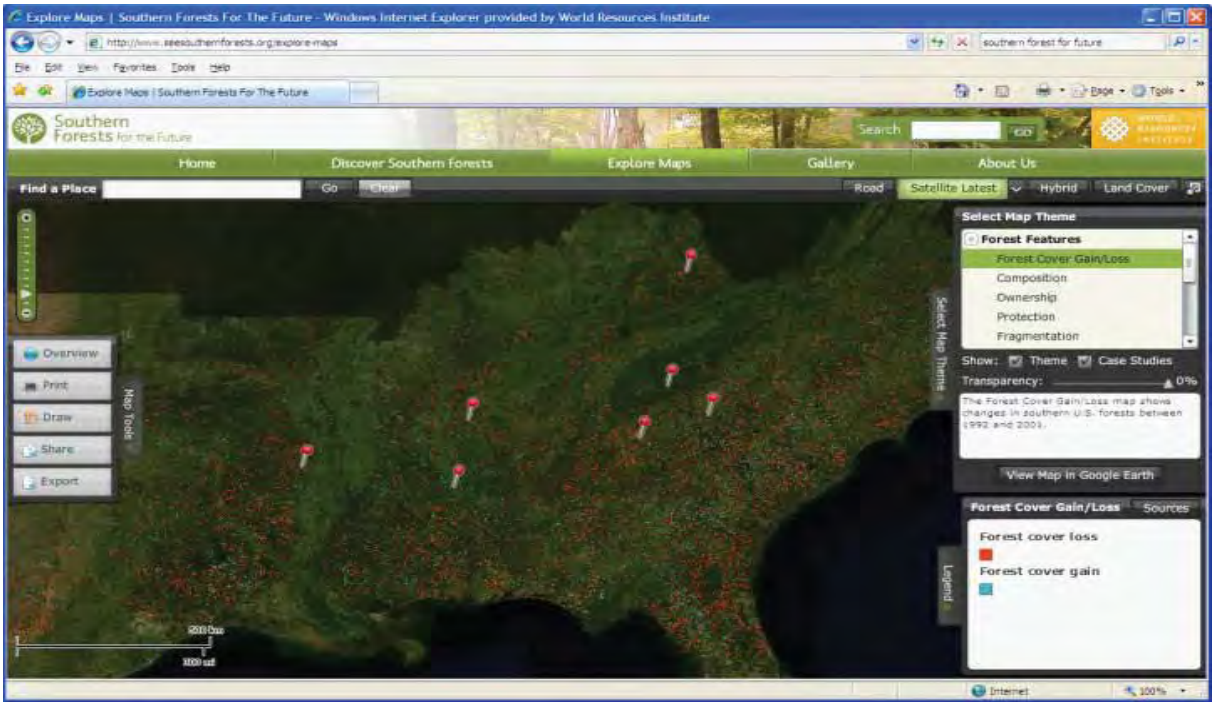
Intact forest loss, 2005 -2010



Tree cover change, 2000-2005 (derived from MODIS)

Clear cut between 2000-2005

Hatched = plantation concession + date granted



What the website might look like

In the acting profession they say that you should never work with children or animals, as they can be unpredictable.

When making presentations, the equivalent rule is never try to work with a live internet connection – these can be unpredictable too.

So I have taken that advice, but here is an example, of what the final product could look like (and this can be found online at the address shown).

For those of you currently online the only part of this presentation I ask you to listen to comes now ……I strongly suggest you take a look at this website. OK, on you go.

This screenshot shows tree cover loss (red) tree cover gain (blue), and pinpoints that allow the user to explore more information about particular areas.

A pinpoint can open a box that contains a case study of a particular plantation, including information such as date of establishment and description of best management practices, or history of the land area.

- Menu of themes and descriptions
- Map legends
- Zoom tool
- Cases – examples of use of tools or field sites
- Selection from among standard base maps (Bing maps and/or ESRI ArcGIS.com)
- Link to Resources page - listing data sources/references and handbooks for using tools

Users and Uses

Palm Oil Producer	→	Demonstrate year of establishment
	→	Show where forest cover change has not occurred
Buyer	→	Independent check on supplier
Financier/ Investor	→	Independent check on the deforestation history of potential client
RSPO	→	Monitor members
Government	→	Identify illegal or unplanned forest clearing
Community	→	Monitor forest conservation agreements with companies

Uses in Biosphere Reserve monitoring

- Reduce disagreements and improve clarity
  - Did deforestation happen? Where? When?
- Recognise good actors
- Bring certainly for private sector > increase investment
- Assist government with enforcement

Create common reference point for all stakeholders

- Conservationists, agriculturalists, investors, regulators and the people living there

Ethnoecological Monitoring of Mangrove Ecosystems in BR

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The Mangrove forest

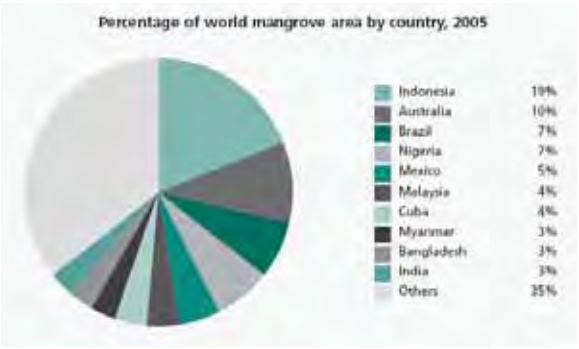
Distribution and Surface

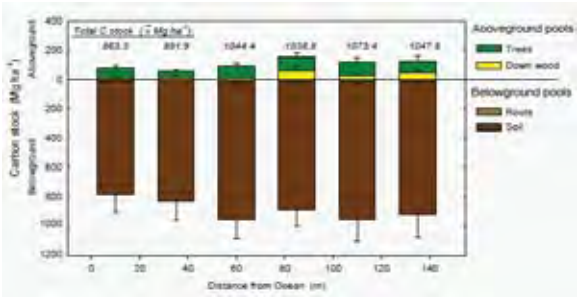
Ecological services; costal protection, food security, fish nursery, habitat for animals, filtering and trapping of pollutants, carbon stocks. The annual economic value of mangroves,

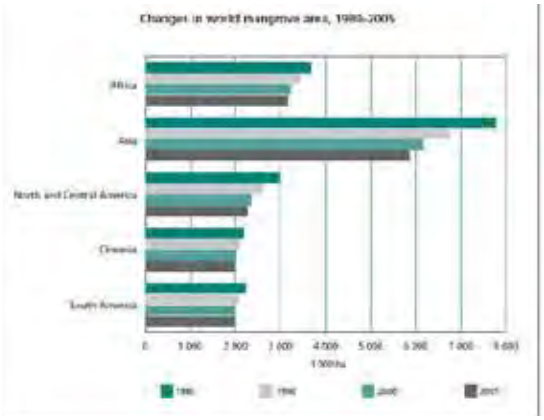
estimated by the cost of the products and services they provide, has been estimated to be $200,000 - $900,000 per hectare

Interactions in between human and mangroves is well documented, and local populations have a corpus of ecological knowledge of this ecosystem concerning its composition function and ecological processus

- Vulnerability to local and global changes
- Early warning ecosystems »







Source: UNEP World Conservation Monitoring Centre and International Society for Mangrove Ecosystems NGM Maps

61 BR have mangrove forest in 29 countries

Continent	N° BR Mangroves	N° Countries	Countries
Asia	18	9	China, India, Indonesia, Iran, Philippines, Thailand, United Arab Emirates, Viet Nam, Yemen
Central and South America	16	10	Brazil, Colombia, Cuba, Dominican Republic, El Salvador, (France), Guatemala, Honduras, Panama, Venezuela
North America	13	2	Mexico, United States
Africa	7	5	Guinea-Bissau, Kenya, Madagascar, Mauritania, Senegal
Oceania	7	3	Australia, Fed. States of Micronesia, Palau
Total	61	29	

The study site 2:

Vietnam, Can Gio Mangrove BR

After the war . . .

- Chemical effects harmfull to human beings and to the mangrove environment
- Low rate of natural regeneration
- No fuelwood

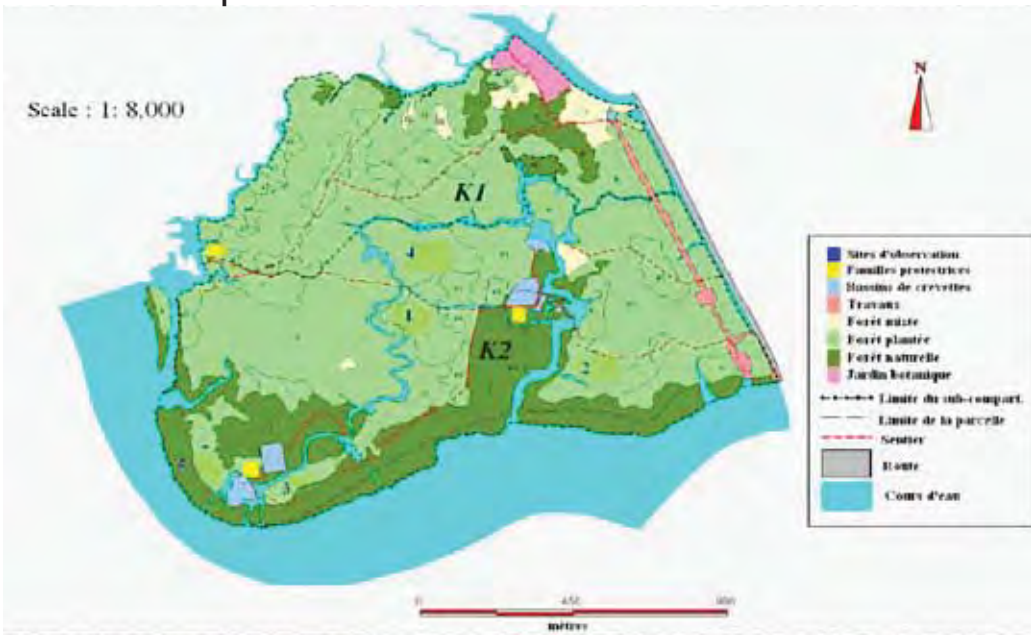
Can Gio mangrove forest in 1972

Local people must use the dead wood for cooking

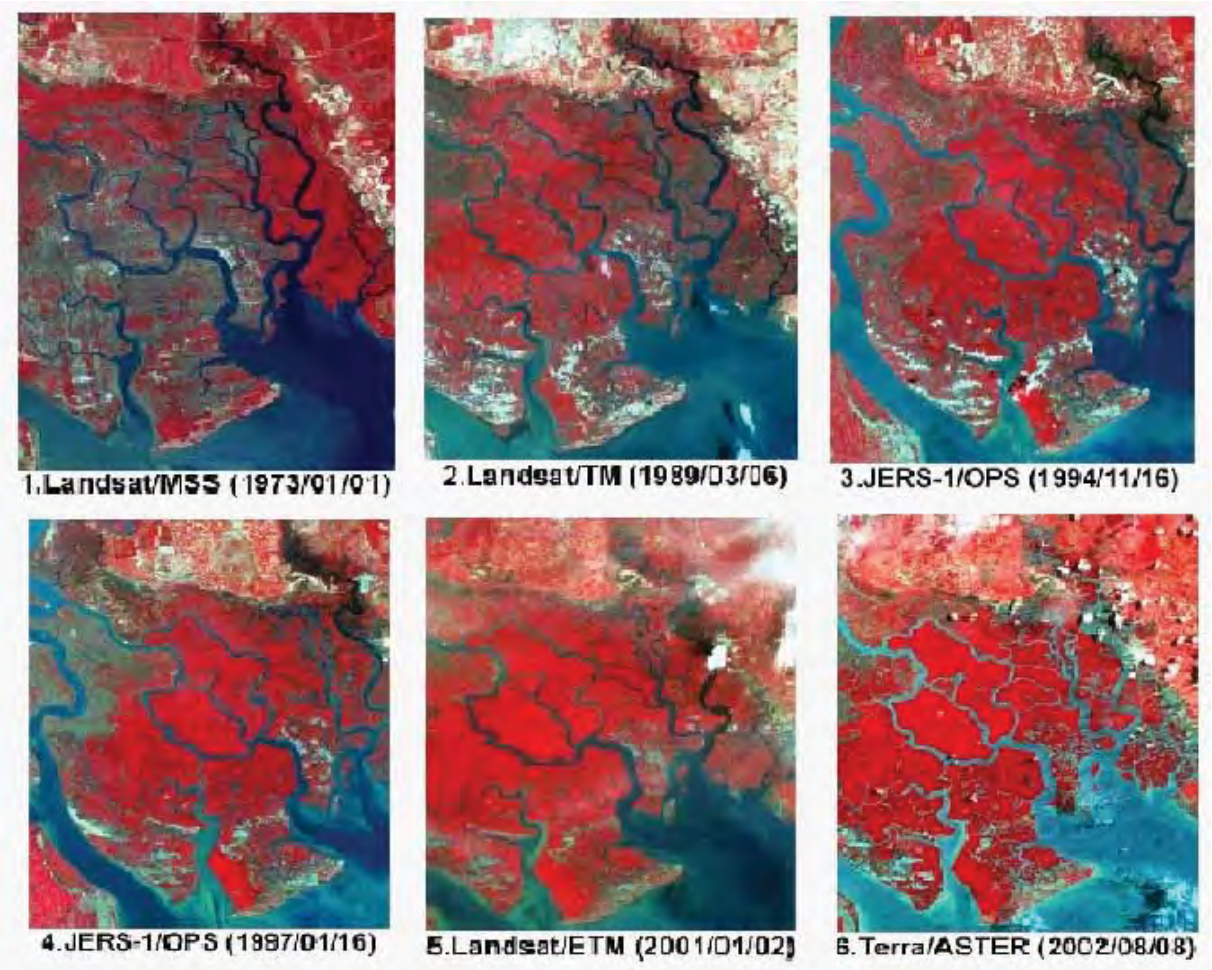
The Plantation of The Forest

- Plantation of *R. apiculata* started in 1978
- 21 000 ha planted in 22 years and 18 000 ha regenerated naturally

The role of the protective families



Colonization of The Vegetation Cover



Habitat	Surface (ha)	Percentage
Planted forest	122,2	69,3%
Natural forest	42,67	25,5%
Mix forest	4,64	2,7
Shrimp ponds	2,46	1,4%
Botanical garden	2,21	1,2%
Others	2,14	1,2%
Total	176,32	**100%**

Outputs…

- Important systems of Local Ecological Knowledge (LEK) in Senegal and Vietnam
- Need to share information and knowledge concerning mangroves in between BR
- Need to develop baselines and monitor gradual changes
- Need to centralize data specific to mangroves and enhance comparative research

Biosphere reserves mangrove monitoring website

testing some study cases. Mangroves and BR are not yet included in any study case but joint efforts in between BRWN and Pl@ntNet could efficiently enhance the sharing and knowledge of mangrove ecosystems in BR and promote specific monitoring in selected sites.

- Information, education and comparative research
- Adapted to the needs of the potential users (or community of users)
- New easy-access tools dedicated to: plant identification and the establishment of potential distribution maps

Pl@ntNet

Collaborative web oriented network dedicated to the gathering and sharing of informatics tools and botanical knowledge

Web-oriented scientific, informative and educational software platform about plant communities,collaborative gathering, share and use of large, multidisciplinary datasets on tropical plants. Global budget 11000000 dollars. Project started by AMAP in 2009,

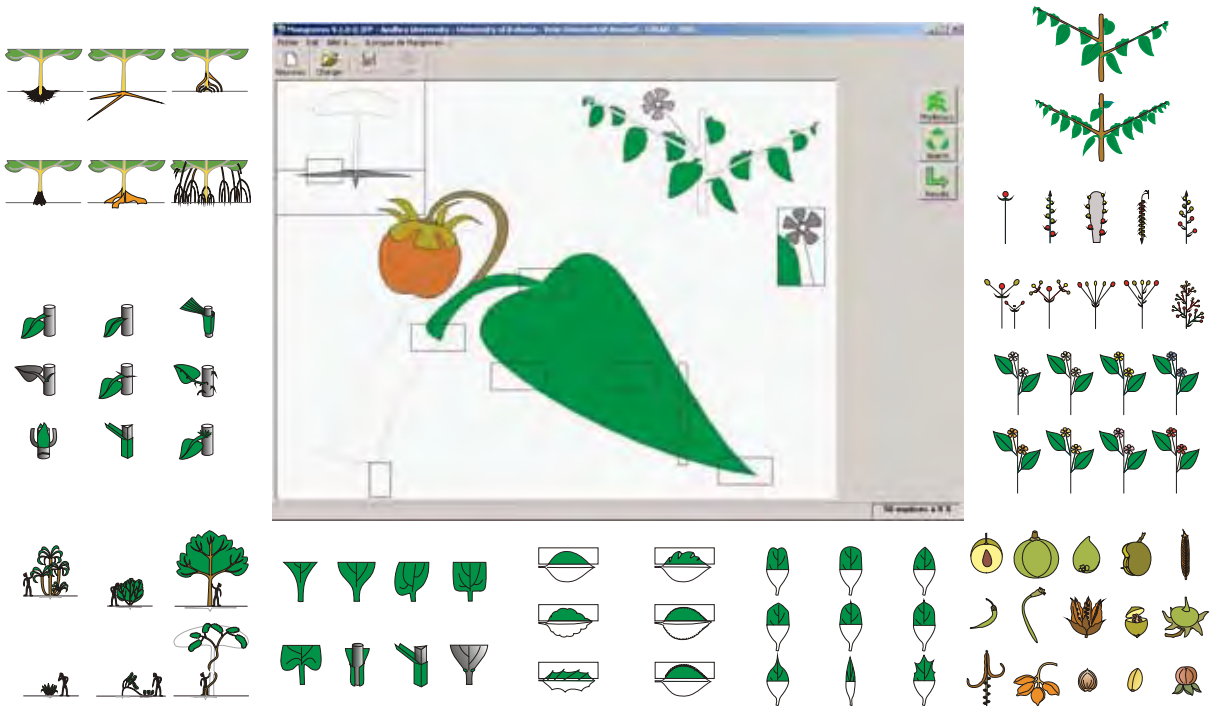
Mangrove species identification system IDAO

- Interactive graphical mode to help non-specialist identify mangrove species
- It is an attractive tool for capacity building, interactive learning, training stakeholders

Developed in the frame of a larger project concerning mangrove ecosystems in India and Sri lanka, computer aided identification system

(key identification) of mangrove species. The database now covers 50 mangrove and associated species. More species can gradually be added to cover a more extended geographical area.

Missing information or data are permitted thus allowing identification of incomplete samples Certain level of observational error are permitted. At each step of the identification process, a probability of



Identification system has been designed to remove the main difficulties encountered by non botanist when identifying species using standard flora.

- The ability to identify the species without its flowers or before it flowers;
- The use of dichotomous key, which cannot tolerate any error and imposes the choice as well as the order of questions; and
- The use of technical terms not understood by the non-specialists.

50 stricted and associated species from Inde & Sri Lanka, 19 charactères et 108 states of caractères, 500 pictures, 514 figures

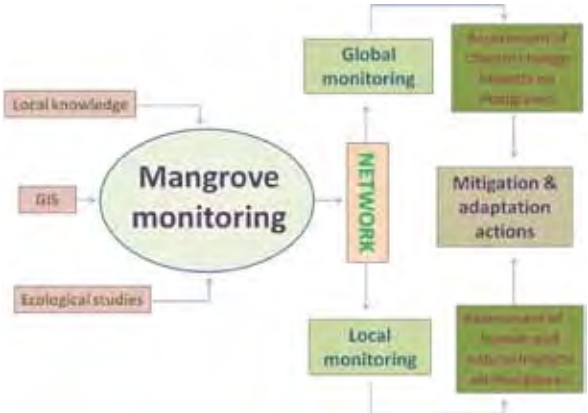
It only uses drawings instead of technical jargon.

It provides users the freedom to choose the character that needs to be described and the order of entrance.

resemblance is calculated for each species. Thus species are sorted by decreasing order of similarity.

Specimen Identification

Information about botanics and morphology, reproductive biology, regeneration, ecology, distribution uses. Contains pictures showing all the body parts of the plant. We can identify easily errors and ask for the specific character that could allow usto distinguish in between various specimens.



Adaptation: Initiatives and measures to reduce the vulnerability of natural and human systems against actual or expected climate change effects.Establishing mangrove baselines and monitoring gradual changes through regional networks will enable to distinguish site-based influences from global climate change, Mitigation is conservation and rehabilitation of mangrove forest will enhance carbon sinks, and reduce the potential of carbon leaking from this habitat.

Perspectives

- Integrate LEK in monitoring initiatives
- Monitoring: standardize indicators and agree on shared methods for diachronic and spatial comparisons
- Promote partnership
- Enhance south south cooperation and data sharing through a specific mangrove monitoring website in BR

Revitalization of Indonesian Biosphere Reserves Programme

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Abstract

The management of biosphere reserves in Indonesia has a goal to conserve and develop biological resources in the context of sustainable development. Indonesia has seven biosphere reserves and each have characteristics of biological species diversity, ecosystem, and socio-cultural aspects. The seventh biosphere reserve are: Cibodas Biosphere Reserve (West Java), Tanjung Puting Biosphere Reserve (Central Kalimantan), Lore Lindu Biosphere Reserve (Central Sulawesi), Komodo Island Biosphere Reserve (NTB), Siberut Island Biosphere Reserve (West Sumatra), Gunung Leuseur Biosphere Reserves (Aceh and North Sumatra), and Giam Siak Kecil- Bukit Batu Biosphere Reserve (Riau, Sumatra). To achieve these biosphere reserve management, several steps can be take, namely: research and development on biological resources, social and cultural aspect; establish and strengthen institutional management, establish management and action plan, strengthen the legal aspects, implementing technology appropriate on community development programme and establish cooperation with various parties both domestic institutions and international institutions. This presentation will discuss the various potentials, opportunities, and prospects for development of the biosphere reserve in Indonesia through cooperation and partnership between the parties, so that the development of the biosphere reserve in Indonesia will be more useful for conservation of biological resources and social welfare in the region and around the biosphere reserve.

Keywords:
Indonesia Biosphere Reserves, biodiversity, culture diversity, research and development cooperation, sustainable development

Introduction

National Committee for Indonesian MAB Programme is a focal point for the implementation of the programs and missions of UNESCO MAB in Indonesia. As for the implementation of the MAB programs and other programs related to sciences in Indonesia, the Indonesian government has assigned the Indonesian Institute for Sciences (LIPI) to manage the task. Further, in an ex officio condition, the Head of LIPI deliveres the task to the Deputy of Life Sciences. Essentially, the MAB Programs hold the mission of ensuring a harmonious, balanced relationship between human and their natural environment.

Indonesian MAB Programme has a long history, dating back to 1972, a few years after the International MAB Programme of UNESCO was established in 1968. The National Committee for Indonesian MAB has the mandate to implement the missions, programs and activities of MAB in Indonesia, especially in

relation with the "biosphere reserves". The MAB Programme is atempting to use biosphere reserves as a vehicle to implement the goals of the Convention on Biological Diversity (CBD) resulted from the 1992 Earth Summit, and emphasized further through Agenda 21, Sustainable Development and the Millennium Development Goals (MDGs). It is believed that biosphere reserves are important sources of information and data where people can learn. This, therefore, may provide support to what promoted by the UNESCO through the "United Nations Decade on Education for Sustainable Development" (DESD 2005 - 2014) for which the "Main Line Action UNESCO MAB Year 2006 – 2007" was developed as an effort to promote "linkage between biodiversity and cultural diversity".

MAB Programme is chiefly developed to improve the quality of relationship between human beings and their environment on the basis of science and technology. Specifically it is aimed to overcome the problems of utilization of biological resources that cause degradation (biodiversity lost), decrease in environment quality and unplanned land use. Such problems mainly stem from the people intention to exploit biological resources for economic benefit rather than for socio-cultural and conservation reasons. Therefore, the establishment of MAB programme has a mission to balance the seemingly conflicting goals of environmental conservation and socio-economic development as well as to mantain the noble values of a nation's culture. In short MAB programme is designed to promote and demonstrate the balance of the relationship between human and the nature through bio-regional approaches.

The main priority of MAB programme is to emphasize the implementation of biosphere reserve concept for achieving sustainable development. Biosphere reserves are used as a place to test and build a sustainable way of life through integrated programs of natural resources management and biodiversity conservation, with the objective to contribute in reducing poverty and increasing the living standard, especially of rural communities. In addition, the implementation of the biosphere reserve concept is also aimed to help reducing the loss of biodiversity, facilitating scientific development and building the capacity in the context of providing services necessary for ecological sustainability.

The Indonesian Natural and Cultural Richness

Natural ecosystems cannot be understood, conserved and managed without recognizing the human culture that shape them, since biological and cultural diversities are mutually reinforcing and interdependent. Together, cultural diversity and biological diversity hold the key to ensuring resilience in both social and ecological systems (Erdelen, 2003). Through the environmental sciences and cultural activities, in promoting awareness and understanding of the relationships between biological and cultural diversity is a key basis for sustainable development (Sukara and Purwanto, 2009).

Beside has high biological diversity Indonesia also possesses high cultural diversity. It doesn't marvel that Indonesia is the world's largest archipelago, containing more than seventeen thousand island extending in an east-west direction for five thousand two

hundred kilometers across the Sunda and Sahul continent shelves. The archipelago exhibits rich biodiversity that is unequalled in Asia (McNelly et al., 1990). Indonesia's territory cover 7.7 million square kilometer, of which approximately 5.8 million square kilometers (75.3 %) is comprised of marine and coastal waters. Indonesia is located between two of Earth's bio-geographic regions: Indo-Malaya and Oceania. The Indo-Malaya region to the west includes Sumatra, Kalimantan, Java, and Bali, and the Oceanic region to the east includes Sulawesi, Moluccas, the eastern Sunda Islands, and West Papua.

Dynamic interaction between people and biodiversity in Indonesia let to the creation of many different cultures and thus languages and dialects. More than four hundred Indonesian ethnic groups are dispersed in different regions. Indonesia boasts 665 different languages and dialects, with Papua accounting for 250 of these, Moluccas 133, Sulawesi 105, Kalimantan 77, Nusa Tenggara (Lesser Sunda Islands) 53, Sumatra 38, Java and Bali 9 (Grimes, 1988). Such ethnics have specific knowledge about how to manage their environment and biodiversity surrounding them. Every ethnic has a specific culture, knowledge and local wisdom and technique adaptation to their various environments.

Concerning the cultural richness in Indonesian, besides have advantages also constitute weaknesses for biodiversity resource management. One of these advantages is that we have various referable traditional pattern and alternative selection of space management and we have material to design system admissible management by all societies and also government. Meanwhile its weakness is that each ethnic has specific pattern according to environmental condition and cultural level. But along with time developing marks sense decentralization of policy in Indonesian, therefore local or region policy that based on actual condition area and society is more elegant compared with uniformity management which hasn't obviously fastened by other area that has different culture and environmental condition.

Biosphere Reserves as *in-situ* learning laboratories for sustainable development

In order to implement the biosphere reserve concept and realization of Biosphere Reserves as a storehouse of information and data as well as a place to learn (Biosphere Reserve as places for learning), we need a management plan through a comprehensive assessment in each biosphere reserve in Indonesia. Based on the objective conditions of availability of data, information, physical infrastructure and human resources, as well as work experience and networking that are available, The Indonesian MAB Programme proposed Biosphere Reserve and surrounding areas as a model area management for sustainable development (in-situ learning laboratory for sustainable development) in Indonesia. This model has a component of the research, education and training, conservation and economic development, and community empowerment involving stakeholders (stakeholders) as well as to provide a management solution based on the interests of ecology, ethics and social economics.
In the framework of the programme implementation of the Biosphere Reserves concept in Indonesia, Indonesian MAB designing action steps as follows:
Given the MAB-UNESCO had believed importance "to the linkage Between biodiversity and cultural diversity" and Indonesia is a country that has a cultural richness and high biodiversity, then we must develop and implement the concept of biosphere reserve management that has ecological benefits, ethical and economic well popularize the area of biosphere reserves as "in-situ learning laboratory for sustainable development".

State of the art Indonesian Biosphere Reserves

Problems related to the Biosphere Reserves

The efforts of Biosphere Reserve development in Indonesia still have many problems, especially on (1) Biosphere Reserve Concept has not been fully implemented by several stakeholders; (2) Collaborative management has not done entirely as expected; (3) Zonation system of Biosphere Reserve has not been done completely, only a few who already have the zonation system of BR: Cibodas BR, Siberut BR and GSK-BB BR; (4) Still exist illegal exploitation of natural resources: illegal logging, illegal poaching, illegal fishing, over exploitation, illegal trading, and Forest Fire; (5) BR has not been a strong legal basis (Government Regulation has not been determined); (6) Conflict interest between conservation and development; (7) Conflict on land use planning (conservation and economic interest); (8) Social-cultural and economic aspects: education, demography (urbanization), dependence of natural resources, etc.; (9) Socialization programà lack of resources; and (10) Fund raising

Steps to develop Biosphere Reserves:

In light of the importance in tackling the issues, the plan of action will support the implementation collaborative management as the key tool for the effective management of the Indonesian Biosphere Reserve. As the top priority, the proposed plan will focus on: (a) Establish of institutional management of BR; (b) Identify all stakeholders and build the same vision, mission, and the global objectives Biosphere Reserve; (c) Build the comprehensive and integrated management plan of biosphere reserve areas (core area, buffer zone and transition area); (d) Implemented the zoning areas; (e) Develop an action plan and pilot project development of buffer zones and transition areas in accordance with local conditions; (f) Capacity Building: Socialization, education and training; (g) Cooperation and networking with various parties including the private sector; (h) Legal Aspect; and (i) Trust Fund.

1. **Cooperation, management and communication**

   Coordination and communication between the parties conducted continuously to strategize the implementation of the biosphere reserve concept and its implementation. Consultation and coordination necessary for the preparation of strategy and management plan the management of Biosphere Reserves in Indonesia.

   So far, there has been important innovation in the management of conservation areas. New methodologies that facilitate the involvement of stakeholders in the decision making and in resolving conflicts have grown significantly and the related regional approaches have drawn bigger attention. Interesting current development in the management of conservation areas is the change in the managerial focus from merely conservation motivation into more acceptable combination of conservation and development through a wider cooperation within stakeholders and a suitable spatial site arrangement.

2. **Zonation Spatial site arrangement and development – linking functions to space:**

   Integrated spatial site arrangement is required for achieving sustainable and constructive management of natural biological resources and their environment. In term of biosphere reserves the arrangement is implemented by means of interrelated and inter-supportive zones, while integrated site development is done through suitable zonation. Principally, biosphere reserve zones consist of a

conservation zone as the strictly protected core area surrounded by a buffer zone that emphasizes the environmentally friendly management, and finally a transition area as the outer layer of the biosphere reserve that serves as an area of cooperation to develop potential species of economic and ecological values to promote sustainable development.

The implementation of spatial site arrangement and development is therefore managed by means of bioregional plan approach that integrates biodiversity conservation into sustainable development.

The concept of biosphere reserve management has to be designed properly in order to deal with the challenges of harmonizing the goal of biodiversity conservation with the needs for socio-economic development and at the same time also preserving the cultural values existed in the area. This means that, in addition to suitable spatial site arrangement, integrated site management have to be based also on the participation of all relevant stakeholders, including the surrounding communities.

One of the advantages of applying biosphere reserve concept in managing a conservation area is that the management of the conservation zone (core area) is not merely focusing on keeping and protecting the zone, but there should also be integrated efforts to develop the surrounding areas. In this regards, the establishment of the buffer zone and transition area is in fact aimed to secure the conservation area and at the same time to improve the quality of the surrounding areas through economic development that utilizes the potency of natural resources existed in the site. The following steps are needed:

- Spatial arrangement of the site according to a zonation model that emphasizes conservation and development.
- Management with ecosystem approach. This means that in addition to protecting the conservation area, there should be efforts to develop the surrounding areas (buffer and transition areas) for securing the conservation area and integrating the cultural diversity with biodiversity, especially in term of the roles of traditional knowledge in the ecosystem management.
- Management with participation approach that emphasizes the involvement of relevant stakeholders, most importantly the local communities, in the management of the site;
- Spatial site arrangement based on the related functions and roles for avoiding conflict of interest in the utilization of natural resources;
- Management based on scientific studies (research) with appropriate monitoring and evaluation activities;
- Implementation of the site management that prioritizes the needs of improving the community life quality through the utilization of potential natural resources without disturbing conservation efforts in a sustainable development framework.

3. Science and capacity enhancement

Various applied research activities can be done in this area; among them are scientific exploration of biodiversity and other potency of the natural resources. This is very important for the management of biosphere reserve area that should be based on scientific data and reliable knowledge concerning the site; Identification of the cultural resources and the local knowledge of communities inside the site and the surrounding areas for the management of the biological resources and their environment; Valuation of various important and potential biological resources to be developed into economic cultivation plants for the communities in the buffer and transition zones; the

development of ecotourism, silviculture of potential biological resources, and research on the suitability of land use. For the implementation of these applied research activities, a suitable "term of reference" is needed to provide guidance to those involved in the pilot project activities.

4. Partnerships

The Biosphere Reserve management is more appropriate when it is managed by multi-stakeholders, from the element of government, private sector, community and NGOs within the Biosphere Reserve area. For stakeholders outside the Biosphere Reserve area, their roles will be concentrated for the achieving the objectives on consultation, advocacies, capacity building, funding support, and relevant development ideas to Biosphere Reserve concept. Therefore, partnership or collaborative management will be more suitable for the Biosphere Reserve management.

5. Implementation, monitoring and evaluation

This activity is in a close association with those of identification of knowledge and assessment of the whole activities conducted in the BR. Evaluation is an important step toward the determination of integrated steps for the management of biosphere reserve, especially in identifying the implementation of the biosphere reserve concept. The evaluation includes:

(a) Evaluation of ecological impacts. This is to identify the kind of management activities conducted in this area that cause negative impacts to the core area and other areas, the kind of productions activities that have been in accordance with the sustainable use of the resources and the adaptation strategies that should be developed for the preservation of natural resources?

(b) Evaluation of economic impacts. This is to identify the kinds of management activities (biological resources management) conducted in the BR that are adventitious economically.

(c) Evaluation of social impacts. This is to identify the impacts of management activities to the various social aspects, such as employment opportunities (seasonal or long term basis) and general life quality improvement (education, health, security, freedom, and others).

(d) Evaluation on the Impact related with equity: This means to analyze the natural resources utilization practices from the perspective of social and its equity for inter-generation (equal rights between man and woman) and also from the perspective of global connection (bridging the gaps between North and South).

(e) Evaluation between the Spatial Planning and the Implementation: One thing that needs to be added from the procedure is to evaluate the appropriateness between the spatial planning and its implementation. Sometimes the spatial planning has not been well implemented at the field level.

An evaluation of interaction relationship among the natural resources user can be facilitated by creating a table. This table can be used as foundation for any further discussion on natural resource utilization. With this table, a specific working group can be formed and discuss the problem solution.

This monitoring and evaluation of Indonesian Biosphere Reserve implementation is very important for: (a) Periodic review of 7 Indonesian BRà In 2010 has done 4 BR (Cibodas BR, Komodo BR, Tanjung Puting BR, Lore Lindu BR) and in 2011 will finishing the 3 BR (Siberut BR, Gunung Leuser BR and GSK-BB BR); and (b) Evaluation of of MAP (Madrid Action Plan): this evaluation has finished for 7 Indonesian BR and has been submitted to MAB-UNESCO Headquarter in 2010.

The Programme Implementation

1. **Establishment of institutional management of Biosphere Reserves:**

   Preparation activity of the institutional management of biosphere reserves in each biosphere reserve in Indonesia is carried out by involving the parties in the biosphere reserves area. Indonesian MAB Programme National Committee for participated designing and facilitating the formation of these institutions. In the year 2010 has formed the institutional management of 2 biosphere reserves, are: (1) Coordination and Communication Forum of Management of Cibodas Biosphere Reserves are established through Decree of the Governor of West Java No S22.51/Kep.157-BKPPW 1/2010, and (2) Biosphere Reserve Management Coordinating Board Giam Siak Kecil-Bukit Batu, Riau set by Governor of Riau Decree No 920/V/2010; and (3) Coordination to prepare the establishment of management institution in Komodo BR, Lore Lindu BR, Tanjung Puting BR, Siberut BR, and Leuser BR.

   The institutional management of BR consists of the "managers" representing the local government, administration, groups, private bodies, NGOs and scientists. In order to develop the Biosphere Reserves as a "laboratory for ideas" it is important useful to establish an ad-hoc working group to take the tasks of management of BR and to perform depth examination on specific topics.

   The institutional management has the following tasks: (1) Establish agreement on the scope of Biosphere reserve area (including zoning) based on the regional site spatial arrangement policy (district/ municipal, province, or national), (2) Develop understanding on the vision, mission, and common objectives of Biosphere reserves management; (3) Integrate the parties policies (planning) concerning the development of Biosphere reserves; (4) Monitoring the implementation of regulation by the parties relevant to the concept of biosphere reserve; (5) formulate plans and priorities for the management activities of biosphere reserve; (6) Formulate solutions à conflict of interest between the parties, and (7) Prepare the proposal à fund rising, and (8) Carry out development activities.

2. **Establishment of the zoning system**

   The advantage of applying the biosphere reserve concept lays on the excellent combination of its three functions, namely: (a) the function associated with conservation of biological resources, ecosystems, and cultural diversity. This function provides contributions to the conservation of landscapes, ecosystems, species, and germplasm, as well as cultural diversity; (b) The function associated with development that supports and enriches sustainable economic development through an ecologically and culturally wise approach; and (3) The function associated with provision of logistics supports for various activities related with conservation and sustainable development, in a local, regional, national, or global context, including research, education, training, and monitoring.

   In implementing those three functions integrative, a zonation approach is applied, in which the site of biosphere reserve is divided into 3 different areas with specific functions and roles: (1) The core area. It is the area for conservation and it must have a firm, long-term legal protection for preserving the biodiversity, monitoring the undisturbed ecosystems or undertaking non-destructive research, and other "passive" activities such as education and training. The core areas of 6 biosphere reserves in Indonesia are National Parks owned by the State. However, this doesn't

mean that the core area must always be a National Park, but it can be a site owned by individuals, non-governmental organizations or institutions, communities, or traditional inhabitants that is allocated for conservation purposes. In principle, a core area must be a conservation area or a protected area supported formally by a governmental regulation or informally by traditional law (traditional institutions). In Giam Siak Kecil-Bukit Batu Biosphere Reserve, which is the seventh Indonesian biosphere reserve, the core area is composed by conservation areas (Suaka Margasatwa Giam Siak Kecil and Bukit Batu) and a production forest set for permanent conservation uses (Sinar Mas Forestry); (2) the buffer zone. It is the area encircling or adjoining the core area that is determined to provide protection to the core area against the negative impacts of human activities. The area of buffer zone can be a site owned by individuals, communities, institutions or others. The management of this area is conducted by the owner, but it should be run in accordance with the government regulation. Basically, activities that can be done in this area are those that are sound ecologically, such as research, education, training, ecotourism, and sustainable utilization of biodiversity or other renewable resources; and (3) The transition area. It is typically the largest part of the biosphere reserve area functioning to developed cooperation with local communities. It is established side by side with the buffer zone and may be owned by individuals, organizations, private institutions, or other legal bodies. This area is a place to developed models for sustainable development, in which the owner(s) together with relevant stakeholders develop an appropriate management of natural resources for the area.

The buffer zone and the transition area serve as a corridor whose function is to protect and ensure the functions of the core as a conservation area of the natural biological resources within. For effective management reasons, there should be a clear border line between the existing zones, since the development of each zone may be implemented in a different way.

- **Cibodas Biosphere Reserve:**
  The zoning system in Cibodas Biosphere Reserve is consisting of Core area (Gunung Gede Pangrango National Park, 22.851 ha); Buffer Zone (Cibodas Botanical Garden, Tea Plantation, Indonesia Safari Garden, Agropolitan area, etc., 12.700 ha); and Transition area (Horticulture, Settlement, Industrial area, dry field, rice field, etc., 80.104 ha).

- **Komodo Biosphere Reserve:**
  Komodo Biosphere Reserve lies in the Wallacea Region of Indonesia, identified by both WWF and Conservation International as a global conservation priority area. This is a transitional zone between the Australian and Asian fauna and flora, containing elements of both. Komodo Biosphere Reserve is located between the islands of Sumbawa and Flores, at the border of the Nusa Tenggara Timur and Nusa Tenggara Barat provinces of Indonesia. The core area is KNP includes three major islands, Komodo, Rinca and Padar, and numerous smaller islands together totaling 603 square kilometers of land. The core area of the Komodo Biosphere Reserve is Komodo National Park (173,300 ha consist of terrestrial Core Area(s) 40,728 ha and marine Core Area(s) about 132,572 ha). Buffer zone and transition area of this BR is Mesa Island and 2 Districts of Sumbawa and Flores about 464 km2.

Indonesia has 6 Biosphere Reserves: (1) Cibodas Biosphere Reserve (the core area is Mount Gede Pangrango National Park); (2) Siberut Biosphere Reserve (the core area is Siberut Island National Park); (3) Leuseur Biosphere Reserve (the core area is Mount Leuseur National Park); (4) Tanjung Puting Biosphere Reserve (cthe ore area is Tanjung Putting National Park); (5) Lore Lindu Biosphere Reserve (the core area is Lore Lindu National park); and (6) Komodo Island Biosphere Reserve (the core area is Komodo Island National Park).

- **Tanjung Puting Biosphere Reserve:**
  The zoning system in Tanjunt Puting Biosphere Reserve is consisting of core area of Tanjung Puting National Park (415.040 ha), buffer zone and transition area are District of Kota Waringin Barat.

- **Lore Lindu Biosphere Reserve:**
  The core area of the Lore Lindu BR is Lore Lindu National Park, LLNP (217,991.18 ha); Buffer Zone (Tea plantation in Napu, resettlement, rice field, cacao and coffee plantation, dry field, etc.); and transition area (Horticulture, Settlement, Industrial area, dry field, rice field, etc.

- **Siberut Biosphere Reserve (403,300 ha):**
  Core area of Siberut Island Biosphere Reserve is Siberut National Park with an area of 190.500 ha (based on Forestry Ministerial Decree No. 407/Kpts-II/1993). Buffer zone and transition area consist of an area of resettlement, agricultural area (plantation, traditional agricultural, garden, forest area, etc.).

- **Gunung Leuser Biosphere Reserve:**
  Core area of Gunung Leuser Biosphere Reserve is the Leuser National Park with an area 1.094.692 ha. Buffer zone of this BR is the Leuser Ecosystem Area, and the transition area is not yet established.
- Giam Siak Kecil-Bukit Batu Biosphere Reserve: Giam Siak Kecil-Bukit Batu Biosphere Reserve (GSK-BB) resides in two residence, Bengkalis Residence and Siak Residence, Riau Province. GSK-BB Biosphere reserve is 705,271 ha included: (a) the core area of Giam Siak Kecil-Bukit Batu Biosphere Reserve (GSK-BB BR) covers a total area of 172,055 ha of pristine lowland peat swamp forest. The core area consist of Giam Siak Kecil Wildlife Sanctuary of 75.000 ha, Bukit Batu Wildlife Sanctuary of 24.800 ha, and a classified Production Forest of 72.255 ha under Sinar Mas Forestry management which is set aside by the company for long-term/ permanent conservation purposes. The company's contribution represents a 72 % increase in the core area, as ecological corridor linking the two Reserves into a contiguous block of natural forest. The area of Bukit Batu and Giam Siak Kecil landscape is part of the Sumatran Peat Swamp Forest Eco-region recognized as critical/endangered ecosystem; (b) The buffer zone consists of a total area of 222,425 ha of which 88 % is managed by Sinar Mas Forestry and its Partners for industrial pulpwood plantation development and the remaining area of 12 % by other stakeholders. The boundary and clear responsibility of the land within the buffer zone is important to protect and safeguard the integrity of the core area. Sinar Mas Forestry and its Partners have important role to conserve the core area since the plantations serve to buffer against encroachments and other disturbances; (c) Transition Area (± 304.123 ha) is the most wide part of Biosphere reserve. This area consisting mainly as settlements, oil palm and rubber plantations, paddy fields, scrublands and other areas generally classified for non-forestry use. The transition zone is bounded in the north by Selat Panjang coast and in the south and southeastern boundary by the Siak and Mandau Rivers and to the west by the Trans-Sumatra Highway.

3. Community Development Programmes

Various applied technology activities can be done in this area; among them is the development of bio-village programme such as: organic agriculture, bio-energy, water purification, fishery development and ecosystem restoration. For the implementation of these applied technology activities, a suitable "term of reference" is needed to provide guidance to those involved in the pilot project activities.

The economic development through the implementation of sustainable development will be one of the development priorities within the Indonesia Biosphere Reserve, particularly to accelerate the community development process. Sustainable utilization of biodiversity and natural resources for the community welfare through the activities development on researches, science, education, tourism and recreation, and support the cultural interests. Furthermore the community development will also be carried out through the development of agriculture and also the development of non-timber forest products.

The specific value of the Indonesian Biosphere Reserve is to combine and integrate the following principal roles: (a) protection of tropical forest ecosystems and their long-term productivity and functional capacity; (b) support should be targeted toward economic development option in the various aspects of the economy, e.g. sustainable of the forest plantation, oil palm plantation, organic farming, ecologically adapted forest management, and environmentally and socially compatible with ecological services (ecotourism, REDD) and develop potential species of flora and fauna for improve people's economic and prosperity; and (c) improve human resources specially local potential stakeholder to develop skills for constructive participation on Biosphere Reserve management.

By taking active steps to protect natural resources, we are not only helping to improve socio-economic of local people and conserve biodiversity resources and environment, but also give the value of the natural resources for our future.

Indonesia believes that to ensure sustainable development it is imperative to integrate the socio-economic and natural resources conservation and continuous improvement of ecosystem quality. It is expected through this development, the community welfare can be improved while respecting socio economic and cultural aspects. The rise of the new understanding that economic development needs the sustainability of natural resources provides hope in the realization of the biosphere concept of management in Indonesia.

The Biosphere Reserve enables stakeholders to achieve stable and healthy economic development practices and strong attitude in understanding the importance of natural resources conservation for the future of man-kind.

- **Bio-village Development Programme**
  Development of rural areas in an integrated manner is through appropriate technology to increase revenue and environmentally friendly. Integration of appropriate technology applications are: (1) Purification of peat water into fresh water ready to drink: Peat water purification (IPAG60) ⊠ Production capacity 60 liter/minute. This project aims to provide potable water by treatment of peat water in using the Peat Water Treatment Installation unit referred as Instalasi Pengolahan Air Gambut (IPAG). Peat water characterized by low pH and brownish red color, thus, the installation of water treatment plant that is able to improve the quality of water as potable water is needed; (2) Organic agriculture: horticultural crops ⊠ Input technology based on local resources ⊠ Development of bio-fertilizer and development of plant cultivation using pot and re-greening program; (3) Bio-energy: a combination of cattle breeding and supply of energy. This project is LIPI Pilot project of 10,000Watt Electricity. The project use Methanogenic bacteria to break down organic materials into biogas for cooking and electricity and waste to organic fertilizer. The

advantages of this programme are: (a) Prevent forest destruction; (b) Improving environmental quality; (c) Improving agricultural land, and (d) Increasing prosperity; (4) Fisheries development in peat-lands; and (5) Ecosystem Restoration: Cibodas BR (tree adoption program), Gunung Leuser BR (ecosystem restoration sponsor by Spain Government and UNESCO), GSK-BB BR (private sector), Siberut BR (private sector: Global green), Tanjung Puting BR, and Komodo BR (habitat restoration).

- **A model of Community Development "Republik Telo"**
  - » Goal : to increase the income of famers by development of integrated agribusiness
  - » Location: TN. BG Purwodadi,
  - » Area 20 ha in Purwodadi , East Java
  - » Producing more 40 based sweet potato derivate products
  - » Replace of 85 % imported wheat flour
  - » Involving farmer from production and end market share

- **Research and development for substitution wood log based**
  - » Top Score in Golden Era
  - » Indonesia = More than 20 million m3 (> 6 Billion USD) annum
  - » Adhesives more 1 million ton (> 400 million USD) annum
    a. Utilization bamboo fiber for wood panel and LVL
    b. Biomass Waste for Eco House Replaced Timber Logging
    c. Green Gold From Diversity Genes hunting and post genomic Era Biodiversity for addressing global climate change and MDGS ACHIEVEMENT

- **Ecosystem restoration: case in Gunung Leuser Biosphere Reserve**

  Reforestation of degraded land through tree nursery and replanting projects in Forest Block of Sei Serdang, Gunung Leuser National Park (core area of Gunung Leuser BR) is supported by UNESCO and Spain Government. This project involves the restoration of cleared forest in the Sei Serdang region of the Gunung Leuser National Park (GLNP). This programme is work in close collaboration with national park authorities and local people to undo damage caused through illegal conversion of protected land into plantation agriculture (palm oil plantation). This project has facilitated the establishment of a group of farmers in this area who are committed to supporting the rehabilitation of Gunung Leuser National Park and actively participate in the protection of the national park from further encroachment. In addition to forest rehabilitation, the project provides sustainable alternative livelihood schemes for local people living adjacent to the park. They benefit from the restoration of natural ecological services (having previously suffered droughts as a result of high water uptake from the illegal planting of oil palms), and also receive agroforestry and business development training. Indigenous tree species planted include sungkai (Peronema canescens), pulai (Alstonia scholaris), durian (Durio spp.), jengkol (Archidendron pauciflorum), merbau (Instia bijuga), meranti merah (Shorea leprosula), cengkuang (Scrutinanthe brunnea) , cempedak (Artocarpus champedan), etc.

4. Research and Development:

As mentioned before, the scientific research has the main role in the management of Biosphere Reserve. The participation of scientist from various fields of natural science and socio-culture will be important to describe the management guideline of

Biosphere Reserve. The theme is expected to be based on the objective knowledge of the area and the basic needs of the community with the long term observation. The Biosphere Reserve must encourage the scientist to study various issues and questions on the land management and supporting the research programme that can provide answers to those issues and questions.

5. Programme activities in Biosphere Reserves

- **Cibodas Biosphere Reserve:**
  Maintenance of ecosystem diversity and establishment of beautiful landscape to serve million people in the city.

  In light of the importance in tackling the issues, the plan of action will support the implementation collaborative management as the key tool for the effective management of Cibodas Bioshpere Reserve. As the top priority, the proposed plan will focus on: (1) Establishment of Institutional management (Decree of Governor of West Java); (2) Conservation Program: Tree adoption, village conservation program, ecosystem restoration); (3) Research and Biodiversity monitoring (LIPI, CII, IPB, ETC.); (4) Community Development Programme (GGPNP, Local Government, NGO, Private Sector); (5) Capacity building: environment education (GGPNP, LIPI); (6) Integrated management and action plan; (7) Ecological services: REDD+, Carbon stock, Tourism Development; (8) Fund raising à ITTO (GGPNP)

- **Komodo Biosphere Reserve:**
  Assurance for the most endangered and protected species as well as to sustain beautiful of biology diversity

  The development strategy of Komodo BR will focus on: (1) Establishment of institutional management and co-management; (2) Revise and Integrated Management and Action Plan; (3) Ecosystem Services: Ecotourism Development; (4) Restoration of habitat and stop illegal fishing; (5) Campaign to enter one of the wonders worlds; and (6) Establishment of zoning system.

- **Tanjung Puting Biosphere Reserve:**
  Assurance for the most endangered and protected species as well as to sustain beautiful of biology diversity

  The proposed programme will be implemented in Tanjung Puting Biosphere Reserve area are: (1) Coordination and socialization of revitalization of BR; (2) Establishment of institutional management, integrated management and action plan; (3) Community development; (4) Ecosystem services: ecotourism development, REDD+, Carbon stock study; (5) Ecosystem restoration; (6) Establishment of zoning system, etc.

- **Lore Lindu Biosphere Reserve:**
  This Biosphere Reserve has a role as *in-situ* laboratory of traditional knowledge for enhancement of sustainable development.

  As the top priority, the proposed plan will focus on: (1) Coordination on revitalization of Lore Lindu BR (establishment of institutional management, management and action plan, community development in buffer zone and transition area, Etc.); (2) Establishment of BR zoning system; and (3) Research cooperation (Gottingen Univ., IPB, Tadulako, LIPI)

- **Siberut Biosphere Reserve:**
  In-situ laboratory of traditional knowledge for enhancement of sustainable development.

  The proposed programme will be implemented in Siberut Biosphere Reserve area are: (1) Collaborative

Management; (2) Community Development and Ecosystem Restoration; (3) Establishment of Institutional Management, Integrated Management and Action Plan; (4) Ecotourism Development; and (5) Revise of zoning system, etc.

- **Gunung Leuser Biosphere Reserve:** Maintenance of ecosystem diversity and establishment of beautiful landscape to serve million people in the city.

  The proposed programme will be implemented in Gunung Leuser Biosphere Reserve area are: (1) Establishment of Institutional Management, Integrated Management and Action Plan, Zoning System; (2) Ecosystem Restoration (TNGL and UNESCO Jakarta Office); (3) Ecotourism development: illegal loggers become ecotourism activities at Tangkahan village; (4) Fauna conservation program; (5) Community development; and (6) Capacity building, Etc.

- **Giam Siak Kecil-Bukit Batu Biosphere Reserve**
  The economic development through the implementation of sustainable development will be one of the development priorities within Giam Siak Kecil-Bukit Batu Biosphere Reserve, particularly to accelerate the community development process. Sustainable utilization of biodiversity and natural resources for the community welfare through the activities development on researches, science, education, tourism and recreation, and support the cultural interests. Furthermore the community development will also be carried out through the development of aquaculture in Tasik and also the development of non-timber forest products.

  The development priority will focus on (1) Establishment of institutional management (Decree of Governor Riau); (2) Community development (Bio-village Programme (2011-2013); (3) Research Cooperation Programme (LIPI, Kyoto Univ., Univ. Riau, BBKSDA, SMF); (4) Station Research Development (SMF, 2011), etc.

  To achieve the goals and objectives of the "Revitalization and Implementation Concept of Biosphere Reserves as Models Management for Sustainable Development in Indonesia", used several approaches including:

6. Socialization of the application of the biosphere reserves concept

Socialization of the implementation of the biosphere reserve concept performed with the following objectives: increasing public awareness and concern on the importance of the biosphere reserve area. Dissemination activities carried out by organizing workshops and seminars in cooperation with the National Parks, Local Government, Universities and other stakeholders.

Socialization is directed at all stakeholders in the buffer zone and transition, especially local governments, potential stakeholders, local universities and communities in the area of the buffer and transition areas.

7. Small team building academic study and preparation of the draft of Government Regulation (RPP) of Biosphere Reserve

Academic study and preparation of the Government Regulation draft (RPP) of Biosphere Reserve is done by forming teams and feeding study consisted of 9 peoples. Academic study and preparation of the draft of RPP begins with review and analysis of regulations and laws concerning natural resources management and conservation in Indonesia, Spatial Planning

Act, and other Government Regulations.

8. Increased capability and capacity building in the area of biosphere reserves

In order to increase knowledge and skills of the community in surrounding areas of biosphere reserves, the MAB-UNESCO Indonesia Programme-LIPI conduct Environmental Education and Care for Nature (PLPA) and other public awareness activities. PLPA is intended for high school students and the community in Biosphere Reserves and surrounding areas with the aim of (a). Encourage high school students and the community to have the attitude and behavior that appreciate the value of biological resources and non bio of his life, (b). Develop knowledge and understanding of high school students and the public about natural phenomena, such as natural selection process, the cycle of the food chain, the impact of human activities to environmental changes, and expected the students able to understand the rules of the balance of the relationship between man and nature, (c). Increasing awareness and concern for the students and the community on environmental conditions and its influence on daily life, (d). Forming a new generation of cadres who are more concerned towards the management and utilization of natural resources oriented to the interests of ecology, economics and ethics. PLPA programme conducted by the MAB-UNESCO-LIPI Indonesia has the peculiarity of the participants in addition to theoretical knowledge taught in the classroom environment in field observation techniques (method of observation, research techniques), oral presentation and scientific writing.

9. Dissemination of information and print media

Dissemination of information about the concept of Biosphere Reserves is to support knowledge and education in various ways including:

- Development of the website: www.mab-indonesia.org; up-date data biosphere reserves of Indonesia, a link to the website of the National Park that became the core areas of biosphere reserves, and others.
- Preparation of posters, leaflets, teaching aids innovation for public awareness, and others.
- Publication of scientific papers, proceedings, and other scientific publication related to biosphere reserves Indonesia
- Digitizing slides and pictures of documents with tools that are available tailored to the system that allows the user documentation

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Future Perspective of Biosphere Reserves in Indonesia

a. Biosphere reserve concept will be applied in the management of all conservation areas in Indonesia
b. Protection of tropical forest ecosystem and their long-term productivity and functional capacity
c. Providing support the main target toward economic development option in the various aspects of the economic e.g. sustainable of the forest product (NTFPs) management, the development of potential species of flora and fauna for improvement of people's economy and prosperity.
d. Improving human resources, especially local potential stakeholder to develop skill for constructive participation in BR management
e. BR implementation not only helping to improve socio-economic condition of local people and conserve biodiversity research and environment, but also pass in the value of the national resources for the future generations
f. Conservation areas managed used the

biosphere reserve concept should be able to provide a favorable benefit both economically and ecologically.

g. Become a center for conservation education
h. Become a laboratory for sustainable development
i. BR area should be useful for conservation and community economic development
j. As a model for conservation management in Indonesia

The MAB programme activities have been planned can be generated by achieving the following outcomes:

1. Biosphere reserve concept has been implemented in each biosphere reserve in Indonesia
2. Institutional management has been formed following the biosphere reserve management plan and action plan.
3. Establishment of the draft of Government Regulation on Biosphere Reserves
4. The concept of Biosphere Reserves has been disseminated and increase public awareness about the management concept of biosphere reserves in Indonesia.
5. Data base on Indonesian Biosphere Reserve
6. The implementation of coordination and cooperation between the parties in the management and development of biosphere reserves in Indonesia.
7. The concept of Biosphere Reserves to be a reference management of conservation areas in Indonesia.

Conclusion

The management of conservation areas should not be aimed solely to maintain and protect the conservation areas, but it should also emphasize integrated management approach of bioregional conservation area and the surroundings. The Biosphere Reserves concept needs to be implemented so that the advantage may be useful for the management of the conservation areas and for the socio-economic and cultural interests of the surrounding communities. The advantages of the application of the concept lays on the balanced combination of the three functions, namely: (1) Function associated with the conservation of biodiversity, ecosystem and cultural diversity, (2) Function associated with sustainable economic development that is ecologically and culturally wise and (3) Function associated with logistical support for various activities including research, education, training and monitoring issues related to the conservation and sustainable development at the local, regional, national and global levels.

For implementation of the Biosphere Reserve concept in a region, some steps are necessary, such as: (1) establishing the managing institution of biosphere reserve. Biosphere Reserve management is more appropriately done in the way of multi-stakeholder, (2) collaborative management is more suitable to manage biosphere reserve. The management of biosphere reserve is not in the form of structural organization, but it is the place of coordination (communication forum) of multi parties (3) In this coordination forum, a leading sector (government) is required, functioning as the coordinator of development planning of the biosphere reserve; (4) in the management of biosphere reserves, the coordinator does not have the right to contribute indecision making procces, because the decision is taken through a multi-party agreement, (5) The role of stakeholders outside the region of biosphere reserve is more suitable for the purposes of consultation, advocacy, human resource development (capacity building), funding support, and innovations that are relevant with the development of biosphere reserves concept.

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The Role of Local and Indigenous Knowledge in Sustainable Development

Promoting and integrating local and indigenous knowledge: *Towards sustainable management of Biosphere Reserves*

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Introduction

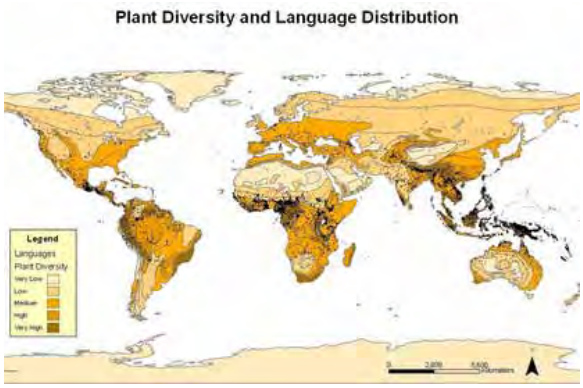
Local and indigenous knowledge, as defined by UNESCO's programme on Local and Indigenous Knowledge Systems (LINKS), refers to "understandings, skills and philosophies developed by societies with long histories of interaction with their natural surroundings." For rural and indigenous peoples, such knowledge allows them to make decisions about fundamental aspects of everyday life (UNESCO 2011a). Local and indigenous knowledge is synonymous with terms such as traditional ecological knowledge (TEK), indigenous knowledge (IK), local knowledge, and rural peoples' and/or farmers' knowledge. As is clear from these synonyms, local and indigenous knowledge is not necessary restricted to knowledge owned by people officially recognized, or consider themselves, as Indigenous People. Rather than associating knowledge with a group of people, it is useful to consider the characteristics of local and indigenous knowledge, which typically:

- Originates and maintained within a community;
- Disseminated orally from generation to generation;
- Owned collectively;
- Develops and changes over generations;
- Embedded in a community's way of life.

Local and indigenous knowledge takes diverse forms, such as stories, songs, folklore, proverbs, cultural values, beliefs, rituals, customary laws, language, and agricultural practices (CBD undated). It has been widely recognized that traditional knowledge can make significant contributions to the conservation and the sustainable use of biodiversity. It is thus that the 1992 Convention on Biological Diversity in its article 8(j) called on States to:

> ***… respect, preserve and maintain knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity and promote their wide application with the approval and involvement of the holders of such knowledge, innovations and practices and encourage the equitable sharing of the benefits arising from the utilization of such knowledge, innovations and practices; (CBD 1992)***

Researchers have identified correlations between geographic distributions of cultural and biological diversity, globally as well as regionally. Asia and the Pacific in particular is a region where areas of high biodiversity coincide with a higher concentration of distinct cultures (Stepp et al 2004). At the same time, Southeast Asia suffers from the highest rate of deforestation in the world, endangering species, landscapes, and the knowledge in these areas (UNEP 2007). It is thus essential that conservation efforts are undertaken in an integrated manner, ways that do not separate people from their environments.



Global Plant Diversity and Language Distribution (from Steppe et al 2004)

In recognition of the importance of cultural diversity and its role in biodiversity conservation and sustainable development in Asia and Pacific region, the meeting of the Southeast Asian Biosphere Reserve Network (SeaBRnet), held in November 2007 at the Maolan Biosphere Reserve, China, was dedicated to the topic of cultural diversity as a foundation for conservation and sustainable development in biosphere reserves. The Maolan Declaration adopted at this meeting acknowledged that "many indigenous peoples and local communities possess valuable cultural knowledge and management systems, which are consistent with or contribute to the conservation of biodiversity and natural resources on this planet". It recognized UNESCO's MAB Programme and its World Network of Biosphere Reserves as "workable tool to sustain the specific relationship between indigenous cultures and the natural environment, and to successfully combine sciences with indigenous practices and knowledge" (UNESCO Jakarta 2008:155).

One of the goals of the Madrid Action Plan for Biosphere Reserves is to "anchor the research, training, capacity building and demonstration agendas of MAB at the interface between the interlinked issues of conservation and sustainable use of biodiversity, mitigation and adaptation to climate change, and socio-economic and cultural well-being of human communities" (UNESCO-MAB 2008). Considering that climate change has been recognized as one of the emerging challenges facing biosphere reserves, promoting and integrating local and indigenous knowledge in biosphere reserves is particularly pertinent. This integration needs to take place in all three functions of biosphere reserves: in the conservation, development, and research/education. Local and indigenous knowledge can play crucial roles in the development of local-level adaptation strategies for climate change and in conservation of these areas, and biosphere reserves are ideal places to demonstrate adaptation measures and then provide valuable lessons for the rest of the world.

This short paper gives an overview of research undertaken in biosphere reserves on local and indigenous knowledge, and underlines the importance of integrating such knowledge in biosphere reserves. The paper emphasizes the need for action research in biosphere reserves, which can contribute to development of local-level climate change adaptation strategies.

Local and indigenous knowledge in biosphere reserves

With the MAB Programme's aim of helping "develop the basis within the natural and social sciences for sustained resource management and improved land use planning", it would be "somewhat surprising" if the Programme did not "include studies on indigenous peoples and their decision-making and resource use systems" (Hadley and Schreckenberg 1995:465). There are two reasons why integrating local and indigenous knowledge in biosphere reserves can contribute to their sustainable management. Firstly, promotion and valorization of local and indigenous knowledge can lead to environmental conservation, and sustainable use and management of land and resources. Secondly,

integration can lead to co-management of biosphere reserves, thus resulting in sustainable development of communities in and around biosphere reserves.

A review of recent literature shows that a vast amount of research has been conducted on the topic, in the 2000s and in South- and Southeast Asia alone (for a review of such literature in the 1980s and 1990s, see Hadley and Schreckenberg 1995). Such research, which has been undertaken by scientists from a wide range of disciplines, demonstrate that recording and applying local and indigenous knowledge "provides one approach to making more effective use of the biological wealth of our planet" (Hadley and Schrechenberg 1995:473). It is possible to divide existing research broadly into four categories as below:

- Research into traditional ecological knowledge and/or traditional resource use and positive contribution to conservation: examples from Nanda Devi Biosphere Reserve , India (Rao et al 2003); Pachmarhi Biosphere Reserve, India (Singh and Chaudhary 2006); Tehuacán-Cuicatlán Biosphere Reserve, Mexico (Blanckaert et al 2007); and in Asia as a whole (Ramakrishnan et al undated).
- Documentation of traditional ecological knowledge related to traditional medicine: for example, at Agasthiayamalai Biosphere Reserve, India (Britto and Mahesh 2007).
- Descriptions of community-based resource management involving local and indigenous communities: at Siberut Biosphere Reserve, Indonesia (Meyers 2005); Pilon Lajas Biosphere Reserve in Bolivia (Peredo-Videa 2008); and Yungas biosphere reserve in Argentina (Ianni et al 2010).
- Studies on indigenous people and their interactions with/impacts from biosphere reserve designations: in Bosawas Biosphere Reserve, Nicaragua (Stocks et al 2007); and Tasik Chini Biosphere Reserve, Malaysia (Habibah et al 2010).

UNESCO—through its MAB and LINKS programmes—has implemented activities related to local and indigenous knowledge in biosphere reserves since the 1990s. Activities have focussed primarily on: (a) conducting research and documentation of local and indigenous knowledge; (b) facilitating development of partnerships with local communities and protected area management, including co-management; and (c) influencing policy on protected area/ biosphere reserve management. Through such activities, UNESCO has attempted to facilitate a paradigm shift, from the more traditional style of monitoring and research that focus on purely ecological research with little involvement of social scientists and local communities, towards multi- and inter-disciplinary research, which focus on socio-cultural factors and involve local communities through action research. The former, while it produced important results, often meant little to local communities, while the latter often facilitates or leads to community participation in management of biosphere reserves, thus making science more meaningful to local communities.

Below are brief descriptions of three projects implemented by UNESCO, two in biosphere reserves and one in a world heritage site. They have been implemented either directly under the framework of its LINKS programme, or in close cooperation with it.

Siberut Biosphere Reserve, Mentawai, Indonesia

Since 1998, UNESCO Office, Jakarta, in cooperation with the Siberut National Park, has been actively engaging in a conservation and delopment project in Siberut, the largest island in the Mentawai archipelago, West Sumatera. The goal of the cooperation was to promote conservation and sustainable management of resources through collaborative and adaptive management. A grassroots co-management programme initiatived by UNESCO and the

National Park led to strengthening traditional knowledge and practices of the local people and transfer of technical skills, resulting in creation of partnership involving Ministry of Forestry and indigenous Mentawai communities. More information on the project can be found in Meyers (2005).

Surin Islands Marine Park, Thailand

The Moken village, built right on the beach, as it was before the tsunami

The Moken are rebuilding their houses made of bamboo and woven leaves.

A Moken woman.

A project titled "A place for indigenous people in protected areas, Surin Islands, Andaman Sea, Andaman Sea, Thailand" was initiated in 1997 by UNESCO's Bangkok Office, the Intergovernmental Oceanographic Commission (IOC), and the intersectoral and interdisciplinary platform on Coastal Regions and Small Islands (CSI). The project involved a World Heritage Site and a group of people called the Moken, often referred to as "sea nomads". The objective of the project was to ensure the continued well-being of the Moken culture, at the same time conserving the marine costal environment that is their home. Activities implemented aimed to empower the Moken to play a principal role in the conservation and management of the area, and to ensure their access to and the right to use their traditional homeland. More information on the project can be found in UNESCO (2001).

Bosawas and Rio Platano Biosphere Reserves, Nicaragua and Honduras

This transboundary area is home to the indigenous Mayangna and Miskito people. In 2003, UNESCO's LINKS programme launched a project to record the knowledge and worldviews of the Mayangna people. A book titled "Conocimientos del pueblo Mayangna sobre la convivencia del homre y la naturaleza: peces y tortugas" (Mayangna Knowledge of the Interdependence of People and Nature: Fish and Turtles) was launched in both Spanish and the Mayangna language in 2010. The book responds to the wish expressed by the Myangna people to safeguard their knowledge of nature and the Universe, and can be used as a pedagogical resource in schools. At the same time, the book demonstrates to the scientific community the depth and breadth of local ecological knowledge and the role the Mayangna can play in the sustainable use and management of the region. More information on the project and the book can be found in Gros and Nakashima (2008) and UNESCO (2011b).

Towards action research and local-level climate change adaptation in biosphere reserves

As was demonstrated through the brief descriptions above, action research on local and indigenous knowledge can have positive impacts on conservation and management of a biosphere reserve. Action research, also termed participatory action research or participatory research, involves participation of local people in research, from design of the research itself, data collection and analysis, to the practical application of findings. It allows researchers and local people to interact in meaningful ways, and allows researchers to deal "with the problem of wondering if we can ever do enough for our research participants in exchange for what they have done for us" (O'Reilly 2005:63).

In the context of local and indigenous knowledge, action research involves recording and documenting collective knowledge and worldviews of a people, with the involvement of local community leaders and members from the beginning. This can lead to integration of local knowledge with scientific knowledge, and result in acquisition of information that is useful to both scientists and local people. Considering the global changes facing communities in and around biosphere reserves—rapid social as well as climatic—it is now more than ever important that research in biosphere reserves is action oriented. Social and cultural changes such as migration, changes in land use, decreasing social cohesion, transition from semi-subsistent to market economy, changes in resource use, and loss of holders of traditional knowledge are all contributing to difficulties in achieving sustainable development for local communities.

At the same time, it is important to note that there are aspects of traditional ecological knowledge that can be an obstacle in achieving sustainable development, especially when such knowledge is taken out of its context, i.e., the ecosystem, worldviews and beliefs out of which they developed. It is also necessary to avoid romanticization of indigenous knowledge, as this can reduce its reliability (CBD 2003). In this regard, all stakeholders need to be willing to work together towards co-management, take time to build trust before action research.

In the context of emerging challenges such as climate change (UNESCO-MAB 2008), it is important, now more than ever, to integrate local and indigenous knowledge in biosphere reserves. This is because indigenous peoples' extended histories of interactions with the

natural environment put them in a position to observe changes in the climate. Because of their long history of experience with climate change and its impacts, they have developed strategies for coping with change; thus, local and indigenous knowledge can provide foundations for new adaptation measures. At the same time, culturally appropriate mitigation plans can acknowledge and enhance indigenous knowledge and practices. Climate change poses a direct threat to the livelihoods of indigenous people because of their vulnerability to climate change impacts: they often live in areas most affected by climate change, their livelihoods are resource-based, and because they are usually the most disadvantaged socio-economically. Thus, the knowledge, observations, experiences and strategies of indigenous peoples are necessary to better understand climate change and its impacts, and to develop strategies for its mitigation and adaptation. This is especially the case when considering that indigenous people are the ones greatly impacted by mitigation and adaptation measures in and around the land where they live.

In recognition of the fact that many small island, rural and indigenous communities are on the frontlines of climate change, one of the key themes of UNESCO's LINKS programme is community-based climate change adaptation. In order to ensure that the voices of local and indigenous people are heard, and to bring their knowledge and concerns into global climate change debates (UNESCO 2009), an online forum in three languages has been established to share observations, concerns, and adaptation strategies, and to build a network of field projects and activities, which can be accessed at: www.climatefrontlines.org.

The mandate of Science for Society Unit of UNESCO Office, Jakarta is to implement LINKS-related activities especially related to community-based climate change adaptation in Asia and the Pacific, in particular in the cluster countries of the Office: Brunei Darussalam, Indonesia, Malaysia, the Philippines, and Timor Leste. We welcome partners from biosphere reserves that are part of the SeaBRnet for collaboration on the topic.

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Contribution of Tasik Chini Biosphere Reserve in Developing Local Community Economy

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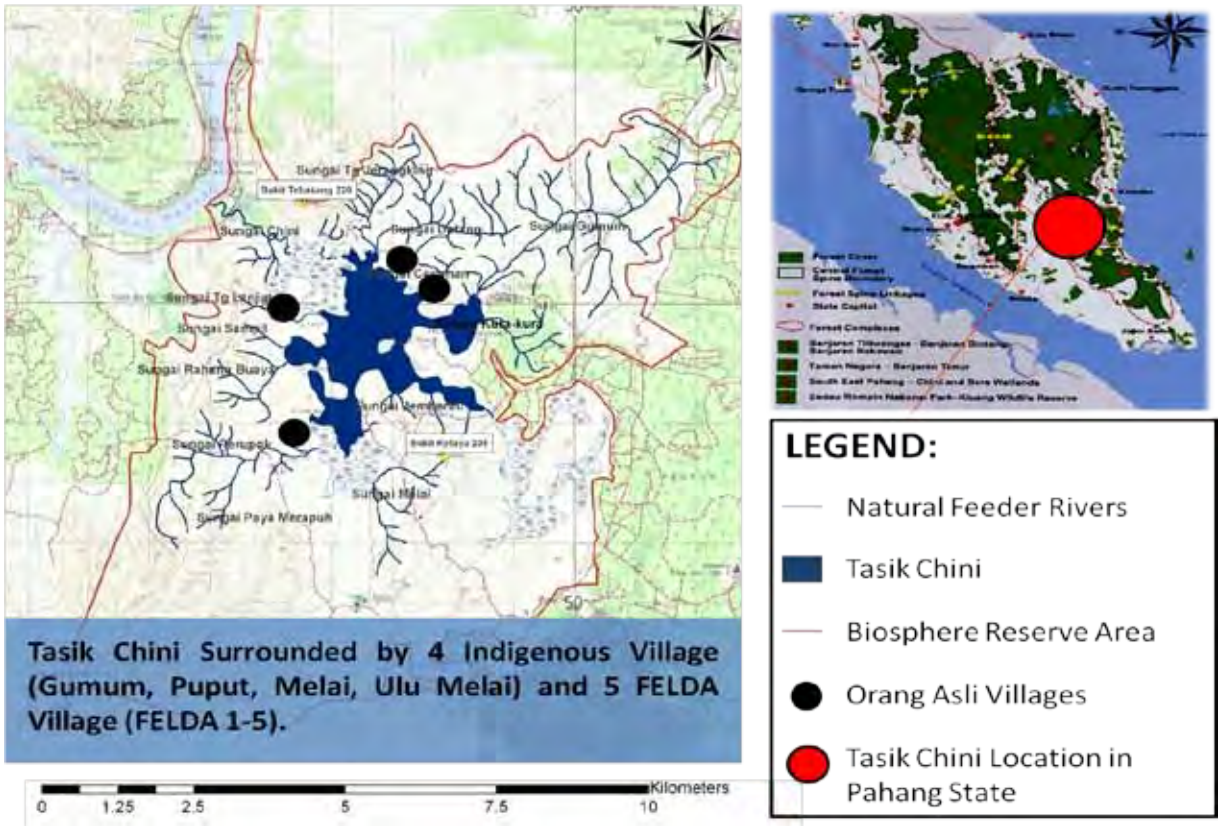
Abstract

The development of East Coast Economic Region (ECER) in Malaysia's development plan has various strategies to spur the development of rich natural resources. But, marginalized groups, especially indigenous groups or the Orang Asli are the exception and not being the focus of the design and development plan. One of initiative in this plan is to enhance Orang Asli Tasik Chini welfare, as one community which is considered marginal in the ECER. This approach would be more impressive if the potentials and opportunities was taken and the role of Orang Asli being concern as one of decision maker in Tasik Chini development plan.

The synergy between stakaholders must be achieved since the beginning of plan design to initiatives of Orang Asli's economic empowerment. As consideration, there are different perspectives of needed between Orang Asli and other stakeholders in ECER development plan. This research tried to identify Orang Asli position in economic and social aspects, opportunities and threats, and



also alternatives for Orang Asli future. This research will elaborate the suitability of ECER development plan with economic and social aspect of Orang Asli development plan in order to enhance Orang Asli welfare.

Based on survey in 2009 and 2010 about Orang Asli perspectives about their economic and social position and their future needs, Tasik Chini is knowing as 'mother' for Orang Asli which support their daily life and needs. Tasik Chini becomes one of their resources and now it is getting destroyed by non green development. Orang Asli start to lost their basic needs resources. If this continues to happen, the Orang Asli Chini Sea will become increasingly marginalized and poor. In addition, the presence of sea chini as biosphere reserve will also be threatened dashed

Because of its specialties' and uniqueness, Tasik Chini and its surrounding areas has become Biosphere Reserve in Malaysia. Tasik Chini is situated in the southern east part of Pahang state. Tasik Chini is the second largest natural freshwater lake in Malaysia. Diverse ranges of

ecosystems exist within the Reserve boundaries; and these ecosystems include significant freshwater lake, Felda plantation scheme and the Orang Asli settlement. This area is popular with mythical legend of sinking ancient cities among tourists and is of global ecological significance too. Some watersheds in the Reserve has been extensively logged in the past fifty years, especially the land conversion into agriculture and plantation area, and others have been subject to varying types and degrees of human activity. The main lake and forestlands within the lake's catchment area are now managed under strict guidelines to maintain ecosystem integrity and health. There are five villages where the inhabitants are the indigenous peoples (Orang Asli) living near the freshwater lake. The main villages within Tasik Chini are Kampung Gumum (main village), Kampung Chenahan,

Kampung Tanjung Puput and other four Orang Asli villages at small communities Kampung Melai and Kampung Ulu Melai. Tasik Chini also offers three main function of a designated biosphere reserve. The core area consists of the area required to meet the long-term conservation objectives; second is the buffer zone(s) and (b) the third region is the transitional zone, which act as areas suitable for working with local communities in testing out and demonstrating sustainable uses of natural resources.

The core area includes natural freshwater lake and its feeder rivers; terrestrial forest reserves surrounding the lake and water bodies as well as the dominant hill areas namely Bukit Tebakang and Bukit Ketaya. The freshwater lake and the surrounding areas have been gazette as Forest and environmentally sensitive land under Rank I (Protected Area in Peninsular Malaysia, Malaysia National Physical Plan). These areas have been categories as Environmental Sensitive Area (SEA) Rank 1. Existing forests and protected areas within the core area conserve a wide range of habitats and landscapes, covering approximately 69.51 km^2 (6951.44ha).

In term of governance, the core areas are of the concern of various stakeholders. A variety of legislative, regulatory and management mechanism are coordinated to ensure the protection and conservation of landscapes, ecosystem, and biodiversity within the terrestrial component of the Reserve. In the core protected area, these mechanisms include federal legislation (Wildlife Act 1972, Environmental Quality Act 1974), provincial legislation Wildlife Act

1972, Fisheries Act 1985, Forestry Act 1984, Environmentally Quality Act 1974 (Act 127) & Subsidiary Legislation, Land Rules Applicable to the States in Malaysia, and the Town and Country Planning Act 1976) and management plans. Adjustment to the core area may occur through treaty, negotiations and the outcome

of community based land and resource use planning processes.

The buffer zone of Tasik Chini BR is also unique, as it surrounds the whole catchment area/core zone in order to prevent the encroachment of development in the core zone. Terrestrial buffer zones include all protected and unlogged major valleys and lake watersheds in the Reserve, totaling approximately 20.56 km^2 (2,056 ha). These areas are subject to forest planning that may lead to further refinements in the application of the zonation model, including the establishment of further transition areas. It also ensures that the area remains a productive natural environment for migrating birds and other wildlife while providing for compatible public use (such as transportation and tourism). Buffer and transition zones promote biodiversity and conservation under a wide range of status and management plans.

The third region is the transitional zones. With the coverage of 30.20 km^2 (3,020ha) for the transition area comprising of private and public land ownership, sustainable resource management has been suggested as tools for development practices. These areas are subjected to ongoing planning that may lead to further refinements in the application of the zonation model, including the establishment of further buffer zones.

Introduction

In this globalization era, the strategic developments based on community needs are very relevant to implement in developed countries or in developing countries. Regional development in Malaysia in the contemporary era adhere to the principles of economic development, social and persekitaran in something that does not compromise the asset and the source semulajadi, otherwise sentiasa mendokong maintenance initiatives and pemuliharaan these sources. In Malaysia, Eastern Economic Area or the ECER is one rather than developmental areas terancang to stimulate the development of some land which diguguskan as a region. It involves the State of Kelantan, Trengganu and Pahang and Mersing.

Realizing ECER is a width and rich area with a diversity of sources, it is not surprising that the planned development would include natural areas and community groups that marginalized from prime development trend. In this case, Indigenous people from Jakun tribes that live in the villages around Lake Chini is among those who are in this situation. They are classified as people who need a reform of the economy, Their dependence on the environment itself will threaten the welfare of the ecosystem of the area. This is certainly not consistent with the objectives of ECER development vision to develop the area with conservation measures and ensure the sustainability of resources. Hence, this paper will examine to what extent ECER plan giving consideration to these groups.

Through some research done by Tasik Chini socio-economic research group in year 2007 and also Public Awareness Programme for the second time which was held in August 2008, this paper attempts to examine the views of indigenous people around Tasik Chini about their economic future. Does the threat of Tasik Chini is also means the significant threats to a way of life and their dependence on resources from the Tasik Chini? This paper is written in several parts, first, discuss the Ecer development scenario and the position of Tasik Chini, examines the views of Aboriginal people about their future in the development of this area

and their willingness to ensure the success of the Biosphere Reserve as an approach for the sustainable development of Tasik Chini, at once positioning Tasik Chini in the ECER development.

The East Coast Economic Development Region (ECER) as the Masterplan of the East Coast Community Development

East Coast Economic Region (ECER) is a regional area of 66.000 sq km with population of 3.9 million or 14% of the total Malaysian population. In the development of the ECER region, economic growth becomes one of its main goals, and this does not exclude the tourism industry. ECER development vision is uniqueness, dynamism and competitiveness. East Coast is trying to highlight the unique culture, society and nature to the world by doing a rapid and dynamic development. In other words, development in selected sectors and strategic area fair to increase population economic sector in this region, especially those considered isolated and remote from the influence of the economic dynamism of the city and the country's major cities.

This region was inaugurated on October 29, 2007 by the Prime Minister of Malaysia, Dato Seri Abdullah Ahmad Badawi. Regional development is the initiative of the federal government and it is the third development area after the Wilayah Pembangunan Iskandar (WPI) in Johor and Wilayah Ekonomi Koridor Utara (NCER) in Northern Malaysia. ECER involves three states on the East Coast of Peninsular Malaysia, such as Pahang, Terengganu and Kelantan and the Mersing district in Johor. The area involved is 66.736 square kilometers or 51 percent of Peninsular Malaysia. ECER involving 3.9 million people. ECER Development will be held for 12 years from 2007 to 2020. Petronas is the main leader.

ECER development costs will be funded by Petronas, a Malaysian government-owned corporation. The first phase involves the cost of RM6 billion. The actual cost is RM112

billion. This allocation is channeled through the the Ninth Malaysia Plan (RMK9) program review and the addition of provisions during the RMK9 mid-term review. 227 projects valued at RM112 billion over the next 12 years will be undertaken by Petronas and others. To facilitate the development of the ECER, the core development of this region is classified according to key sectors such as shown in Table 1, which includes tourism, agriculture, education, infrastructure, fisheries and ports.

Tasik Chini as Part of the East Coast Region Development Area

Tasik Chini is the second largest freshwater lake, in Malaysia, located in the southeastern state of Pahang. Tasik Chini is also surrounded by 12 lakes called the sea by local residents. Every ocean has its own name and total whole area of the lake is about 202 hectares. Tasik Chini area surrounded by tropical forest and total whole area of natural forests and fresh water is estimated to be approximately 12,000 acres or equivalent to 4.975 hectares. Communities that inhabit the area around the lake consists of the Orang Asli from Jakun tribes, though there are also some Semelai tribes, the Indians and the Europeans, as a result of local population marriage with outsider.

Tasik Chini is also a wildlife area with various species. According to the survey, there are 200 species of birds and 240 species of fish around the lake. Tasik Chini also has a rich wealth of flora and fauna and biological resources such as 51 species of plants low forest type, species freshwater swamp forest crop, 25 species of aquatic plants and 87 species of freshwater fish. Tasik Chini consists of 12 series of lake that called ocean by local population and the largest is the Gumun ocean, Melai ocean, and Jemberau ocean. The area around the lake resembles a hilly and similar to the back of a dragon. There are mountains called Mount Chini with a height exceeding 800 meters and covered with thick forests.

Table 1 : ECER Development's Main Core

Core Development	Features
Tourism	• Develop resort centre facility and international hotel in coastal area. Would attract 7.4 million foreign tourists and 21.4 million domestic tourists by 2020. • Kuala Terengganu will be the hub of activities coast, cruise terminal, marina, craft markets, shopping centers, parks and several national parks, Endau-Rompin National Park. Mersing Jetty. • Tioman Island will be a tourism attraction. • Pengkalan Kubur become tourism centre border and South-East Asian level trade centre / growth triangle of Indonesia Malaysia Thailand. • Kota Baru City Centre (KBCC) in Palekbang near Kota Baru will be developed. • Nenggiri river, Burok river, Jenera river, Pulan river and surroundin area sekitarnya will be developed as national park • Kuantan Sentral and Bukit Gambang Resort City for Pahang • Oil industry, gas and petrochemical. • Manufacturing industry - downstream industry palm oil based, wood and different latex and agricultural products to produce goods such as oleochemical material, furniture, glove and halal food. • Taman Industri Halal in Pasir Mas was built to generate the downstream sector.
Agriculture	• Hulu Setiu - agropolitan project covering 2,000 hectares. • Kuala Berang, Hulu Terengganu - Goat Breeding nucleus Centre Research. Expected to produce 10.000 breeders such as Jamnapari, Boer and Anglo Nubian in 2015 of high quality. Currently, Malaysia imports 70.000 goats from Australia and New Zealand each year. • Cooperation agreement (MoU) among Goat Breeding nucleus Research Centre, between JPH with Marditech Corporation Sdn Bhd and Terengganu Agrotech Development Corporation Sdn Bhd (TADC) had been signed. • Animal breeding research center covering 800 hectares will be built in Tersat, Kuala Berang. • Integration of goat farm with rubber field of 2,000 hectares, owned by Risda in Besut and Hulu Terengganu. • South Kelantan Development Authority (Kesedar) will promote • 5.200 families in Gua Musang. Involving the Ministry of Rural and Regional Development. • Musang Mountain, Lembangan sungai Nenggiri, gazetted as a State Park. More than 10,000 indigenous people from the poor Temiar tribes will enjoy the ECER development. • Valley Modern Agriculture in Bachok and Pasir Puteh - farm fresh fruits and vegetables, 2,000 hectares. • Terminal Makanan Nasional (Teman) in Kota Baru under the • Ninth Malaysia Plan (RMK-9) will develop 4,000 farmers. • Chicken farm in Gua Musang. • Lembaga Kemajuan Pertanian Kemubu (Kada) akan bring forward 4250 families into commercial agriculture. • Flood mitigation projects and coastal erosion prevention.

Education	• Universiti Malaysia Kelantan (UMK). • Science Park in Besut, covering 283 hectares will be a new urban university. Would be occupied about 10,000 residents.
Facilities	• Sultan Mahmud Airport, Kuala Terengganu was upgraded as an international airport (direct flight to Mecca from Kuala Terengganu) • The dam will be built by local companies. • Sultan Ismail Petra will be also enlarged. • Coastal road from Kota Baru to Mersing will be widened equal to highway.
Fishing/port	• Kemaman Port. • Kuantan Port will be upgraded. • Fisherman's jetty in Tok Bali, Pasir Puteh.

Source: http://www.ecerdc.com/2008/index.htm

As small settlements in the District Structure Plan and East Coast Economic Region, Tasik Chini is proposed as an ecotourism destination in order to generate economies of the region around the (Department of Town and Country Planning Pahang 2005). According to Datuk Seri Mohd Najib Tun Razak, Tasik Chini should be restored as a center of biodiversity and the development of the East Coast Economic Region (ECER). He believes that if Tasik Chini is restored, these destinations will be the center of eco-tourism projects under the ECER to attract tourists from around the world to enjoy the beauty of the lake. However, in the present circumstances, Tasik Chini is threatened by economic activity due to less consideration to the ecological welfare. The results of scientific studies Tasik Chini Research Centre, UKM, clearly shows several indicators of the more polluted water lake, lotus attraction increasingly extinct and tourist arrival to Tasik Chini increasingly decline. In this situation the question arises, why is it occurs? Is that Indigenous people in Tasik Chini no longer depends on source of wealth in this lake? Who exactly affect the quality of Tasik Chini and how to restore Tasik Chini?

Objective of The Study

This research is a micro study in the biosphere reserve of Tasik Chini which is one of the ecotourism destinations available in Pahang with a macro view on the suitability of Tasik Chini in the ECER area. This study strive to sustain the biosphere reserve Tasik Chini as ecotourism to increase awareness and prosperity of local communities. Tasik Chini is expected to achieve sustainability in the region either in the ECER region or town. Specific goals to be achieved in this study are:

a. Identifying the potential and suitability of Tasik Chini as economic resource in clusters of ECER.

b. Identify strategies and patterns of development to optimize the potential and suitability of Tasik Chini as economic resource in clusters of ECER, particularly for regional town.

c. Recommend guidelines and action plans to develop Tasik Chini that could provide benefits to the community in order to achieve sustainable development, especially in improving the economy of local communities.

This specific purpose made by structured, starting from macro level to the micro level so that findings is able discuss and analyze Tasik Chini from various point of view. This study is expected to put the Tasik Chini expansion plans to the national level until it becomes a national issue which requires mutual awareness.

Methods

The Use of this methodology is to create a more systematic study. The research methodology consists of the types of data used, methods of data collection, sampling and determining the number of respondents and data analytical method.

This study uses primary and sekuder data obtained from the field through qualitative and secondary data obtained from the relevant departments or agencies. This research involves not only local communities but also other stakeholders who also gave a role in sustainable regional development, strategy determination and determination of its involvement as a model for local government, non-governmental organizations, research centers, and others.

For the depth and suitability analysis, this study uses three types of analysis, the descriptive, evaluative and comparative. Descriptive analysis is used to describe the products offered by Tasik Chini's competitors which is located in the ECER area so that the suitability of Tasik Chini is available as ecotourism destinations in the ECER area. In addition, descriptive analysis was also used to identify potentials of Tasik Chini by identifying the characteristics of local social and economic Tasik Chini Biosphere Reserve. This description is based on SWOT analysis which is part of the descriptive analysis of the role of ecotourism in order to facilitate the identification of Tasik Chini Biosphere Reserve in raising awareness and well being of local communities.

Evaluative analysis is used to evaluate the role of nature, which have been developed, with standards of community involvement that has been done, particularly in environmental conservation.

While to determine the suitable strategies and models for development which is based on the ratio between the area of ecotourism Tasik Chini other Biosphere Reserves are expected to produce strategies to attract tourists to come to Tasik Chini and Tasik Chini expansion plans to achieve sustainable regional development benefit, especially economically to local communities, while still maintaining the natural environment of Lake Chini.

Study Site

According to historical records, the origin of Tasik Chini began since the 14th century following the discovery of several archeological artifacts from the existence of a city, namely Khmer, Cambodia which is believed, located in the middle of the lake which is now was

drowned of water few metres in bottom of the lake. Also associated with the existence of this lake is the story of the legendary belief of the local indigenous people to a dragon or huge snake known as Seri Gumum Dragon. Dragons are believed to be the keeper of the lake at one time and the occurrence of violations of the agreement between the owner of the lake area with the settlers, indigenous people, then the area was flooded to form a lake called Tasik Chini. There is a story that stated the name is taken from the name of Chini Hill located near the lake.

Tasik Chini is located in the southeastern state of Pahang, about 100 km from Kuantan and

60 km from the town. It can be reached via KL-Karak Highway or via Segamat Highway to the town of Chini, and then turning into the lake through an oil palm plantation with

a journey time of 15 minutes from the town. o can be visited through land route from Kuantan to Kampung Belimbing or Kampung Rambai which is near to Maran before traveling by boat through the Pahang river before going through the mouth of Chini river with a distance of 4.8 km.

Tasik Chini surrounded by 12 freshwater lakes called 'ocean' by local residents. Every ocean has its own name and area of the whole lake area is about 202 hectares. Tasik Chini is also surrounded by tropical forest and the total area of forests and natural fresh water is estimated to be approximately 12,000 acres or equivalent to 4.975 hectares. It is the second largest natural lake after Tasik Bera in Malaysia. It is noted as lake that possesses natural treasures and a variety of biological ecosystems, because very suitable to be promoted for eko-tourism purpose. However, any activity carried on around it, including the development of tourism or agriculture in a big way, either directly or indirectly, can disturbing the ecosystem of the lake. It not only can interfere with any biological diversity of ecosystems, including fauna and flora as well as water quality and the environment around the lake, but also a certain impact on the social and economic life of local residents who are dependent on the resources provided by the lake.

Approach

This study used the concept of sustainable regional development based on the Biosphere Reserve to the equation between economic development, environmental preservation, cultural promotion and a strong government with increasing economic and social empowerment of local communities and the environment (MAB Biosphere Reserve Bulettin 2004). This concept entails the development and the local community and integrate the roles of each stakeholder in order to achieve synergy. This concept is applied with a very large involvement of local communities. Quick understanding of participation is one way to learn and to get information, in a limited time, about a community, region, activity or specific problems by using common management technique.

The concept of sustainability is often associated with quality of life that encompasses the economic system, social and environment to ensure the comfort of living and a healthy and productive environment. These goals not only for the purposes of the present generation but also for future generations. This causes the term is always used as sustainable development, sustainable communities, agriculture, sustainable education, etc. Based on this fact, sustainable development is indeed inseparable from the development of science that integrates elements of economic, social and environmental studies in different contexts. Sustainable development is a development concept that emphasizes the integration and balance between economic development and social and environmental requirements to meet current needs without affecting the ability to meet future needs.

Results

This section contains the discussion on the potential of Tasik Chini as biosphere reserve in the economic development of the surrounding community. The tourism sector is one of the leading sectors could be stimulated to develop the economic of communities which is still in traditional in nature.

Population around Tasik Chini

Around the lake there are five (5) villages - Kampung Gumum as the main village, Kampung Tanjung Puput, Kampung Cendahan, Kampung Melai, and Ulu Melai and Kampung Ulu Gumum with an inner lead called Batin Awang Alok, 63-years-old.

The majority of indigenous people around the lake are from kaum Jakun tribes. They are estimated about 400 people with 190 people consisting of children. Most of the households from a sum 70 families that living around the lake found focused in Kampung Gumum (39 families). This was followed by the Kampung Ulu Gumum (12 families); Kampung Melai (3 families), Kampung Ulu Melai (6 families), and Kampung Cendahan and Kampung Tanjung Puput (5 families, respectively). According to UMNO women representative's census for election 2004, overall household around Tasik Chini amounted to 70 families with house number of buildings including the whole cottage is 98 pieces.

Of the total homes, 10 homes known as Jasmine house has been built in the 1970s by JHEOA as a result of the project to help the poorest people in the area. The majority of houses in the Kampung Gumum made of wall of wooden floor and zinc roof. There are also a number of houses in this village are made of cement (brick) and roofed with zinc or asbestos. However, there are some other houses in the village is still weak state of the walls and floors of bamboo and tree bark while the roof made of sago leaves. For homes in other villages as Cendahan, Melai, Ulu Gumum and Tj. Puput, almost all the old huts made of bamboo and tree bark on the walls and floor while the roof is lined with sago leaves.

Although the majority of residents are from sukukaum Jakun, but there are a number of people consist of sukukaum Semelai which being married to local residents. Moreover, there are outsiders living in this village such as Indians ethnic, Chinese, Malay, Iban and the European foreign descent. The presence of those people in this village is because of being

married to local residents while carrying out economic activities such as managing the resort for foreign tourists.

Infrastructure facilities around the main villages namely Kampung Gumum equipped with facilities which the coverage is not comprehensive. Here are two different resorts known as Tasik Chini Resort is operated by a foreign developer, Gumum Resort funded from the Koperasi Kijang Mas Company owned by indigenous peoples, and a National Service Training Camp. Two guesthouses such as Rajan Guesthouse and Gumum Guesthouse also operate in the research area. These villages have been supplied with electricity and piped water, though not all homes have it. For some homes, they have to use electricity from the generator or use a kerosene lamp. Their water resources depend on water of the lake for washing and bathing even though some others depend on water wells for the two activities. Noted the use of water wells is divided into two types - water wells for use in cooking and drinking and water wells for bathing, swimming and washing clothes. For some people, especially from the KampungCendahan, Tj. Puput, and Melai, water of the lake is often used for bathing, swimming and washing clothes.

Gumum Village also equipped with a community hall or public hall which is newly built about 2 years ago. Beside that, it also provides a field to play soccer for local residents and school children near Tasik Chini, namely Sekolah Kebangsaan Kampung Gumum. Gumum Village has been contacted by tarred roads and can be reached by taxi or bus or by boat through the Chini River. However, the mode of transport to other small villages such as Kampung Melai, Ulu Melai, Cendahan, and Tanjung Puput can only be done by boat or canoe to travel with distances of about 5 minutes to the Tanjung Puput Cendahan and up to
30 to 45 minutes to Kampung Melai, and Ulu Melai from jetty Kampung Gumum.

Original State Around Tasik Chini

Tasik Chini original state reputedly filled with lotus plants trees. Fishing activity is the main occupation of local people besides finding

and gathering forest product around the lake. Hunting activity with chopsticks and trap also conducted.

In the rainy season around October to January, the lake water level will be increased to make more extensive coverage and lakes ideal for fishing. It is said more than a decade ago, the lake is rich with various species of fish. According to reports, the number of fish species ever recorded in this lake has reached up to 144 species at different times. Lake area was also known as bird convergence area of 200 species was recorded. In October and March, the migration out into the lake increased, especially from northern Asia to avoid the winter. In July to January, this lake seems beautiful momentarily because of the grown orange and white coloured lotus flower plant.

Current State Around Tasik Chini

Now fishery activity already decline following resources extinction. This caused many forced to find a source alternative such as tapping rubber or working in an oil palm plantation nearby. There are also involved in the work of a tourist boat carrying tourists to explore the pilot or interpreter nearby forest. Fishery shortage of activities cause tools of traditional fishing is no longer produced except as a craft material for sale to tourists. Other handicraft items for sale for tourist such as woven mats, hand bags made from pandanus leaves (Rasau). They also made small blowpipe, catapult, and boat model from the nearby forest resources for selling to the tourist. The tourists are also charged at lower rates to try blowpipe at the target provided. Herbs such as Tongkat Ali, Fatimah incisors, sweet, and etc are also available in several package sizes for sale at a price of about RM25 to RM30 per packet. Blowpipe's price is estimated around RM65 to RM250 a hit. However, only a few residents involved in making of handicraft, especially from Tj. Puput and Kg. Cendahan. There are several other local residents doing bring boats mining activities for the children to school or take visitors around the lake for a fee of RM70-RM120 for a single trip for a group of 6 to 8 people.

Several other activities is being done by local resident is to manage a rest house. There is also which manages fish breeding area property outsider for attraction or offering for tourist. Some local residents will be fishing in the lake and sell the lives of the restaurant business. Chini hill climbing activities and exploring the lake by boat is run as a tourist attraction activity. Other activities include the substitution of traditional activities such as jungle tracking, Boating, fishing, bird watching, canoeing and others. However, there are also local residents, especially young people who migrated further into town, Kuantan, Maran, and others to work as wage laborers.

Understanding Biosphere Reserve: Voices from The Locals

During the campaign, several questions pertaining issues of Biosphere reserves were asked to respective participants. As predicted by members of the steering committee, most of the participants admitted that their knowledge in relation to the Biosphere reserve is minimal. They however, posed many questions pertaining to the development of Biosphere Reserve, especially who 'owns' the areas and what sort of benefits the locals should be getting from such programmes. In fact, they mentioned of giving full support to activities and programmes organized by the local stakeholders, as they believed that this entire programme would eventually influence their livelihoods. What is more important, according to the Tok Batin, ' semua akan mendapat kebaikan'. Orang Asli, Felda dan Tasik akan dapat faedah'.

The participants were asked whether they knew the nomination process taking place in

Tasik Chini. The responses for the nomination process are quite similar to the answers for the knowledge of BR. More than 50 percent of the respondents did not even know what really biosphere reserve meant. However when respondents were asked to detail out the Biosphere

reserve components, they seem to suggesting a wider spectrum of an ideal BR. Table 4 shows their responses, the average mean for Biosphere Reserve components is 4.36. Four BR components were found to exceeding the average mean, and these involved matters concerning the responsible agency, sustainable development, Biodiversity and a living laboratory. For most of the respondents, they ranked the assurance of the area to control development and maintain the natural well-being the highest. Apart from that, they ranked second for the sustainable development followed by the biodiversity and living laboratory.

Biosphere Reserves and the Expectation of Indigenous People in Tasik Chini

Biosphere reserves, the implemented program by the MAB-UNESCO, is not a new matter in the regional development arena and society marginalized among international community. Until the year 2009, there are 531 reserves Biosphere in 105 countries around the world (UNESCO 2009). Actually Biosphere reserve is one development approach which offset ecology welfare, social and economy (Vernhes 2001). This program was launched in 1974 and updated after Seville Conference 1995, and have purposes to i) reduce the loss of biodiversity ii) increase standard living of people who are staying in reserve radius, iii) strengthen the social position, economy and culture to ensure environmental sustainability, iv) directly contribute in achieving the objective of MDG or Millenium Development Goals, especially MDG7, the environmental sustainability (UNESCO 2009). For this country, Biosphere reserve is an approach to develop in Tasik Chini, following this area has some priviliges in terms of ecology, community and commercial. But,however, it is now staying in threat from the result of reaction or development plan that less fulfilling needs and ecosystem suitability in this area.

Biosphere Reserve consists of two basic words, the biosphere and the reserves. The reserve word means an area which has assets and resources that are vital to all communities in the world. The biosphere word have meaning, is part of life and all things that represent life in

this planet. UNESCO uses this terminology because understandable and interpreted in many countries. This does not mean the area of Biosphere reserves is area that contiguous with human and development, however it is human activities, human health and the community to form part of the biosphere reserve. In sum, biosphere reserves explained as specific area where people are in it to practice sustainable natural resource use in character (Irribaren 2001, Little 200)

Biosphere Reserves have three main functions namely biological diversity conservation, sustainable development and support for logistics (Vernhes 2001). The term logistics refers to educational activity, research, training and supervision as a support to the development and preservation. Education, training, research and supervision developing local ability to make a decision and implementation. Planning on this activity support the community as part of Biosphere reserve to identify needs according to their own way. This Biosphere reserve also got support from various sector in terms of cooperation to preserve and develop biosphere reserves. For details about the functions of biosphere reserve can be seen in Figure 1.

As part from biological diversity protected area, biosphere reserve area has a huge

opportunity to be developed as ecotourism. Ecotourism defined as visiting activity to natural areas to see and enjoy the flora and fauna with a low environmental impact or none at all (Scheyvens 1999). Ecotourism has objective to create sustainable environmental conservation along with the increasing empowerment of communities, especially around communities. Ecotourism is tourism based nature with the following of educational aspects and interpretations of the natural environment and cultural community with ecologically sustainable management (Ceballos-Lascurain 1996). Therefore, the preservation and development of the area have great community involvement that can be created by the ability of local communities, particularly in contributing to the preservation of the environment.

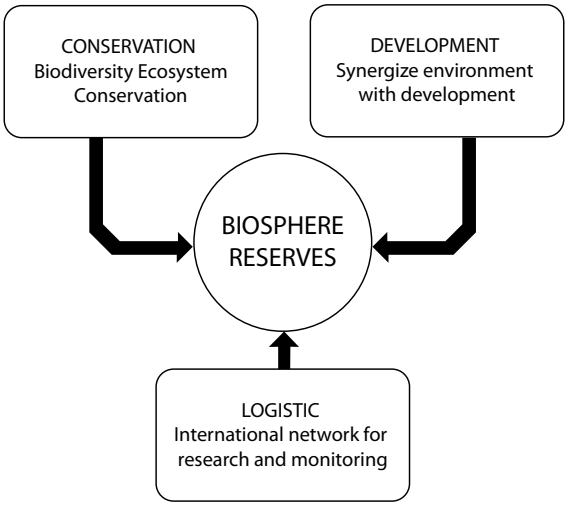


Figure 1: Three Functions of Biosphere Reserve
Source : www.unesco.org/mab/doc/faq/brs.pdf

According to Wright (1994), one of the important factor which became the achievement key is role and community involvement, capacity look after and organize those areas would only be achieved if community and the other different stakeholders have the information, understanding and shared vision in managing resources. This construction and local community expansion will be successful, only if stakeholders, especially local communities are actively involved. Community-oriented development is an approach which has been widely used in the preservation of regional resource management programs in various countries, especially in developing countries. (Scheyvens 1999; Sofield 1996).

For Tasik Chini, the ability in gaining recognition as a Biosphere Reserve also means providing a sustainable form of life for all residents, especially Jakun Tribes. By the approach of Biosphere Reserve as well, the development of Tasik Chini can be planned, guided by the

preservation of the environment and local culture. In the context of the economy, the indigenous people should act as 'actors' in Tasik Chini to generate economic potential, rather than as 'objects' of economic resources. The uniqueness of indigenous people as cultural identity is maintained as an attraction for tourists to understand more about the unique of culture of Tasik Chini. For them, Tasik Chini is the economic capital of the groove pattern of life. They will keep and transmit it to future generations. In other words, normal daily activities they can do such as hunting and finding the forest product. However, it did not deny their opportunities to enjoy decent living and get the facilities they should get in line with the quality of life of people in this country.

Discussion

As acknowledged that reliance of indigenous people on their source environment is very close, indigenous people of Jakun Tribes living in the Tasik Chini is no exception from this support. Economics of Jakun Tribes here is much related to the agricultural economy, finding forest product, tapping rubber, and being fishermen to get protein from sources that are all around them. From studies that carried out in 2007, a total of 80 indigenous families have been studied. This finding gives economic position of indigenous people here. Indigenous population around Tasik Chini occupied several villages, as shown in Table

2. Their average rate is consisting of Jakun's population, worked as a farmer and do a side job. Headed households among the Jakun is made up of people of various age levels, with their relatively large number of households. Among the indigenous people, they are also living in nuclear families.

Table 2. Total of Respondent by Villages

TYPE OF VILLAGES		
	Number	Percentage
Kg Gumun	45	56.3
Ulu Gumun	15	18.8
Kg Cendahan	5	6.3
Kg Tanjung Puput	5	6.3
Kg Melai	2	2.5
Ulu Melai	8	10.0
Total	80	100.0

Average employment is agriculture-based population and the relatively small amount of their income, but they are rarely able to explain their exact monthly income. They also said they had no permanent job, but doing a side job as long as they earn in a month. This they also do their farming activities, hunting, looking for forest products and fishing in the lakes around. Instead for them, daily activities can not be separated from life right now because this is part of the user terumun. Moreover, this activity is to get food and their daily needs. However, modern activities are palm oil plantation in Kampung Gumum created to add more of their income.

Palm oil plantations are under the monitoring and management RISDA's side that help indegenous people to make their economies. Instead of RISDA's side also assisted its palm trees, poisons and fertilizers for palm oil cultivation, through the RISDA Cooperation. Field of palm oil in Kampung Gumum is of 600 acres in which each participant is acquiring six acres to commercialize them. Indirectly, their involvement in farm activities is to assist indegenous people to obtain a regular income to meet their daily needs, while introducing the progress of the villages around Lake Chini. Overall, the indegenous population depends on fishing and the environment of the forest looking

Among indigenous households, especially the head of household, they rarely receive formal education, but among their children, school children in primary schools are increasingly becoming a concern people and their parents. There is a primary school and makes it easier for people who have children aged 7 to 12 years to send their children to school. Formal education is an opportunity for young people to improve the living standards of their families. Study Omar Mustafa (2006) showed that people here quite poor, living in a somewhat dilapidated homes. Facilities in this area have not spread among the villages in this area. Kampung Gumum is relatively better than other Villages where there is houses made of brick, electricity, no schools, boards and tarred roads. Accessibility to the Kampung Gumum is better mode of transport due to the boat to be used in addition to road or highway. While other villages, only can be accessed by boat.

Like the other indigenous residential areas, its welfare and future development of the people supervised by the Department of Indigenous Affairs (JHOE). This Department of Indigenous Affairs (JHOE) assisted from aspect of the construction of the house for Orang Asli group that inability and had many number of independent, apart from helping terms of providing basic amenities for natives in Taik Chini. Apart from that, Indigenous people's village having association to safeguard and environmental protection. Under Tasik Chini Protection Association, this association created to preserve and protect the environment from further polluting the ecology of Tasik Chini.

Such as stated at early of this paper, Tasik Chini is currently in the process of nomination as a Biosphere Reserve, of course, this initiative will open up and provide more opportunities for them to overcome the crisis of poverty, basic taste better and thereby changing lifestyles. What is their hope to realize this? This question is revealed in the next section, with a focus on the reaction of residents Gumum as case studies.

Economic Empowerment of Indigenous People in 'Kampong' Gumum

Kampung Gumum is indigenous people's village and become an attraction in tourism sector in Tasik Chini. Gumum village is also as central village to all indigenous people of village in Tasik Chini. Among others village is Tanjung Puput, Kelahan, Kulai and a few other village. Kampung Gumum population have more about 500 peoples from 40 indigenous people families remainder in this Tasik Chini that stationed following group of family placement. Kampung Gumum is headed by Tok Batin which control and take care of every villages of indigenous people's village in Tasik Chini, and he assisted another member of the JKKK. Most of the indigenous people in Kampung Gumum is Jakun tribes. Religion that followed are varied, consisting of animism, Moslem and Christian.

Economic Activity in Kampong Gumum

Based on data in field, the main activities at Gumum village are farming and hunting, fishing and making handicrafts. Incomes from this work are producing a simple pattern of income, but do not generate regular income in the population. However, when asked about the opportunity to continue the traditional economy at present and future, Table 3 shows the reaction to them.

Table 3:
The Opportunities to continue the current economic and the future

Answer	The opportunities to continue the current traditional economic		The opportunities to continue the future traditional economic	
	Number	(%)	Number	(%)
Becoming worse now	4	8.9	9	20.0
Worse like before	14	3.11	14	31.0
Good like before	25	55.6	16	35.6
Better now	2	4.4	6	13.3

N = 45 people

Over 55% of respondents said the situation was better now, and 5% felt better than now. While questions about the opportunity to continue traditional activities in the future, shows the increasing in percentage, from 4.4% to 13% in the future. This situation is likely due to the issue of nominating the Biosphere Reserve is starting to be heard by most people who want the continuity of their traditional activities.

Meanwhile, the views of those involved in eco-tourism opportunities are also found in the field. From Figure 2, it is obtained that ecotourism opportunities in good level as before with more than 50% of the population of Gumum's statement. However, the opportunity to become entrepreneurs in the future of ecotourism, is at good level as current time. This is because the concept of ecotourism has become increasingly popular among indigenous

people. They believe that their 'place' and 'activity' become a choice of foreign tourists from Cherating to continue visiting this natural lake. According to Mr Bahrin, tourist arrivals is not certain and based on season, many of them come from Cherating and some directly from Kuala Lumpur. Tasik Chini image among the "specialized tourist 'does not decline, but their arrival just as day trippers from either Cherating or Kuantan.

The Job Opportunities in Current and Present Time

Opportunities to get jobs in current time and in the future also get responses from the respondents. Table 4 shows their responses. From this table is found, more than 50% of the respondents's view are, the employment opportunities at the present and future good as ever and will be better than now. This is because they found the attention of indigenous peoples increasingly high, beside that, they also get information about job opportunities from this area such as Pahang and of higher education institutions especially UKM. The new development plan is to convince them that they will get this opportunity. Moreover, the role of village heads in spreading the develompent information also bring the positive effect to their current job opportunities.

Table 4:
The Views of Gumum Society About Current Job and Future Job

Jawapan	Current Skilled worker		Future Skilled Worker	
	Number	(%)	Number	(%)
Becoming worse now	4	8.9	5	11.1
Worse like before	13	28.9	11	24.4
Good like before	22	48.9	21	46.7
Better now	6	13.3	8	17.8

N = 45 people

In addition, other attractions that can generate the household's economic is the skills of indigenous peoples in producing products that can be sold to tourists. It can be shown in Table 5. From the pattern of responses, it was found that more than one-third of the

respondents said that carving is a key advantage of skills they possess. While 25.6% states they are in good in making handicrafts, including woven mats. Production of carvings like chopsticks and other sculptures are also the skills they possess. Similarly with the crafts, most of the indigenous people earn their living by making handicrafts. Among the crafts produced are baskets, decorated with beads that look more interesting. For sale.

Table 5:
The Views of Gumum Society About Current Job and Future Job

Answer	Number	(%)
Tenunan kain	15	12.8
Engraving	13	33.3
Engraving	10	25.6
Woven mats	7	17.9
Traditional dance	1	2.6
Traditional song	3	7.7
Total	39	100.0

Source: Field Research, The Public Awareness Program, August 2008.

However, the traditional art of dance and song is quite low, about 10%. Their cultural activities like traditional dancing such as sewang dance is not considered as an asset they can sell in the context of tourism because of seasonal tourist arrivals and it is only directed to certain attractions. There is also possibility creates an embarrassment and low self-esteem showing the dance in front of outsiders.As a result, this activity is done for entertainment only.

The Threat of Current and Future Resource Destruction in Kampong Gumum

As was reported that Lake is endangered of natural assets extinction including natural source especially plants and animals and their food sources, it also affects the society of Kg. Gumum. For them, Tasik Chini is in the damage of sources at present and will continue to happen in the future. Extinction of the present and future sources are said to be in a doubtful situation. Of the total respondents, 57.8 percent state of the currebt extinction is becoming

worse and continuing happen in the future (Table 6). A total of 95.6 percent of respondents said that it will becomes worst in the future. Tasik Chini and its source is no longer a mother of economic to the society.

Table 5:
The View of Society About the Extinction of Current and Future Resources In Kg Gumum

Aspect	Answer	Number	(%)
The extinction of current resources (a)	Becoming worse now	26	57.8
	Worse like before	13	28.9
	Good like before	5	11.1
	Becoming better now	1	2.2
The entinction of future resources	Becoming worse	43	95.6
	Becoming better	2	4.4

N = 45 people

From the responses obtained from the first public awareness program, the residents of Tasik Chini is also expressed to the extinction of forest resources and fish resources. In fact, due to the relatively polluted lake water, bottom fishing is also decreasing. Meanwhile, revenue collection, such as petai and soaking are also significantly reduced

Response of 'Tok Batin' and JKKK (Jawatan Kuasa Kampong) as Governans of Tasik Chini

In the context of the unity of indigenous people, Tok Batin is the referred source in the various welfare and future of their subordinates. Help and opinions of the Tok Batin in many cases will provide a more convenient routes for them to obtain assistance from the authorities. Based on interviews in the field, although Tok Batin voices a stress and problems

to his superiors, he was unable to overcome some problems related to their economy as a whole. In assistance case, continuing oil palm garden after rubber crop felled, not been operated yet nicely.

As a result, those who run the plantation is said having difficulties in collecting revenue of palm fruit because of the ground system is not compatible with the existing road system. The ground road of palm oil garden leads to the difficulty of fruit production efficiency. In terms of fertilizer, they did not get a thorough instruction of fertilizer, especially how to manage fertilizers which is not polluted. For them, the location and high structure of the field in slopes of the hill has caused water runoff carrying fertilizer into the lower area and enter the lake area.

Recommendations to Strengthen the Economy of Tasik Chini Indigenous People

From the above discussion, it is clearly there is an attempt to find a way to increase economic for Indigeneous people of Tasik Chini which need to be enhanced. Some of the problems described is closely related the unstable economic system at the macro level but conversely if it is examined through micro or the spectacle of the population. For them the opportunity to find forest products have become a routine part of their economy.

Initiative developing Tasik Chini and vicinity as Rizab Biosfera certainly bring good expectation of the current situation. However, economic opportunity among people who have energy source asset, capital and cultural asset need to be traced, maximized and then publicized to community. This step will create enable economic programme suggestion in the future which can be matched with human resource asset and culture in society. Capacity and group tendency can be adaptable with new opportunities that will be introduced in line with measures to revive Tasik Chini as ecotourism attraction and research centre.

Based on interviews with researchers in Tok Batin when public awareness programmes first carried out, he acknowledged the efforts

to ensure his men have a birth certificate is the first step to enable the enjoyment of other economic opportunities. However, efforts to register the population has not been completed. According to him, this step allows the children to go to school to study and futher other opportunities will follow. It is because without a valid birth certificate as the indigenous people entity, in this area will be affected. In this context, building its identity as indigenous people are the foundation of their lives and activities at Tasik Chini.

Meanwhile, the state and federal government's action to improve infrastructure in promoting eco-tourism has not been felt by local communities. This is need to be done because fading reliance to local source especially Tasik Chini will participate fading sense of belonging community to this area. Organising a deeper explanation of the issues that threaten their lives can also be done in schools and youth organizations. Activity sponsorship oriented on uniqueness of Tasik Chini and local economic opportunity is reasonable to be exposed to new generation especially youths and student because those will continue fighting to increase dignity of Jakun tribes in this country.

There are some of economic challenges of the tourism and agricultural development around

Tasik Chini, such as:

a. An economic need of the money has been increased as a platform to hold or support the needs of daily life. However, the extinction of natural resources due to exploring the nearby forests for oil palm agriculture in huge-scale, coupled with declining resources of the lake, create a need for local residents to find other alternatives to earn a living. Consequently, many young people going out to do migration in finding another job to ensure the acquisition of fixed income. However, due to lack of academic qualifications and skills, many of them trapped in inferior job type with lower income.

b. Economic resources of the lake, such as fish are almost extinct since the authorities build the dam at the mouth of Sg. Chini in 1995 to improve the lake water level of eco-tourism destination. Effects of dam construction has affected the original functions of the lake as a breeding ground for fish such as kelisa fish (arowana) and belida fish (giant featherback) which are entering the lake via the Chini River from Sg. Pahang in certain months to spawn, breed and thrive. It becomes more daunting when the lake water is polluted, because of accelerating the process of extinction of the fish resources in the lake. This makes the lake as a source of supply of fish for food and income of local residents has been reduced. As an alternative, local residents are forced to venture into other economic areas such as rubber gardening and do other side work to get additional income. Lake water pollution also creates business market of lake fish increasingly difficult lately following the concern of customer who avoids eating fish from polluted lake.

c. Construction of the dam also resulted in the flow or movement of lake water is limited due to the high acid content. This lead to the deterioration of growing and breeding process of the fish in the lake. At the same time, the contaminated water of the lake causing weed plant species were breeding rapidly in the lake area. This situation not only threatens the lives of fish and other lake creatures, but also impedes reproduction of the lotus plant. Weed plants 'tail of cat' prevented seeds of the lotus plant to reach the bottom of lakes and sprout then grow because of the restrictions of roots (weeds) 'tail of cats', in addition, preventing sunlight reach the bottom of the lake. Consequently, the growing up of a lotus in the lake area is decreasing, because of the potential prejudice of the lake as a tourist attraction.

d. Breeding weed plant 'tail of cat' in Tasik Chini is said to occur from the activities of tourist's boat movement and fisherman's fishing boat, or taking tourists from the Paya Bungor Lake which are certainly plentiful in the area. The effect of the spread of weed plant 'tail of cats' growth has brought the difficulty for the movement of boats in the lake due to the simple roots stuck in the engine and lead to damage to the boat engine. The growth of weed plant 'tail of cats' in lakes also causes the flow or movement of lake water is limited, then agglomeration bacteria in the water continued to rise because the threat to biodiversity and water quality and the environment around the lake. Compared to before, when the rainy season, water from the Sg. Pahang will flow into the lake with fish and other water sources. Whereas after the rainy season, the lake water will flow out through the Sg. Chini to Sg. Pahang which can cause the sewage and bacteria can be cleared from the lake.

e. Since the activities of miners to operate tourist boats have been raised the revenue, the competition with those outsider in controlling tourist boats around the lake continued to rise. However, in that competition, the outsiders who have a huge capital has always successfully to take a huge profits rather than the local population, especially among the indigenous people who have lack of capital and facilities. Until this research have been done, operators of tourist boats only 2 people from local people. It is very contrast with the situation two years ago with the boat operator from among the local population is about 4 people. Reduction the number of operators of tourist boats from the Local people following the inability of the owners to fix damaged boats and engines that require relatively high financial cost. This situation is quite different from the operator of the boat owned by an outsider, an average of Malays. They dont only have a more suitable boat- engine speed, but also have better financial to support the business in repairing if any damage occurred to the boat or the boat engine. This phenomenon shows the effort to develop eco-tourism activity around the lake is not enough to bring economic benefits to local people.

f. Effect of construction of the dam at the mouth of Sg. Chini has increased the water level in the lake to the height about 1.8 to 2.8 meters. Some of the edge of Sg.Chini is becoming wider and shallower due to cliff erosion. River edge erosion is not only due to high water levels, but also due to frequency of the boat passed which cause the land of the edge become more soft and lead to the occurence of soil erosion. As a result, many trees are endangered. Some have fallen into the lake or across the river so that bring the difficulty for the movement of tourists and local fishermen's boats on the river. By one estimate, the increase in water level of Tasik Chini and also the construction of dams at the mouth of Sg. Chini has resulted in about 60 hectares of forest area around the edge of Tasik Chini experiences the destruction.

g. Efforts to replant the rubber land garden with oil palm plantation in Kamoung Gumum organized by Risda which were abandoned after the old rubber trees were uprooted as well as threatening the economic resources of local residents. Risda's failure to continue the oil palm planting work on rubber nearby Kampung Gumum caused many of the locals lose their source of income from rubber tapping work. For those who are directly in continue volved in rubber tapping activities of the remaining rubber plantation, the return is not that big, about RM70 per month.

h. Felda Agricultural land clearing for oil palm plantations in a big way near the lake have been threatened eco-systems of surrounding areas. Cutting down the forest and old rubber trees from the surrounding

areas have significantly enhanced the process of soil erosion and muddy runoff and contaminated with pesticides and fertilizers in the lake. The situation is getting worse by finding that local people also do logging on the forest area near the lake for agricultural purposes, and gardening products. This resulted in some area lakes and rivers have been an increase area of sand edge, because making the lake more shallow and muddy.

i. Containment activities in the lake water is also causing a certain season, especially around October to December, the small villages around the lake, such as Tanjung Puput, Cendahan and Malai are often overwhelmed by flood water.

j. Chini Resort Development and the National Service Training Camp also giving a certain impact on the sustainability of ecological and environmental quality at Tasik Chini. There are claims that initial cause of the lake water pollution is the sewage pipes of the two places have been allocated to the lake. Such matters, however, was denied by the supervisors of the training camps and resorts.

k. Water runoff from oil-palm estate and nearby rubber estate sponsored by Felda and Risda also brings about weedicide inflow into that lake especially when rainy day. It is threatening quality of the water in the lake including for life in river and residents's usage.

l. The process of clearing the surrounding forest for oil palm and rubber farming is also threatening the source stability hunt and forest product such as forest herbs, sandalwood or aloes wood, rattan, etc. Reported that searching for the forest product and hunting are more difficult to be done by local residents. Long time ago, going to forest looking for rattan, woods and stick root only takes time about one day to three days only. Currently, journey to forest not only taking more time but effort to get forest product is decreasing and difficult. In fact, not many local people who get involved in this work.

m. Extinction of the surrounding forest and fish resources in the lake area is also causing the probability of local residents and tourists discover the presence of birds and wild animals of certain species is said to have declined in recent times. Before, there are about 200 species of birds can be found around the lake, currently the number is dropped to only a few species. These developments show how greed development activities primarily involve exploration of the forest area around the lake has been threatening the ecology of animals that often visit the lake.

The challenges of socio-cultural tourism and agricultural development around Tasik Chini:

a. Widespread symptoms of alcoholism and drug addiction among young men due to the influence of the presence of tourists and foreigners.

b. Safety issues of residential areas around the kampung Gumum increasingly threatened by the increasing cases of clashes involving the visitor chalets who organized dances while drinking alcohol.

c. Improve symptoms of theft involving local youth and rural people on drug and alcohol addiction. Chalet Resort Gumum often suffered invasion and theft of furniture, electrical equipment, and travel goods. Vandalism also occurred on private goods and public property.

d. Free sex life style involving young men in the Kampung Gumum is increase. Youngsters from the surrounding areas (Felda) is also often visited some dating area until the late night.

e. Pollution of the lake and surrounding villages continued to occur. Plastic food wrappers and bottles of soft drinks and alcohol appeared scattered mainly in the area on the lake or the jetty. Engine oil bottles are also seen scattered in various places around the lake, polluting the area and Resort Gumum and Resort Tasik Chini.

f. Chalet manage operating costs has become increasingly expensive. Incidents of crime and environmental pollution caused little interest to tourists travel to this area. For those who are present, the average visit only for a short period. There are reports showing the number of visitors staying in resorts around Tasik Chini is not reach 10 percent of tourists come to travel during daylight hours only. In other words, Tasik Chini is a temporary stopover for tourists on their way to Kuantan, because not many people staying at nearby resorts.

g. Tourists and foreigners also build relationships with people outside of the local population. As a result, rural lifestyle has been imitated by many of local people i.e. how to dress, speak, and behave. There are some of villagers in kampong Gumum can speak foreign i.e. English and French. Open-minded to outsiders prevail, but some are already married to foreigners i.e. of ethnic Indians, Chinese, Iban, including the Europeans from the Dutch and Russian.

h. Admission outsider also influence the belief systems of local population. Some have turned religion from animism to Islam and Christianity. The entry of Christian missionaries is more significant than Islamic preachers which lead to the bigger number of local population has embraced Christianity.

i. Local youth are more likely to work outside the village and absorb the values of urban life when returned to the village on weekends. Each house can be said to have been equipped with TV sets, radio and DVD. Several houses were also equipped with refrigerators, fans, gas stoves and such. Some houses have also been refurbished and built with better materials than cement board with a better design and comfort. Most of them have a better job as a contractor near an oil palm plantation, retired government department or to marry someone outside the more secure economic position. .

j. Cases involving drug addiction and the sale of drug which involved of local young people are familiar in the research area. Similarly, cases involving motor racing around the outside of the village have also been problematic. Inner reprimand and local residents are often neglected or ignored. Practice respect for older people has faded and loose. This phenomenon raises a sense of frustration and dissatisfaction among the local population, especially among older persons in the village. Accidents often occur, and in some circumstances lead to serious injury.

k. Drinking water and domestic use increasingly contaminated with ecoli bacteria. Pollution also involves the flow of groundwater leading to contamination of water wells. Rationing of water supply pipe is often happen to hit a few days to several weeks in a month. Among the causes were due to low water pressure. The construction of national service training camp near the water supply also inhibits the native people of this community area. This is due to the use of water is preferable for the camp participants and tourists from nearby resorts.

l. Water pollution of lakes and wells cause the criminal problem from local people that their children often fall sick due to having diarrhea Berit (diarrhoea) because of drinking the pond water during bathing, swimming. There is also grumbling disease or itchy skin due to bathing, swimming in the lake. For those who are still working

on the lake for fishing activities as daily food, there were comments that the fish taste muddy although it said no such thing happened about 10 years ago. The biggest problem for parents of local people is to control their children from the age-long bathing-swim in the lake and prevent them from drink the polluted lake water.

Conclusion

From the discussions above, obviously the effort to find a way to increase economic for Orang Asli Tasik Chini need to be raised. Some of the problems that elaborated have strong relation with unstable population economic system by macro otherwise if it is scrutinized by micro or from population spectacle. For them, the opportunity to find forest product already become a routine part of their economy.

Initiative in developing Tasik Chini and area around the lake as biosphere reserve lead to a good hope of present situation. However, economic opportunities among residents who have assets of energy resources, capital and cultural assets must be tracked, maximized and then publicized to community. This move would enable the recommendations of economic programs in the future can be matched with human resources and cultural assets in a given society. Capacity and group tendency also can be adjustable with new opportunities which will be introduced in tandem with reviving Tasik Chini as eco-tourism attraction and research center.

Based on interviews with researchers Tok Batin when the first public awareness programs conducted, he admitted that measures to ensure his subordinates having birth certificate is the first step to enable the economic opportunities enjoyed by others. However, efforts to register people have not done. According to him, this step allows the children to school and subsequently other opportunities will follow. This is because without a birth certificate as a valid entity Orang Asli in the area will be affected. In this context, building self-esteem as children of indigenous people is the basic for activities and their lives in Tasik Chini.

Meanwhile, the measures of the state government and Federal government to improve infrastructure in order to promote eco-tourism has not been felt by the local community. This need to be done because the extinction of dependency on local resources, particularly Tasik Chini will also lead to the extinction of sense of community belonging to the region. Organizing an in-depth description of the issue claim their lives also can be done in school and youth associations. Organization-oriented activities unique of tasik Chini and local economic opportunities should be exposed to a new generation, especially youths and students because they will continue the struggle to increase the dignity of Jakun Ethnic in this country.

This paper are merely part of study findings researcher doing under research project in year

2007 and this go ahead in first and second public awareness programme in year 2008. The discussion about the economy of Tasik Chini and kg Gumum especially, indeed become the scenario actually be expected to be a guideline of the activities of which will be held in the local area. Local resident's opinion nowadays and future justified heard, because what they voice out is internal strength and anxiety dimension is in socio-economic radius population continue to support existence of Tasik Chini. Steps to improve the economic resources of Tasik Chini is also reasonable to be done by identifying daily activities that have contributed to the preservation of this unsustainable area for life and their environment. Activities of a sustainable appreciation is surely existing, due to their dependence on natural resources is a cultural assets that can promote economic of Tasik Chini.

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Conservation Through Climate Change Mitigation and Adaptation

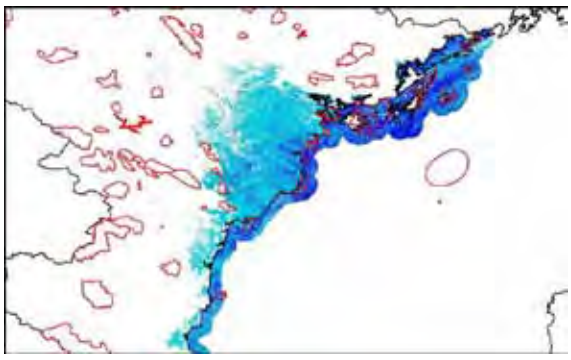
Using Biosphere Reserves as Learning Laboratories for Impact Assessment and Adaptation to Climate Change

The Provincial-trans-boundary Coastal Wetland Biosphere Reserve in Red River Delta (Red River Delta Biosphere Reserve), Vietnam

Nguyen Hoang Tri
Center for Environmental Research and Education, Hanoi National University of Education

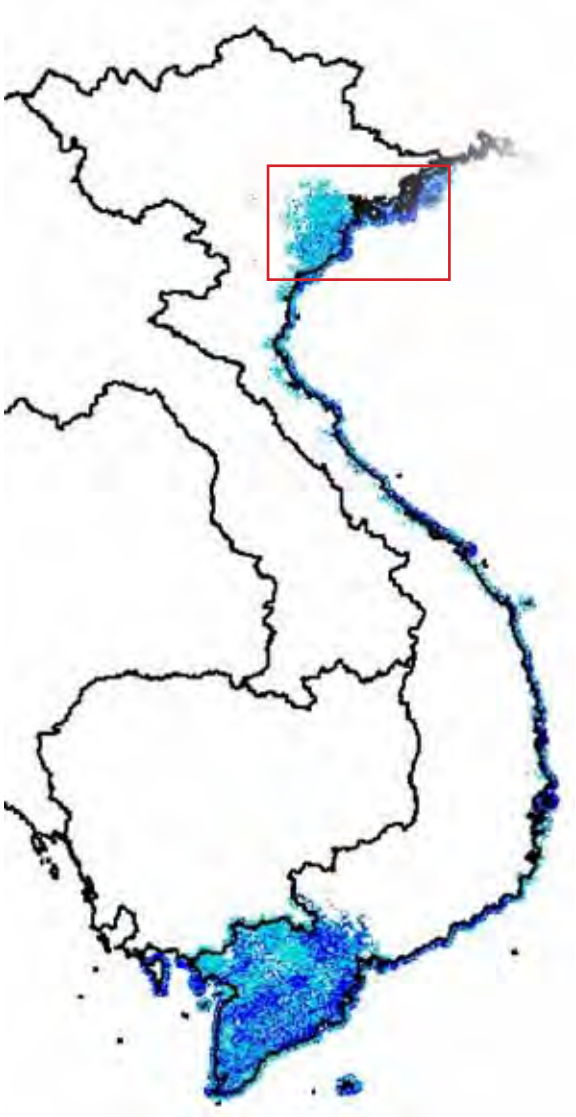
Nguyen Van Hien
Faculty of Biology, Hanoi National University of Education

The report deals with developing a co-management mechanism agreed by three provinces in the Provincial-trans-boundary Coastal Wetland Biosphere Reserve in Red River Delta (Red River Delta Biosphere Reserve) to implement three functions of biosphere reserves in three zones and using the biosphere reserve as learning laboratory for impact assessment and adaptation to climate change based on the national scenarios of climate change in this area. The learning laboratories are developed by integrating historical studies of how climate changes and climate variations in the past have affected



Critical Natural Habitats affected (Red River Delta)

Scenarios of Climate Change in Red River Delta

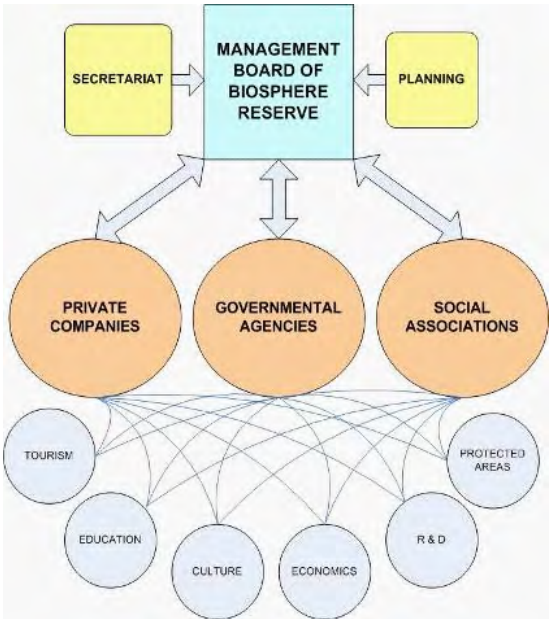


Sea level rise (dark blue = 1m, light blue = 5m)

Red river delta

human and/or natural system; impact of present day climate and climate variability; and creation of models with expert and manager judgment to develop a consensus view. The adaptation refers to all those responses to climate change that may be used to reduce vulnerability and actions designed to take advantage of new opportunities that may arise as a result of climate change. A matrix of nine selected sectors including population and migration, income and poverty, water, agriculture, tourism, human health, fisheries and aquaculture, energy, and biodiversity in three functions of the biosphere reserve is developed for impact assessment and adaptation scenarios. Two critical sectors of mangroves and agriculture are selected to develop integrated models for doing research on impact assessment and adaptation with changing their behavior to cope with a different climate. The report also proposes a cooperation mechanism among biosphere reserves in the national network to deal with impact assessment and adaption to climate change in the country.

Provincial-trans-boundary Coastal Wetland Biosphere Reserve in Red River Delta (Red River Delta Biosphere Reserve) Co-Management Mechanism



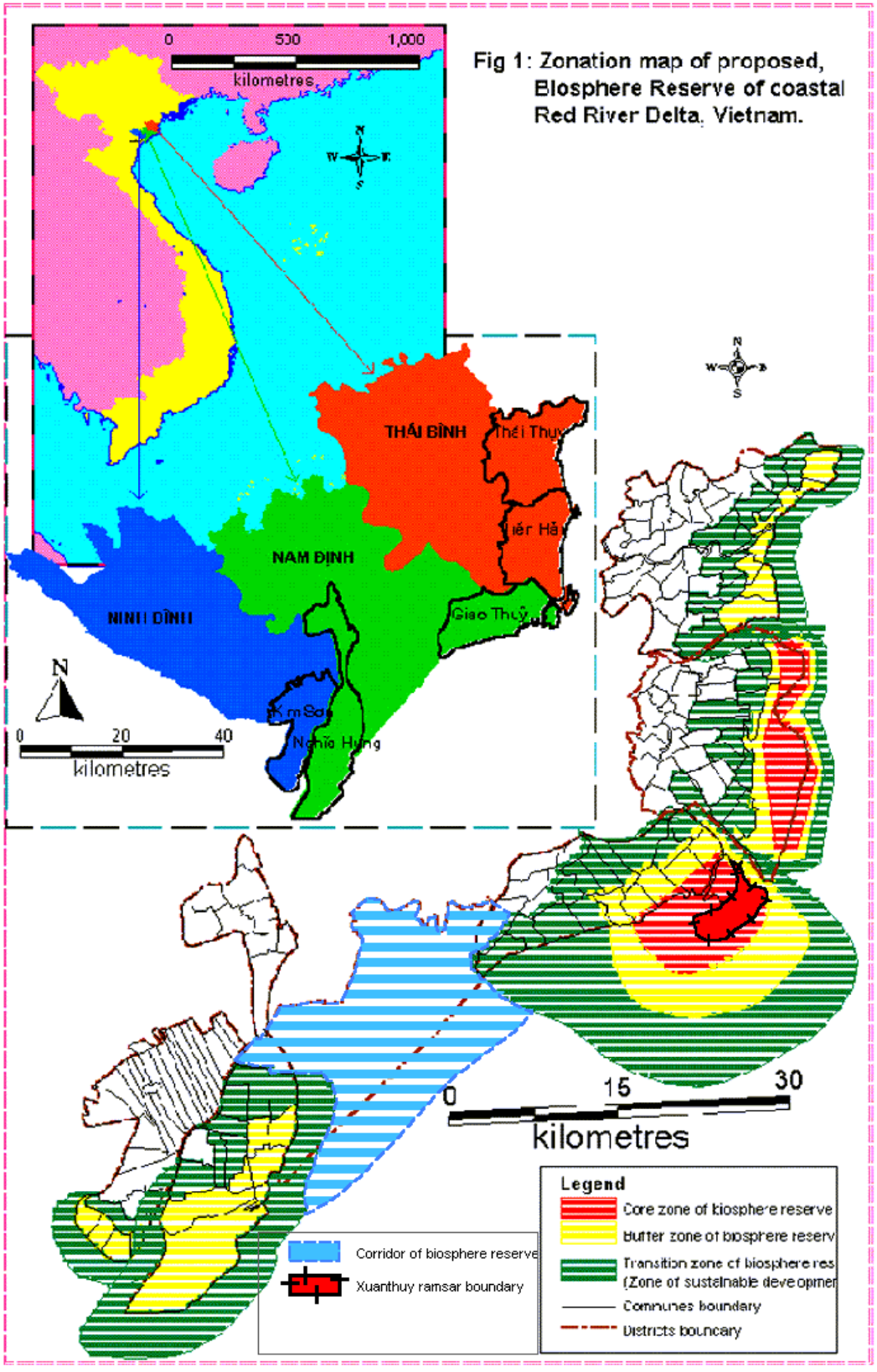
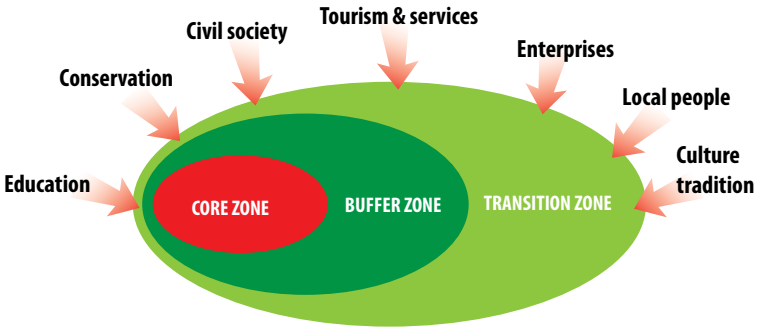


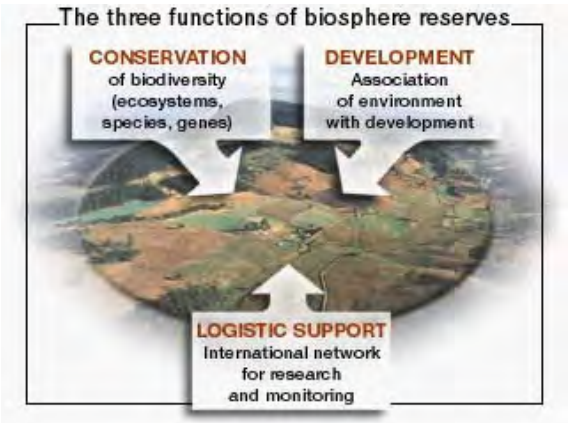
Fig 1: Zonation map of proposed, Biosphere Reserve of coastal Red River Delta, Vietnam.

Biosphere Reserves as a Site of Sharing Benefits and Responsibilities

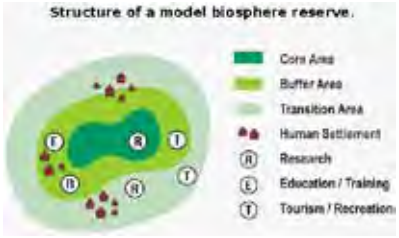
System Thinking, Landscape Planning, Inter-Sectoral Coordination, Quality Economy



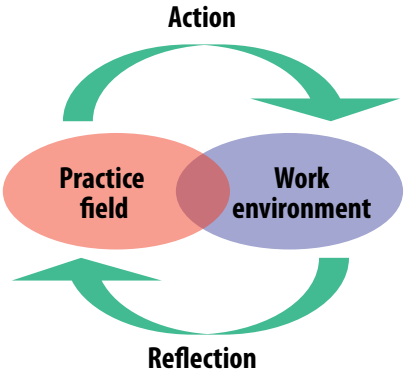
Coordinating harmonically activities based on benefits and responsibilities for sustainable development by national regulations and laws



Using Biosphere Reserves as Learning Laboratories for Sustainable Development



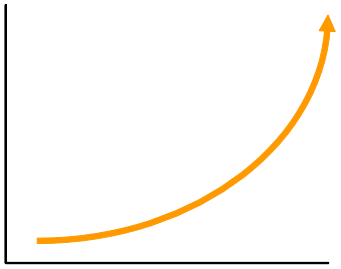
- Learning laboratories -process as well as settings in which a group (management team) can learn together
- Learning lab enable managers to experience and see the consequences of their actions, policies and strategies
- Learning lab allow learning to become a integral part of management work; it helps learning to become institutionalized.



System thinking - New perspective

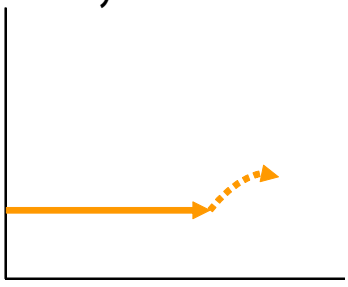
Vulnerability assessment of climate change in the biosphere reserve

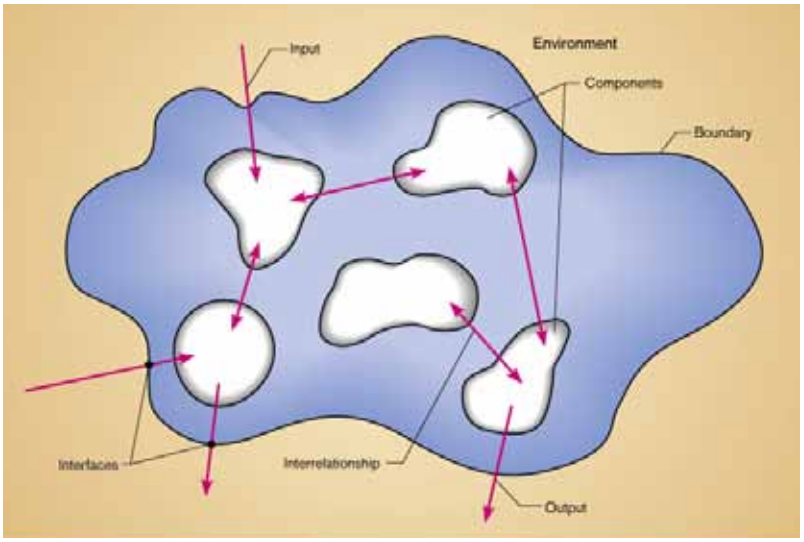
Economy



Environment

Poverty





Biosphere as a system

Using Biosphere Reserve As Learning Sites for Impact Assessment and Adaptation

- Highlighted as an important issue in the management plan
- Knowledge exchange and education on climate change
- Improving energy efficiency
- Biogas installation
- Adaptation: Mangrove plantation
- Adaptation: Integrated Coastal Zone Management (ICZM)
- Biological corridor in zonation
- Diversifying re-forestation and rehabilitation
- Climate change education
- Research innovations – system thinking
- Community-based tourism
- Improved local incomes by quality certification

Conservation of Mangroves in Ranong Biosphere Reserve

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Abstract

Mangroves of Ranong province had been declared as biosphere reserve in 1997. The Ranong Biosphere Reserve (RBR) incorporates a range of diversified natural and disturbed habitats including mangrove forests, tropical rain forest, open sea, seagrass beds and urban and agricultural land. However, mangroves are the most significant parts and represented for this biosphere reserve. The Ranong Biosphere Reserve embraces 30,309 ha and divided into three zones; core, buffer and transition zones. The core zone is the most pristine mangroves bounded by the sea and mangrove canals. The Buffer zone surrounds the core zone. This zone is managed to provide a buffer between the core and surrounding areas. Some activities such as fishing, rehabilitation of mangroves and ecotourism are allowed. The transition zone is comprised of areas converted for tin mining, agriculture, shrimp farming and urban development, and surrounds the core zone and buffer zone.

Mangroves in Ranong Biosphere Reserve cover an area of 6,897 ha. However, in some areas particularly in the buffer zone were utilized for charcoal production for more than 30 years. This results in poor condition of mangroves. Therefore, the government launched the rehabilitation project in degraded mangroves. Since 2002, the rehabilitation of mangroves in degraded area covers the area of approximately 1,440 ha.

Regarding to mangrove plantation, the plantation is done either by Department of Marine and Coastal Resources or by private individuals. The species most commonly planted are *Rhizophora apiculatea* and *R. mucronata* with some other species such as *Ceriops* and *Bruguiera* which planted on the higher areas within the mangrove area.

The protection of the existing mangrove forest from the invasion is also needed. The project on canal excavation has been launched since 2002 to distinctly separate mangrove areas from private lands. The canal which two meters depth and four meters width was excavated in the mangrove areas. The mangrove area adjacent to the community will be first conducted. Until now, the project has been conducted approximately 20 kilometers.

The government through the department of marine and coastal resources also tries to promote the conservation of mangroves by conducting the training projects on conservation of mangroves to the people who live nearby the Ranong Biosphere Reserve. This action aims to increase people awareness on mangrove conservation and education on mangrove ecosystems including the sharing information between the dwellers and the government officers to solve the management of mangrove resources. These would help to improve the mangrove forest in Ranong Biosphere Reserve in good condition and sources of carbon sink.

Introduction

The Ranong Biosphere Reserve is located in Ranong Province, in the south of Thailand on the west coast of the Malay Peninsula, 650km south of Bangkok and 300km north of Phuket. Ranong province is Thailand's least populous province, renowned for receiving the highest annual rainfall in the country. The main industries in the province are fisheries and the production of rubber, cashew nuts and fruits. The Ranong Biosphere Reserve covers an area of 30,309ha, south of the township of Ranong. The mountainous Ngao Waterfall National Park forms the eastern boundary of the reserve, which borders the Andaman Sea to the west. Ranong Biosphere Reserve incorporates a range of diversified natural and disturbed habitats including mangrove forests, tropical rain forest, open sea, seagrass beds and urban and agriculture land. However, mangroves are the most significant parts and represented for this biosphere reserve. Key ecosystems and features of the Ranong Biosphere Reserve include:

Mangrove Forests: The reserve incorporates a large proportion of the mangrove forests of Ranong Province. These luxurious forests grow in the soft muddy soils of the Kra Ruri River delta, on the border of Thailand and neighboring Myanmar. The mangrove forests of Ranong province are the largest concentration of mangroves remaining in Thailand and one of the most extensive in the Indo-Pacific region.

The mangrove forests in the reserve are mostly secondary forest, having been previously harvested for the production of charcoal; formerly a major industry in the area. The virgin old-growth forests that remain are now reserved for research purposes. One area in the reserve at Had Sia Khao comprises a stand of Rhizophora apiculata trees estimated as being 200 years old. Some of these trees reach up to 35m in height and over 2m in circumference at breast height.

The reserve comprises of species of mangrove trees, shrubs and vines: the most common being *Avicennia alba, Bruguira cylindrica, B. parviflorea, Ceriops tagal, Rhizophora apiculata, R. mucronata, Sonneratia alba* and *Xylocarpus granatum*.

Mangrove forests are important for their vital role in the coastal food chain, providing a source of food for many marine animals as well as providing shelter for young shrimp, crabs and fish in their complex roots systems. In this way, mangrove forests support Ranong's fishing industry, providing employment, food and other economic benefits for a large number of people. Mangroves in the reserve are also important source of wood, which local people use to construct their houses and fishing equipment and as fuel material for cooking. Furthermore, the mangroves serve to maintain coastal water quality by trapping sediments and filtering nutrients carried down by the river systems. Finally, mangrove forests in the reserve protect the coast from erosion during the southwest monsoon season.

Tropical rain forest: A further fascinating feature of the Ranong Biosphere Reserve is the tropical rain forest. These forests are scattered throughout the reserve; on islands rising high above the mangrove forests and further inland interspersed by agricultural and urban land. The main tree species found in the tropical rain forest are *Dipterocarpus spp.; Anisoptera spp.; Shorea siamensis; Hopea ferrea; H. odorata* and *Dillenia spp*.

Seagrass beds: Seagrass beds are located in isolated patches throughout the reserve. These beds are comprised of *Enhalus acoroides; Cymodacea serrulata; Halophila ovalis* and *Halodule uninervis*. Seagrass beds are important for juvenile fish, prawns and other small animals, playing a role similar to mangrove forests, providing them with food and a place to live. They also hold the muddy soils together protecting against erosion and provide a source of food for the endangered dugong and some types of sea turtles.

Urban and agricultural land: Areas of urban and agricultural land in the reserve lie in the narrow coastal plain between the mangrove forests and the Ngao National Park, Fifteen villages are located within the reserve boundaries; five of these based within the mangrove forests.

Local population and economic activity: The population of the reserve is made up of people of predominantly Buddhist and Muslim religion; the only exception being a village on the western side of Koh Lao island which is occupied by "Chow Ley" or "Sea Gypsies" who practice an animist religion. Villagers living within the mangrove forests predominantly make their living from catching mud crabs, small *Acetes* shrimp and small pelagic fish. Some villages are also involved in the production of shrimp paste and cultivation of fish in cages in the mangrove canals. Villagers living landward of mangrove forests predominantly derive their incomes from the growing of fruit, rubber and cashew nut and shrimp farming which occurs within and on the boundary of the mangrove forests. Large areas of the reserve lie abandoned after having been disturbed by tin mining, a major economic activity in Ranong until the mid 1980's. These areas are no longer suitable for agriculture due to the poor soil condition.

Wildlife habitat: The reserve is home to a diverse wildlife population. Mammals that can be seen when visiting the reserve include otters, bats, crab eating macaques, tree squirrels, and civets. Endangered dugong and dolphins have also been sighted in the area. Reptiles found in the reserve include turtles, monitor lizards and many species of land and sea snakes. The diverse range of habitats in the reserve attracts a multitude of bird species, many species migrating here from other parts of Thailand and from overseas to breed and raise their young. Most commonly sighted species are the king fishers, hawks, bee-eaters, egrets, herons, kites, plovers and ducks.

International Research: The Ranong Biosphere Reserve is home to the Ranong Mangrove Forest Research Center in Ngao Sub-district, approximately 15km south of the township of Ranong. The Royal Forest Department opened this center in 1983. In 2003, the Royal Forest Department underwent a restructuring, during which the Ranong Mangrove Forest Research Center was transferred to a newly formed unit, the Department of Marine and Coastal Resources.

The objectives of the center are:
1. to conduct research and support the research projects of other research organizations within Thailand and overseas.
2. to disseminate information about mangroves ecology and
3. to encourage the conservation of mangrove forests.

Furthermore, the Ranong Mangrove Forest Research Center has been designated as the authority in charge of administrating the Ranong Biosphere Reserve. Over the years, the center has hosted many international research projects which have greatly increased our knowledge of the mangrove ecosystem and its value. At present, the center is active in educating the local community about the environment and the value of mangrove forests, hosting many school and community groups and organizing community replanting days. Facilities at the center include an information center and boardwalk with interpretative signage focusing on the mangrove environment.

Mangroves in Thailand

In Thailand, mangroves occur on the sheltered muddy shores and low-lying bogs of river and stream estuaries at levels between low and high tides, along the banks of the Gulf of Thailand and on the west and east coasts of the peninsula. The best developed natural mangroves remain only along the western

Old growth mangroves at Hat Sai Khao

coast especially in the provinces of Ranong, Phangnga and Trang. The mangroves along the coasts of the Gulf of Thailand are mainly classified as young growth because most of these mangrove forests had suffered heavy felling for many years, especially in the upper part of the Gulf of Thailand, particularly in the provinces of Petchaburi, Samut Songkram and Samut Sakorn. The recent estimate of mangroves by the Department of Marine and Coastal Resources in 2002 was 233,699 ha.

Mangroves in Ranong Biosphere Reserve

UNESCO declared mangrove areas under jurisdiction of Mangrove Forest Research Center and surrounding areas as Ranong Biosphere Reserve in 1997.

Mangroves in Ranong province covered a total area of 19,237 ha. They occur on the shelter muddy shores of river and stream estuary between low and high tide. The significant feature of mangroves in Ranong province is the many connecting waterways, one of which is Klong Ngao or Ngao Canal. Klong Ngao, Ranong province is in the core area of Ranong Biosphere Reserve. The total area of mangroves in Ranong Biosphere Reserve is approximately 43,104 rai (6,897 ha).

Vegetation

Meepol (2010) reported that Thailand's mangrove flora in Ranong Biosphere Reserve belongs to 26 families, 38 genera and 51 species (Table 1). Most of the dominant and important species are in the family Rhizophoraceae, especially genera Rhizophora, Ceriops and Bruguiera, the family Sonneratiaceae such as Sonneratia, and the family Avicenniaceae with many species

The distribution of mangrove species occurs in distinct zonation patterns with different species or combinations of species dominating different zones, result from the environmental factors such as the texture of soil, the water salinity, the frequency of inundation. Meepol (2002) reported that mangroves at downstream of Ngao Canal which located in the Core zone of Ranong Biosphere Reserve from seaward to landward sites as the following manner. Mangroves at seaward zone were occupied by *Sonneratia alba, Avicennia alba, A. marina* and *Aegiceras corniculatum*. This zone has a length of about 50 m from seaward. From 50 to 130 m, mangroves comprised of mixed species such as *Rhizophora mucronata, Bruguiera cylindrical* and *B. parviflora*. At the inner zone, from 130 to 200 m along the transect line, mangroves comprised of pure stand of *Rhizophora apiculata*.

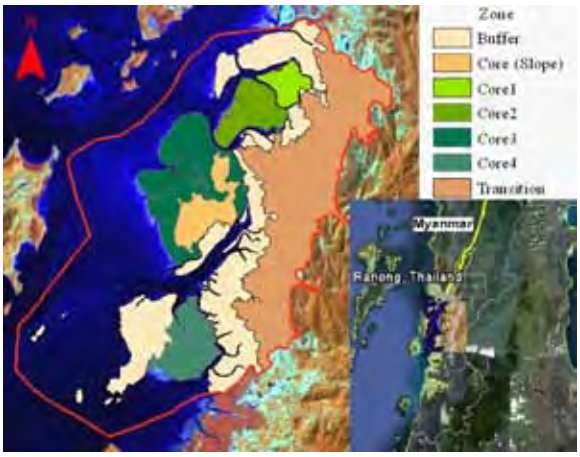
Table 1 Mangrove species in Ranong Biosphere Reserve, Ranong province, Thailand.

No.	Sciencetific name	Family
1	*Acanthus ilicifolius* L.	Acanthaceae
2	*Acanthus volubilis* Wall.	Acanthaceae
3	*Cerbera odollam* Gaertn.	Apocynaceae
4	*Nypa fruticans* Wurmb.	Arecaceae
5	*Phoenix paludosa* Roxb.	Arecaceae
6	*Finlaysonia obovata* Wall.	Asclepiadaceae
7	*Pluchea indica* (L.) Less.	Asteraceae
8	*Avicennia alba* Blume	Avicenniaceae
9	*Avicennia officinalis* L.	Avicenniaceae
10	*Avicennia marina* (Forsk.) Vierh.	Avicenniaceae
11	*Dolichandrone spathacea* (l.f.) K.Schum.	Bignoniaceae
12	*Lumnitzera racemosa* Willd.	Combretaceae
13	*Lumnitzera littorea* (Jack) Voigt.	Combretaceae
14	*Wedelia biflora* (L.) DC.	Compositae
15	*Diospyros areolata* King & Gamble	Ebenaceae
16	*Excoecaria agallocha* L.	Euphobiaceae
17	*Flagellaria indica* L.	Flagellariaceae
18	*Scaevola taccada* (Gaertn.) Roxb.	Goodeniaceae
19	*Barringtonia asiatica* (L.) Kurz	Lecythidaceae
20	*Cynometra ramiflora* L.	Leguminoceae
21	*Pongamia pinnata* (L.) Pierre	Leguminoceae
22	*Intsia bijuga* (Colebr.) O. Ktze.	Leguminoceae
23	*Derris trifoliate* Lour.	Leguminsae
24	*Caesalpinia crista* L.	Leguminsae
25	*Dalbergia candenatensis* (Dennst.) Prain	Leguminsae
26	*Hibiscus tilliaceus* L.	Malvaceae
27	*Melastoma saigonese* (Kuntze) Merr.	Melastomataceae
28	*Xylocarpus moluccensis* (Lamk) M. Roem.	Meliaceae
29	T*hespecia populnea* (L.) Soland. ex Correa	Meliaceae
30	*Xylocarpus granatum* Koen.	Meliaceae
31	*Ardisia elliptica* Thunb	Myrsinaceae
32	*Aegiceras corniculatum* (L.) Blanco	Myrsinaceae
33	*Acrostichum aureum* (Linne)	Pteridaceae
34	*Acrostichum speciosum* Willd.	Pteridaceae
35	*Rhizophora apiculata* Bl.	Rhizophoraceae
36	*Rhizophora mucronata* Lamk.	Rhizophoraceae
37	*Rhizophora stylosa* Griff.	Rhizophoraceae
38	*Bruguiera cylindrica* (L.) Bl.	Rhizophoraceae
39	*Bruguiera parviflora* (Roxb.) W.&A. ex Griff.	Rhizophoraceae
40	*Ceriops decandra* (Griff.) Ding Hou	Rhizophoraceae
41	*Ceriops tagal* (Perr.) C.B.Rob.	Rhizophoraceae
42	*Bruguiera sexangula* (Lour.) Poir.	Rhizophoraceae
43	*Bruguiera gymnorrhiza* (L.) Lamk.	Rhizophoraceae
44	*Kandelia candel* (Linn.) Druce	Rhizophoraceae
45	*Merope angulata* (Willd.) Swingle	Rutaceae

46	*Sonneratia alba* J.E. Smith.	Sonneratia-ceae
47	*Sonneratia ovata* Back	Sonneratia-ceae
48	*Heritiera littoralis* Dry-and.	Sterculiaceae
49	*Brownlowia tersa* (L.) Kosterm.	Tiliaceae
50	*Clerodendrum inerme* (L.) Gaertn.	Verbenaceae
51	*Premna obtusifolia* R. Br.	Verbenaceae

Policies on Mangroves in Thailand

Tenth National Economic and Social Development Plan



Map of Ranong Biosphere Reserve

For more than 30 years, the Thai Government has prepared 5-year National Economic and Social Development Plans to help guide the social and economic development of the country. In the present national plan, the Tenth National Economic and Social Development Plan (2007-2011) set the following goals for mangrove conservation Thailand:

1. Conserve mangrove forest at least 1.25 million rai. (200,000 ha).
2. Protect and restore marine resources and coastal ecosystems.
3. Preserve, conserve and protect biodiversity in highly biodiversity areas.

The responsibility for mangroves in Thailand lies with the Department of Marine and Coastal Resources, under the Ministry of Natural Resources and Environment. Prior to October 2002, the responsibility for management of Thailand's mangroves was with the Royal Forest Department, Ministry of Agriculture and Cooperatives.

Conservation Strategies

Mangrove forest in Thailand had been utilized for a long time. The government provided the majority of the mangrove areas for concession forest. The management of mangrove previously aimed at timber production. Havanond (1994) reported that the timber production from the concession forest in 1975 was 658,570 m3 but it was only 193,145 m3 in 1993. The decrease of timber production was result from the decline of mangrove forest and the over-exploitation for timber production. It was found that during the concession period (1968-2002) mangrove stocks were depleted and land degraded due to failure of weak enforcement of the existing rules and regulations. Large areas therefore were left with non-commercial species. Therefore, in 1996, the government proposed the total log ban in mangrove forest resulting in 2002 the concession forest was terminated.

After the end of the concession period, the management of mangrove forest focuses on conservation and rehabilitation the mangrove forest for sustainable resources. For the rehabilitation, the government set a large-scale mangrove rehabilitation program in improving the environment of the coastal

area of the country. Large area of degraded mangrove forest, abandoned shrimp pond, abandoned mining area, degraded mangrove areas and new mudflat are the target areas to be planted with approximately 1,600 to 2,000 ha yearly. The rehabilitation project is being carried out not only by the government but also in private sectors, NGOs and local communities. Between 2002 and 2006 the rehabilitation project had been conducted with the total area of approximately 64,000 ha. At present, the rehabilitation is almost completed finished. The plantation activities have been largely concentrated on the direct planting of nursery grown or elongate propagules of Rhizophora species on mudflats and degraded areas. The species most commonly planted are *Rhizophora apiculatea* and *R. mucronata* with some other species such as *Ceriops* and *Bruguiera* which planted on the higher areas within the mangrove area.

Conservation of Mangroves in Ranong Biosphere Reserve

Rehabilitation of mangroves in degraded area.

Mangroves in Ranong Biosphere Reserve are classified as conservation forest resulting from the abolition of concession forest in 1996. In the part, mangroves in this area particularly in the buffer zone had been utilized for charcoal production for more than 30 years. After the end of concession forest, the government rehabilitated mangroves in degraded areas, abandoned shrimp farm and abandoned tin mining areas. From 2002 to 2006, the rehabilitation project covered the area of approximately 1,440 ha. The species most commonly planted are Rhizophora apiculatea and R. mucronata with some other species such as Ceriops and Bruguiera which planted on the higher areas within the mangrove area. At present, the restoration of mangroves is almost finished.

Nursery practices for mangrove species

The government also launched the canal excavation to distinctly separate mangrove areas from private lands in Ranong Biosphere Reserve. The canal which two meters depth and four meters width was excavated in the mangrove areas. The project had been done approximately 20 kilometers through the biosphere reserve. However, there are two acts which protect mangrove areas in Ranong Biosphere Reserve, Forest Act B.E.2484 (1941) and National Reserved Forest Act B.E. 2507 (1964). Under the two acts, people cannot destroy the mangrove areas including settle in the mangrove area.

The government through the department of marine and coastal resources also tries to promote the conservation of mangrove forest by conducting the training projects on conservation of mangrove forest to the people who live nearby the mangrove forest in Ranong Biosphere Reserve. This action aims

to increase people awareness on mangrove conservation and education on mangrove ecosystems including the sharing information between the dwellers and the government officers to solve the management of mangrove resources. The training project for the locals in Ranong Biosphere Reserve starts from 2002 which run two courses yearly. The number of people participated this project is now more than 500 people.

Rehabilitation of mangroves in degraded area.

Rehabilitation in abandoned tin mining area

Rehabilitation of mangroves in abandoned shrimp farm
Conclusion

Mangroves are valuable resources in Ranong province and represented for the Ranong Biosphere Reserve. In the part, mangroves in this area particularly in the buffer zone had been utilized for a long time such as charcoal production result in low productivity. However, mangroves in this area also had been converted to other activities such as tin mining area, shrimp farm and human settlement. The government is attempting to conserve mangrove forest. Many schemes have been implemented such as the total log ban in mangroves, action plan in mangrove rehabilitation, protection and education. These would help to improve mangroves in Ranong Biosphere Reserve in good condition and mangroves can act as full function in mangrove ecosystem.

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Coping with Local and Global Environmental Change in the Philippines: The Case of Puerto Galera and Palawan Biosphere Reserves

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Abstract

The two Biosphere Reserves in the Philippines (Puerto Galera and Palawan) are areas with high similarities in relation to physiography but with stark contrasts in efforts to address impacts from environmental uncertainties, including climate change. Declared in 1977 as a Reserve with a total land area of 23,247 ha, the town of Puerto Galera has been transformed from a predominantly pristine and conservatively homogenous community thriving mainly on land-based small-scale industries to one whose environment has largely been abused in the name of 'ecotourism development' by a currently culturally pluralistic society. Its performance as a Biosphere Reserve is for the most part Unsatisfactory. On the other hand, the province of Palawan, declared a reserve in 1990 with a total land area of 1.5 million ha, remains largely agricultural with small-scale sea-based industries and ecotourism for support. It enjoys the reputation of being the 'last frontier' of the Philippines, consistently in the Hall of Fame in environmental circles. As a Biosphere Reserve, it performed largely Marginally Satisfactorily. While development, conservation and logistical support -the hallmarks of BRs- have been undertaken in both areas at comparable extent and rates, it has been the political impetus and the effectiveness of advocacy for societal mobilization towards more sustainable futures, which made the difference for the two reserves.

One unique element about embarking on climate change adaptation measures in the Philippines is that the solution is intricately intertwined with environmental protection and ecosystem-based management. Here, I investigate the dynamics of governance as reflected in the extent coastal marine science has been linked to policies in climate change mitigation and in coastal ecosystem protection and management in the two reserves. The outcome is put in the context of how successful they are in adapting to negative environmental impacts. An Action Plan is proposed based on the concept of Biosphere Reserve Sisterhood as a means to reverse the trend in environmental degradation and misuse and adapt the communities to the impacts of negative environmental uncertainties.

Keywords Biosphere Reserve, climate change, Puerto Galera, Palawan, Philippines

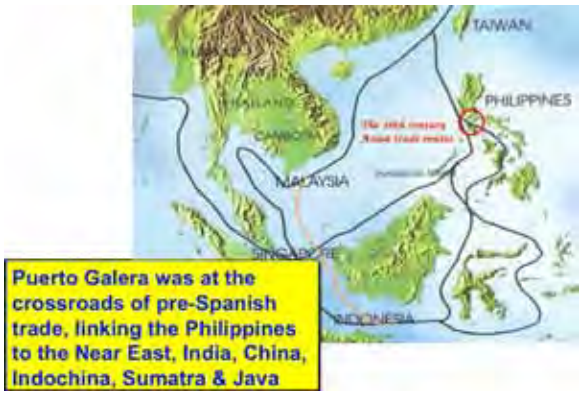
Main Points

1. Puerto Galera & Palawan Biosphere Reserves had commendable beginings (re pre- & post Seville Strategy & Madrid Action Plan 2005 - 2008)
2. However, along 15 criteria for sustainability, the cucrrent initial performance of Puerto Galera as a BRR is largely UNSATISFACTORY. On the other hand, performance of Palawan as a BR is MARGINALLY SATISFACTORY
3. While both ar trying their best to adhere to the goals of the MAB, constraints & opportunities afforded by current realities, led the BRs to rely heavily on activities that are extractive of the natural resource base, at some point jeopardizing the survival of indigenous peoples;
4. To address the issues, we propos an action plan that works on the principle of BIOSPHERE RESERVE SISTERHOOD

The importance of our Biosphere Reserves :

To the world

Puerto Galera was at the crossroads of pre-Spanish trad, linking the Philippines to the Near East, India, China, Indochina, Sumatera & Java. Puerto Galera Bay : one of the most beautiful bays in the world



By forcing more 'eddies' to form, Puerto Galera expands the distribution of species enhancing the 'center of the center' of marine shore fish diversity in the world

Palawan

"the Philipines' last frontier"

- Puerto Princesa Subterranean River National Park & World Heritage Site
- The Tubbataha Reef National Marine Parka, Ramsar Site & World Heritage Site

The Province is a Biospher Reserve

To the Philippines

The country's richest source of natural biodiversity which provide goods & services to the environment & people

Philippines : most urgent biodiversity conversation priority on the planet

To our people

A Biosphere Reserve is life, a home and a future

Puerto Galera Biosphere Reserve

Location : 13°23' to 13°32'N
120°50' to 121°00'E
Area : 23.247 ha
Altitude : 0 to +1800 m.a.s.l
Year designated: 1977

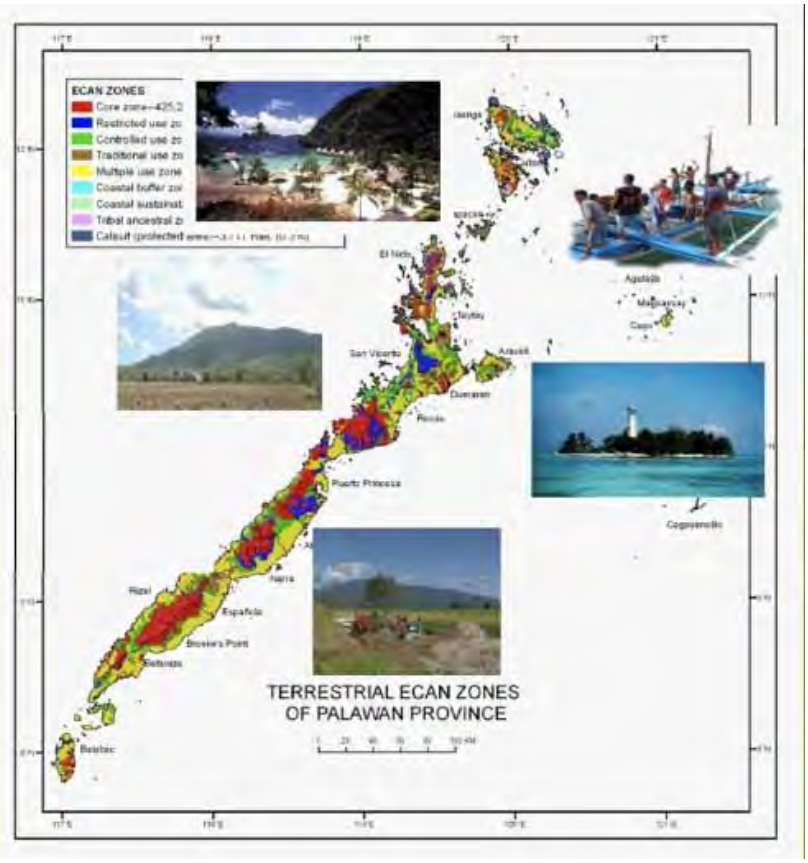
Major ecosystem type :
Tropical humid forests with coastal marine components

Major habitats & land cover :
Malasimbo rainforest, brushland, mossy forest, marine ecosystems, agro-ecosystems, coconut plantations

Puerto Galera Biosphere Reserve Major Issue

1. **Some unsustainable tourism practice**
2. **Waste management**
   - causting pollution
   - impacting mangroves, seagrass & reefs ; hence
   - reducing the source of livelihood & visitor arrivals
3. **Violation of laws**
   - gross violation of laws (e.g. law on 'setback')
   - succumbing to the glitter of foreign but short-term & environmentally unfriendly investments
4. **Unpreparedness to adapt to climate change**
   Puerto Galera needs to give priority to capacity building at all levels in order to mitigate & adapt to the impacts of climate change

Industries coexisting with protected areas



Some notable 'wise practices' in Puerto Galera

2005
Coastal Resources Management Plan (WWF & Locsin Foundation, Inc)

2006
Municipal Ordinance #06 - 03
(Environmental User's Fee System, EUF)

People Participation & Empowerment

The Palawan Biosphere Reserve

Location : 08°30' to 12°45'N
117°30' to 121°45'E
Area : 1,150, 800 ha
Core area : 55,625 ha
Buffer zone : 636,550 ha
Altitude : -180 to +2,085
Year designated: 1990

Major ecosystem type :
Tropical humid forests with coastal/marine components

Palawan Biosphere Reserve Major Issue

1. 1. Poaching of marine resource (peta)
   Foreign Intrusion in Palawan, 1995 - 2002

Nationality	Number	Percentage
Chinese	469	65%
Malaysian	131	18%
Vietnamese	91	13%
Indonesian	26	3%
Taiwanese	10	1%
Total	727	100%

2. Impacts of Petroleum explorations (peta)

3. Highly extractive industries e.g. mining (peta)

4. In the span of 60 years (from 1946 to 2005), the forest cover of Palawan was reduced in half

Year	Forest Cover of Palawan (hectares)	(%)
1946	1.3 million	89%
1983	779,600	68%
2005	666,338	46%

5. Unpreparedness to adapt to climate change impacts
   (peta)

   Most of Palawan's coastal fringes will be inundated by 1 - 6 m sea level rise

6. Gross violation of laws
   Dicontent among the populace, fueling dissent, disobedience & distrust towards authorities & hopelessness on the part of common people.

Some notable 'wise practices' in Palawan

1983, 1985
Comprehensive Plan (development = environment)

1987
Draft Strategic Environmental Plan (SEP)

1990
Palawan as a Biospher Reserve

1992
SEP Law passed in Congress (ECAN as the strategy)

Carbon Sequestration in Palawan Forests

Forest cover	Carbon density* (tC/ha)	Area (ha)	Total Carbon Stock (million tons)	Value at US$15/tC (trillion pesos)**
Old growth forest	349.81	189.771.8	66.4	41.8
Mossy forest	204.25	21,600.8	4.4	2.8
Residual forest	336.4	373.278.2	125.6	79.1
Mangrove	174.9	58.399.6	10.2	6.4
		643,050.4	**206.6**	**130.1**

* Values from Lasco at al. 1999 as cited in cruz at al 2002
** 1US$: PhP 42

Current Initial Performance Rating of the BRs in relation to specific 'on the ground' actions

ISSUES	PUERTO GALERA	PALAWAN
Capacity Building	U	S
Institutional Strengthening	MS	MS
Participatory actions	MS	S
Consensus building	MS	MS
Strengthening local identities	U	MS
Transdiciplinary actions	U	MS
Communication	U	U
Long-term benefit	U	MS
Transferability	U	MS
Cultural sensitivity	MS	MS
Gender sensitivity	U	U
Science - based decision support	U	MS
Local legal policy	U	MS
Documentation	U	MS
Monitoring & Evaluation	MS	MS

Highly Satisfactory (HS), Satisfactory (S), Marginally Satisfactory (MS), Marginally Unsatisfactory (MU), Unsatisfactory (U) and Highly Unsatisfactory (HU)

Proposal : Biosphere Reserve Sisterhood

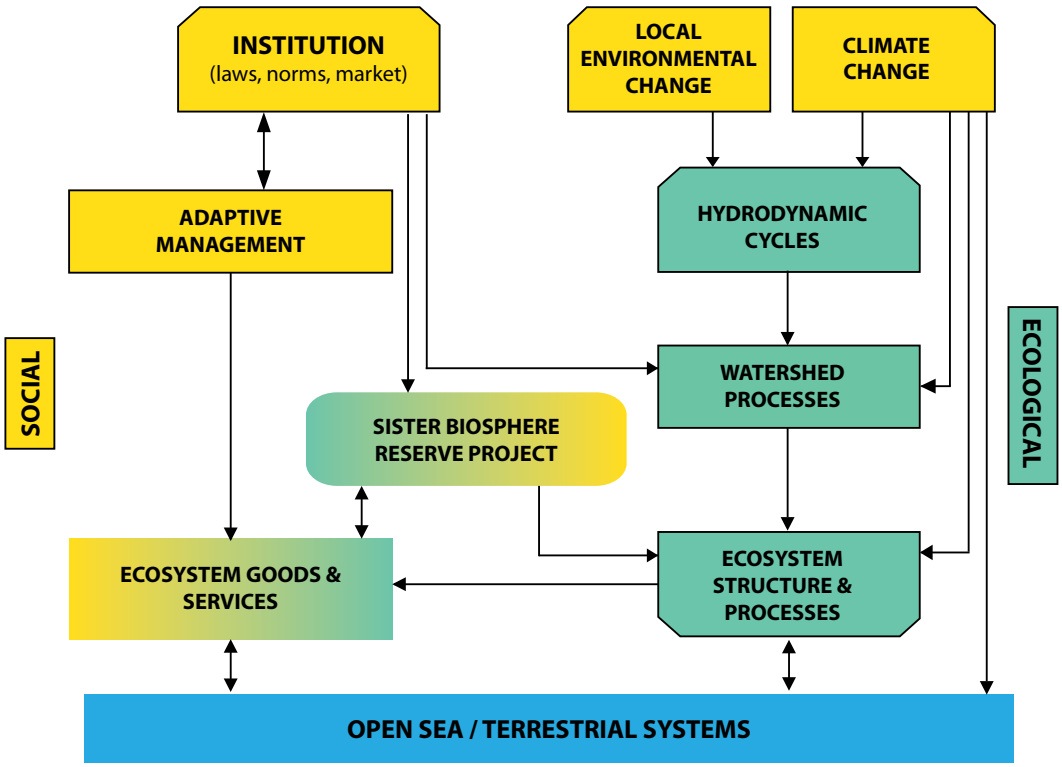
Objectives :

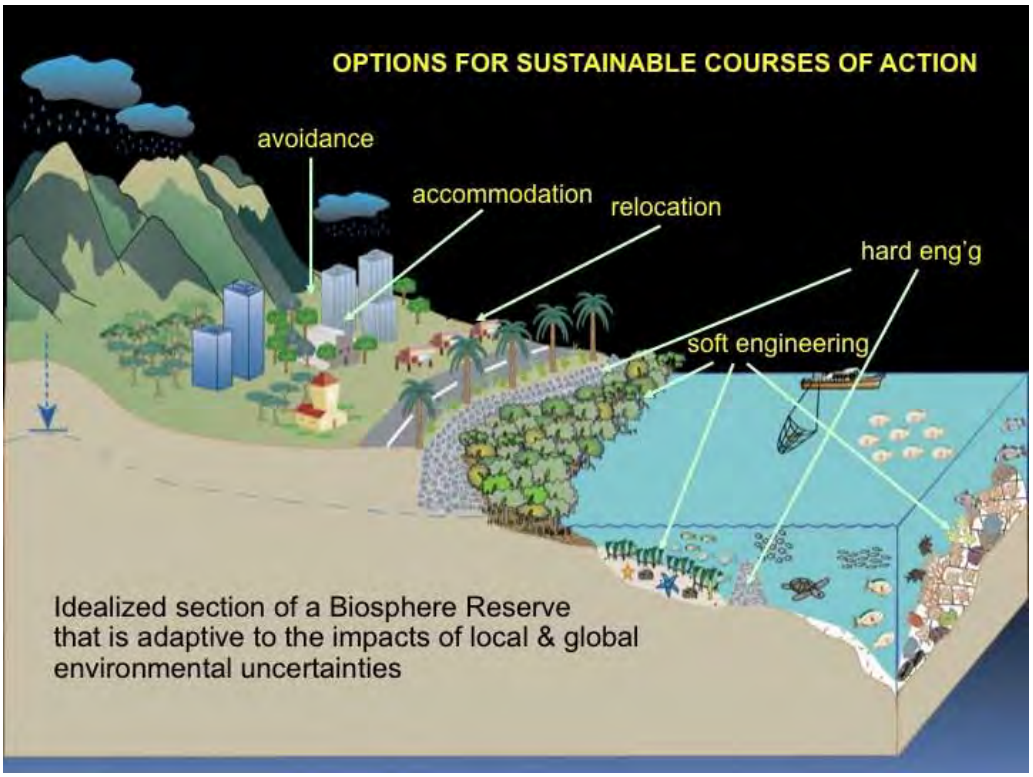
- Biodiversity enhancement
- Climate-change resilient communities
- Environmental degradation reversal
- Greater understanding of BR role in people's lives

Strategies :

- Application-oriented research
- Ecosystem-based adaptive management
- Broad consultation & networking
- Adoption of wise practices
- Capacity building
- Integrated decision support system

Conceptual Framework of the Philippine Action Plan Emphasizing the Role of the Sister Biosphere Reserve Project





Carbon Stock and Biomass Estimation of Four Different Ecosystems Within Cibodas Biosphere Reserve, Indonesia

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Abstract

Cibodas Biosphere Reserve (CBR) offers a challenging land use management and strategy in coping with climate change and CDM issues, due to the existing diverse ecosystems both natural and man-made. However, one of the main problems faced by Indonesia is the lack of quantitative data on CO_2 sequestration capacity. No single carbon stock assessment was conducted at CBR since it was declared. This research aims to estimate carbon stocks contained in different ecosystems, identify CO_2 sequestration capacity within different land uses, and establish carbon stock baseline data of four different ecosystems: natural forests, botanic gardens, monoplantation, and agriculture. The Brown formula was used to calculate above ground carbon, while the total dry weight of samples was used to estimate understorey and litter fall biomass. Necromass was calculated by multiplying volume and density (ρ). Above ground carbon value was converted from the biomass (i.e. biomass*0.46). Soil carbon was estimated by consecutively multiplying: soil organic carbon, weight of dry soil per soil volume, and area and depth of soil samples. The total carbon stock was the sum of above ground and soil carbon. The results showed that carbon sequestration capacity varied among ecosystems: natural forests contained 276.50 tons C ha-1, botanic gardens 127.19 tons C ha^{-1}, tea plantation 99.59 tons C ha^{-1}, while agriculture only 5.53 tons C ha^{-1}. The contribution of above ground carbon to the total carbon stock was very high (99 per cent), in contrast with that of soil carbon which was only one per cent. The highest carbon stock contained in natural forests was found at the *Vaccinium* site. Carbon stocked in trees varied amongst locations, from 142.19 to 323.91 tons C ha^{-1}. Trees contributed 80.16 per cent of the above ground carbon stock at the natural setting, while litter fall only supported 15.1 per cent, understorey 4.1 per cent, and necromass even only 0.64 per cent. These findings can be used as a benchmarking for guidelining afforestation and reforestation programs within REDD/REDD plus mechanism.

Keywords: Cibodas Biosphere Reserve, carbon stock, land use types, REDD plus.

Introduction

Due to the existence of the diverse ecosystems both natural and man-made, Cibodas Biosphere Reserve, Indonesia, offers a challenging land use concept in coping with climate change and clean development mechanism (CDM) issues. Totally Cibodas Biosphere Reserve covers an area of 114,779 hectares (Soedjito, 2006) comprising various ecosystem (landuse) types, including natural forests, man-made mixed vegetation settings (i.e. botanic gardens), monoplantation areas (mainly tea plantation), and agricultural lands. The total carbon stocked in this biosphere is strongly assumed to be very high.

However, one of the main problems faced by Indonesia and most tropical countries is the lack of quantitative data especially on CO_2 sequestration capacity of different land use types (Tomich et al., 1998; Soedjito, 2004; Hairiah & Rahayu, 2007; Hawkins *et al*., 2008; CIFOR, 2009; Tedjakusuma, 2009). No single carbon stock assessment was conducted at Cibodas Biosphere Reserve since it was declared in 1977.

The quantitative data of carbon stock and biomass production of all ecosystem (land use) types existed in this biosphere are indeed required for estimating the biosphere capacity for reducing glass house gas emission particularly CO_2. By quantifying the carbon stocked in each land use type then an appropriate current model can be designed and established which integrates with the climate change management and CDM.

Objectives

This research aims to estimate carbon stocks contained in different ecosystems, identify CO_2 sequestration potency within different land use types, and establish carbon stock baseline data of four different ecosystems (comprising natural forests, botanic gardens, tea plantation, and agricultural lands) occurred in Cibodas Biosphere Reserve. Carbon stock assessment conducted in these four different ecosystems covered both above and below ground (soil) carbon.

Materials and Methods

Study Sites

CIBODAS BOTANIC GARDENSBoth plant collection and non plant collection censused

Four different ecosystems within Cibodas Biosphere Reserve, West Java, Indonesia, were determined to study to cover various land use types, as each land use type (system) contained a different vegetation composition and structure. First ecosystem was a natural forest area within Mount Gede Pangrango National Park (Taman Nasional Gede Pangrango) covering a total area of 21,975 ha within the administrative units (regencies) of Bogor, Cianjur and Sukabumi (Fig. 1). To narrow down the study area, a preliminary survey exploring the national park was conducted to get access to various sites and altitudes and thus cover different plant composition before selecting the sites. The second location was a botanic garden area (namely Kebun Raya Cibodas - LIPI, covering an area of 85,7 ha) located in the district of Cipanas, the regency of Cianjur (West Java). The third location was a tea plantation (namely PTPN Gunung Mas, covering an area of 657 ha) located in the regency of Bogor (West Java). The fourth

Figure 1. Four study sites established within Cibodas Biosphere Reserve, West Java (Indonesia), indicated by yellow arrows (map source: Google Earth, 2009).

location was an agricultural land (namely Agropolitan, covering an area of 880 ha) located in the districts of Cipanas and Pacet, the regency of Cianjur, West Java (Fig. 1).

Site Samplings

Each selected site was sampled into belt transects of 100 m x 20 m each for assessing large trees within natural forests; of 40 m x 5 m each for tea plantation and agricultural lands; and of 1 m x 1 m for grasses and agricultural commodities (Ludwig & Reynolds, 1988; Hairiah & Rahayu, 2007). Each transect was established with the major axis orientated north-south derived from a selected compass bearing (Ludwig & Reynolds, 1988). Each belt transect was located by a Garmin Global Positioning System MAP 175. To estimate a full carbon stock, all plant individuals comprising large trees (DBH > 30 cm), small tress (DBH = 5 – 30 cm), seedling and understorey, and necromass within each transect were measured and counted (Hairiah & Rahayu, 2007; CIFOR, 2009). To avoid any problems of double counting, all recorded individuals were tagged. Belt transects were set up and assessed in 2009 and 2010. Different from the other three ecosystems, a plant census was applied for calculating the biomass and carbon stock contained in Cibodas Botanic Gardens.

Carbon Stock Assessment

The materials to be analyzed for the carbon stocks included the existing vegetation (both upper and lower canopies), understorey, liitter fall, necromass, and soil. The Brown formula ($Y=0{,}118*D^{2{,}53}$) was used to calculate above ground carbon (Brown, 1997;), comprising tree biomass, understorey biomass, necromass, and litter fall (Ketterings *et al*., 2001; Chave *et al*., 2005, Basuki *et al*., 2009). The total dry weight of samples was used to estimate understorey and litter fall biomass. Necromass

was calculated by multiplying the volume and density (ρ). Above ground carbon value was converted from the biomass (i.e. biomass*0.46). Soil carbon was estimated by consecutively multiplying soil organic carbon, weight of dry soil per soil volume, and area and depth of the soil samples. The total carbon stock was the sum of above ground and soil carbon. Root biomass assessment was excluded at this stage of study due to some technical difficulties.

Results And Discussions

The results showed that carbon sequestration capacity varied among ecosystems or land use types): natural forests contained 276.50 tons C ha^{-1}, botanic gardens 127.19 tons C ha^{-1}, tea plantation 99.59 tons C ha-1, while agriculture only accommodated 5.53 tons C ha^{-1} (Fig. 2). The contribution of above ground carbon to the total carbon stock was very high (99 per cent), in contrast with that of soil carbon which was only one per cent.

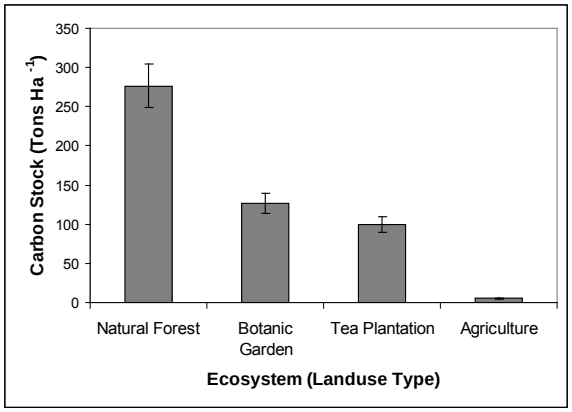

Figure 2. Carbon stock contained in different ecosystems (land use types) within Cibodas Biosphere Reserve, West Java, Indonesia.

The carbon stock and biomass contained at different elevations of natural forests within Mount Gede Pangrango National Park (as the core of Cibodas Biosphere Reserve) were shown in Figure 3. The highest carbon stock in the natural forest was found at the *Vaccinium* site, while the lowest content occurred at the elevation of 1819 m above sea level.

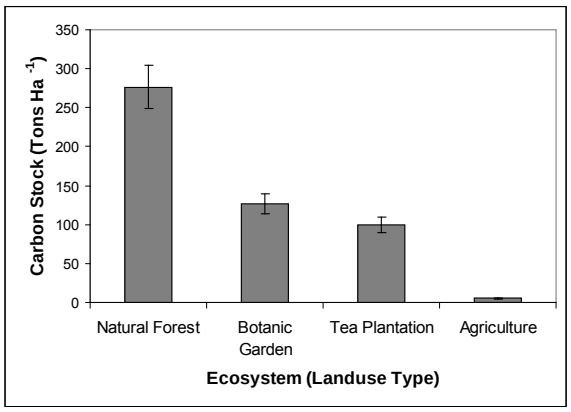

Figure 3. Estimated carbon stock and biomass contained at different elevations of natural forests within Mount Gede Pangrango National Park (Cibodas Biosphere Reserve), Indonesia.

Carbon stocked in trees (comprising small and large trees) varied significantly amongst locations, from 142.19 tons C ha^{-1} where the lowest proportion of large trees occurred (at the elevation of 1819 m) to 323.91 tons C ha^{-1} where most large trees occurred (at the elevation of 2005 m above sea level), Fig. 4. As elevations increase the proportion of small trees tends to increase (Soule & Orians, 2001), in which the highest proportion occurred at the 2750 m above sea level. Conversely, the proportion of large trees tends to decrease particularly on elevations above 2000 m. The lowest elevation measured in this study was at 1194 m containing the lowest proportion of small tress.

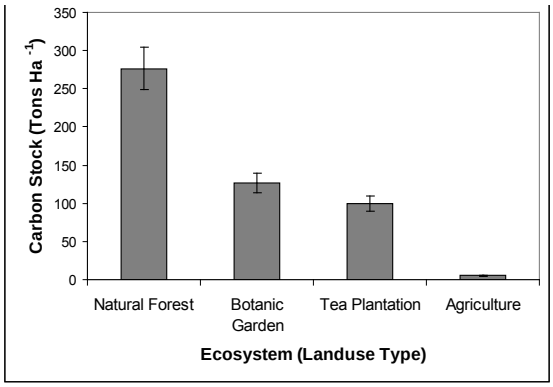

Figure 4. Carbon stock contained in large (DBH >30 cm) and small (DBH: 5 – 30 cm) trees at various elevations within the natural forests of Mount Gede Pangrango National Park (Cibodas Biosphere Reserve), Indonesia.

Trees contributed 80.16 per cent of the above ground carbon stock at the natural setting, while litter fall only supported 15.1 per cent, understorey 4.1 per cent, and necromass even only 0.64 per cent (Fig. 5). It is surprisingly that the carbon contribution of the understorey is much lower than that of the litter fall in this forest.

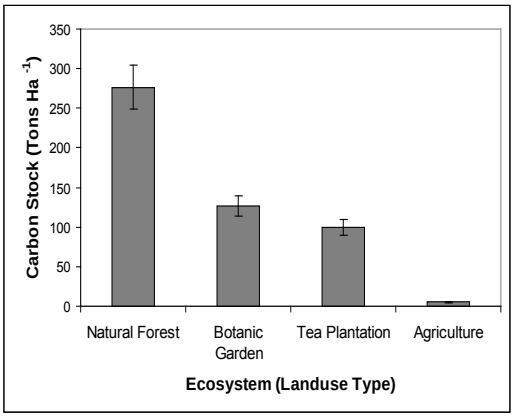

Figure 5. Carbon stock contained in different life forms and masses (tree, understorey, litter fall, and necromass) within natural forests of Mount Gede Pangrango National Park (Cibodas Biosphere Reserve), Indonesia.

Conclusions

It seems that carbon sequestration capacity varies among ecosystems or land use types. It is not surprisingly that natural forests contain the highest carbon stock compared to the other three man-made ecosystems, indicating the importance of the conservation of natural ecosystems. The contribution of above ground carbon (contained particularly by large trees) to the total carbon stock was very high in contrast with that of soil carbon. These findings can be used as a benchmarking for guidelining afforestation and reforestation programs within the CDM and mitigating climate change (REDD or REDD+).

Acknowledgements

We thank the Indonesian Institute of Sciences (LIPI) Competitive Research Program for the funding granted for conducting this research (2009-2011). We also thank the management of Mount Gede Pangrango National Park (the Indonesian Ministry of Forestry), Gunung Mas Tea Plantation (PTPN VIII), and the Agropolitan (Cianjur Local Government) for permission to enter the national park, tea plantation, and agricultural lands. We also highly appreciated Ahmad Jaeni Ashari, Dimas Ardiyanto, Zaenal Mutaqien, Rustandi, and Upah bin Basar from Cibodas Botanic Gardens – LIPI for the assistance and field work during the study.

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Giam Siak Kecil-Bukit Batu Biosphere Reserve:

Environmental Services and Private Sector Participation

Canecio P. Munoz

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Jakarta

Outline

- a brief about us
- industry challenges and opportunities
- biosphere reserves as framework for
- promoting sustainability
- initiatives to monetize environmental services

A Brief About Sinarmas Forestry

- manages pulpwood plantations
- exclusive supplier of fiber to Asia Pulp & Paper
- about 1.5 million hectares land bank, over 1 million hectares planted
- planting on avg 1 million seedlings everyday

A Brief About Sinarmas Pulp & Paper

- producer of pulp, paper & paper products
- 7 million tons annual production capacity of pulp, paper, packaging materials
- 8 pulp & paper independently-owned production facilities

Indonesia, a hotspot in biological and ecosystem diversity, and carbon emission reduction potential

Industry Challenges & Opportunities

- Increasing climate change & other sustainability issues
- Forest certification (SFM) has become a global procurement issue
- Increasing public- and consumer- awareness
- Increasing involvement by governments at all levels
- Concept of CSR adopted and implemented – by more and more companies

World's CO2 Footprint

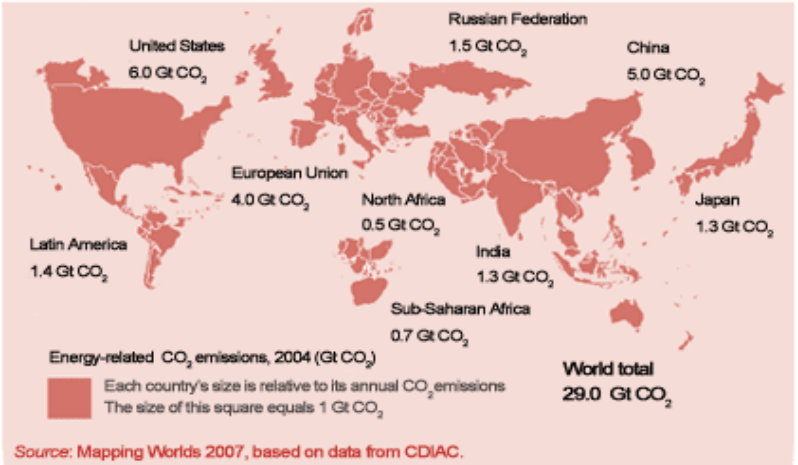
UNDP: "Differences in the depth of carbon footprints are linked to the history of industrial development. But, they also reflect the large 'carbon debt' accumulated by rich countries—a debt rooted in the over-exploitation of the Earth's atmosphere. People in the rich world are increasingly concerned about emissions of greenhouse gases from developing countries. They tend to be less aware of their own place in the global distribution of CO2 emissions (Map 1.1)."

MAB Programme UNESCO

- provides an excellent framework for developing an integrated & coherent landscape management thru multi-stakeholder collaboration

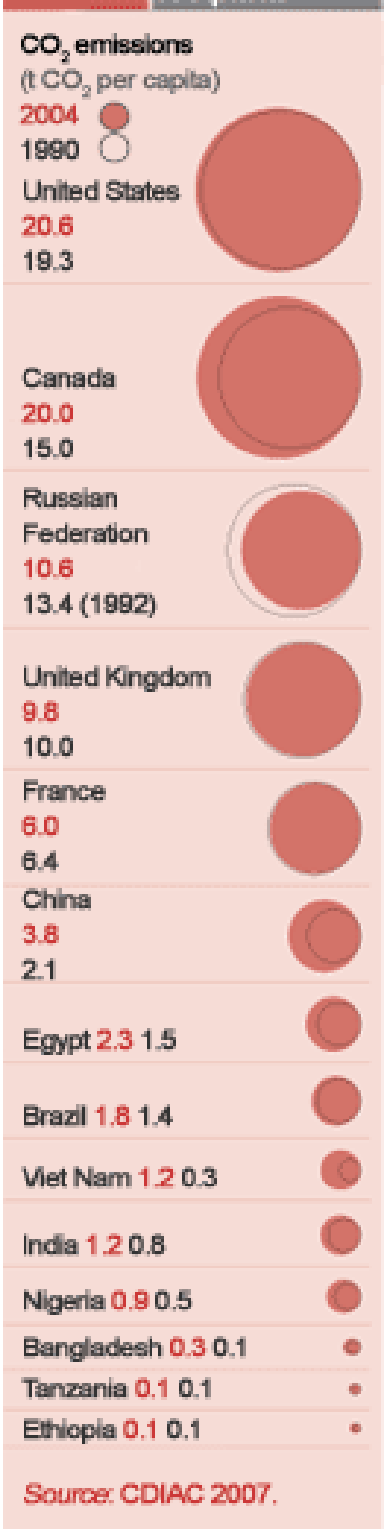
- a fascinating opportunity for Sinarmas Forestry, APP, Ministry of Forestry, Local Governments, LIPI, NGOs to demonstrate genuine and lasting commitments to sustainability

Map 1.1 Mapping the global variation in CO_2 emissions

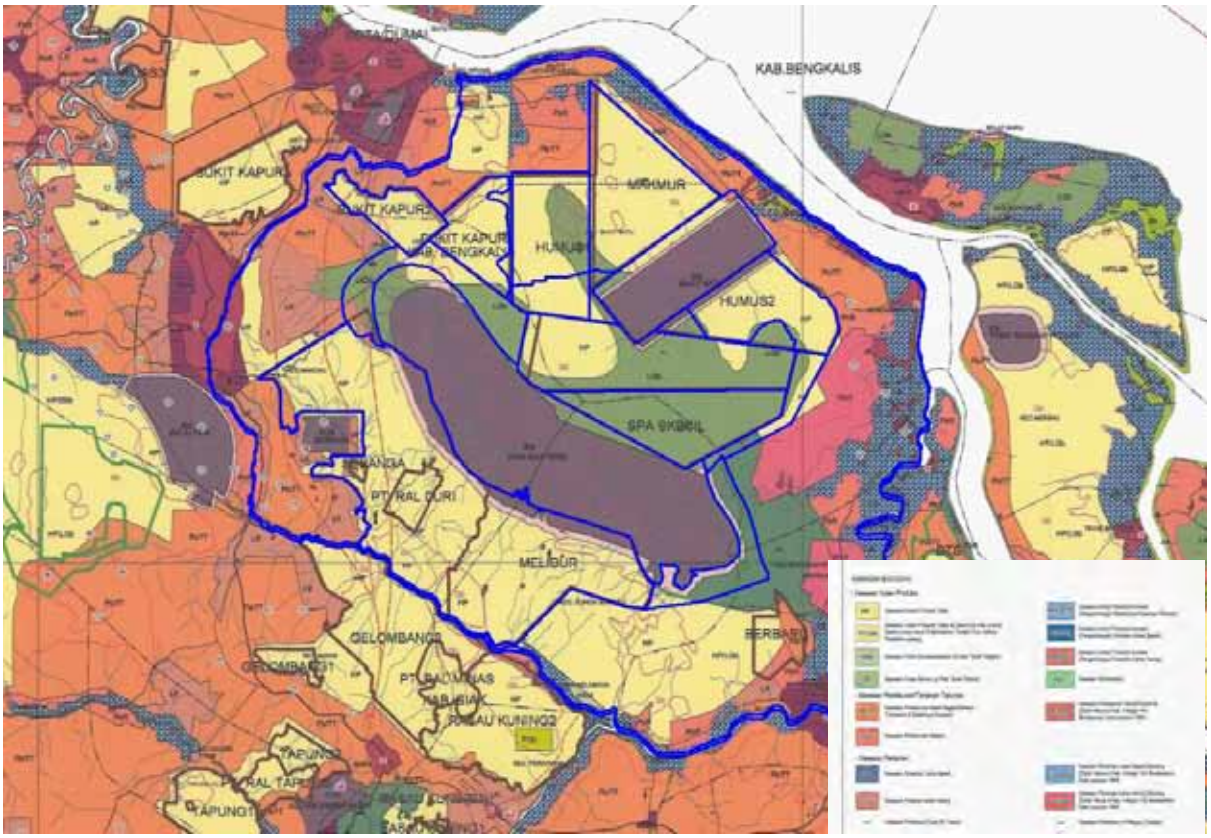


Source: Mapping Worlds 2007, based on data from CDIAC.

Figure 1.6 Rich countries-deep carbon footprints



Source: CDIAC 2007.



Core Area	178,722 ha
Giam Siak Kecil Wildlife Reserve	84,967 ha
Bukit Batu Wildlife Reserve	21,500 ha
Sinar Mas Forestry & Partners (production forest)	72,255 ha (40%)
Buffer Zone	222,426 ha
Sinar Mas Forestry & Partners (plantation forest)	195,259 ha (88%)
Others (production forest)	27,167 ha
Transition Area	304,123 ha
Estate crops, agriculture, settlements, etc.	298,458 ha
Sinar Mas Forestry & Partners (plantation forest)	5,665 ha
Total Area	705,271 ha

:

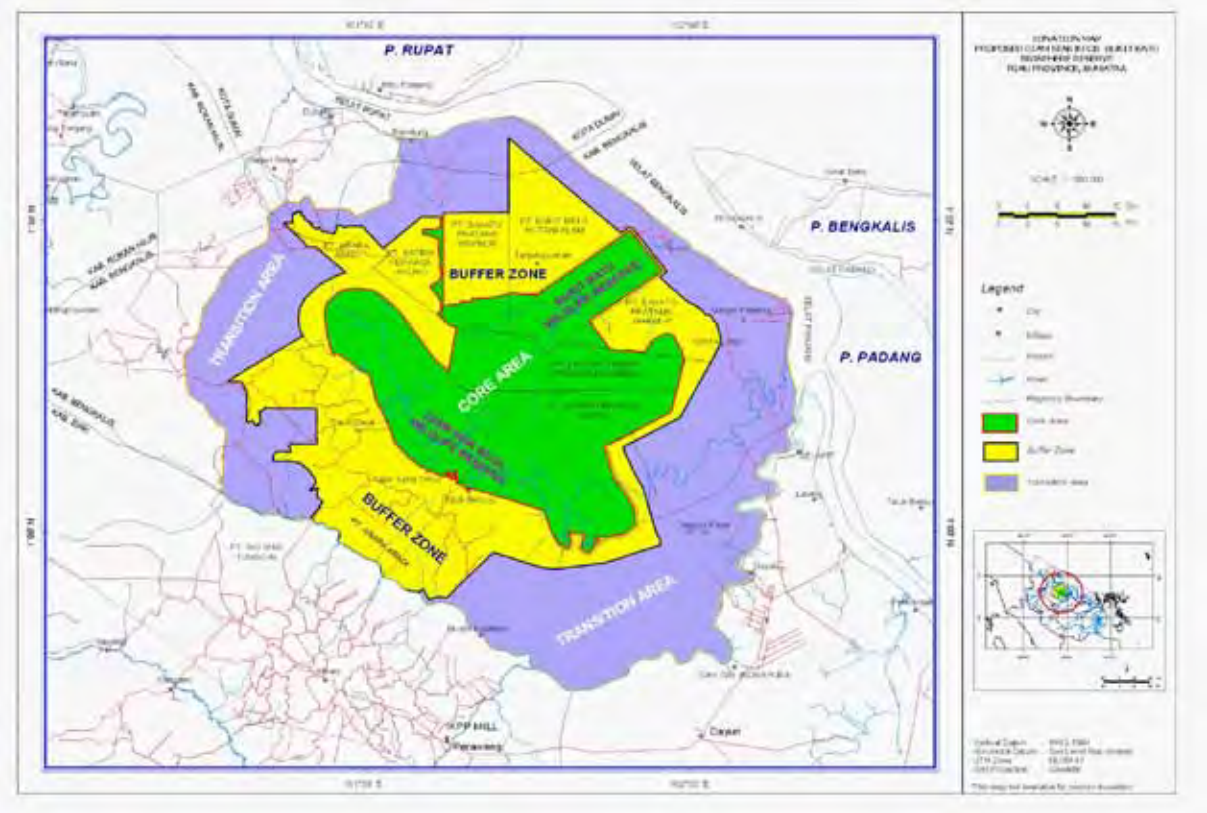
GSK-BB BR: Monetizing Environmental Services

REDD+ Mechanism Potential Offers

1. payments for reductions in CO2 emissions from forests, either by:
   - preventing their destruction or degradation
   - conservation or enhancing forest carbon stocks
   - sustainable management of forest

   carbon credits as a potential source of sustainable income to the BR
2. a significant potential for rapid and low-cost emission reduction with the added co-benefits
   - biodiversity conservation
   - water & soil conservation
   - poverty reduction

GSK-BB Biosphere Reserve (705,271 Ha)



3. increase economic value of forests to local inhabitants and other key stakeholders so that they have greater interest to protect the resource
4. improve local socio-political governance

REDD+ Pilot Project By Pt Dexter PI

- Ecosystem Restoration License covering 46,654 ha production forest in Core Area applied
- Carbon credits potential within production forest in Core Area between 131M – 466M tCO2 (URS 2008)

High value products development from endemic biological resources, e.g.

- food
- medicinal products

Promoting sustainable management of forests through forest certification program

- mandatory scheme (MoF), Certified 1.4 million ha
- LEI voluntary standard, Certified 577,000 ha

Concluding Remarks

- biosphere reserve landscape management concept offers an excellent alternative tool moving towards achieving sustainability goals
- key to its success is sustained funding, e.g. generating significant financial benefits from environmental services
- strong and effective support from key stakeholders
- clear management responsibilities

Other Business I:

Biosphere Reserve Management and Nomination

Challenges and Opportunities of Managing a Park as a Biosphere Reserve: Lessons Learnt from Gunung Leuser

Wiratno

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Ministry of Forestry Government of Indonesia

Overview

In Indonesia, conservation initiatives have been strated since the Majapahit Kingdom, dated 1395 . There is the Malang Inscription (Prasasti Malang). It stated that there is a policy to save their natural resources, that is water catchment area and its supporting contains, and the other hand it can be given the alternative solution for the consequences of regulation. During the Duct colonial period, in 1714 , C.Chastelein a member of Raad van Indie (the legislative council), initiated the designation a 6 hectares forest in Depok as a nature reserve (natuur reservaat), representing the lowland tropical forest in Java. The movement continued in 1889, upon the suggestion of the director of Lands Plantetuin in Bogor, 280 hectares of natural forest at Cibodas was declared an area for researcho Montain forest flora. This area was expanded in 1925 to include Mount Gede and Mount Pangrango (Wiratno, et.al., 2001). After 91 years or in 1980, this area was declared as one of the first five national park in Indonesia. It is Mt Gunung Gede Pangrango National Park. This is the start of new era for conservation policy in Indonesia eventhough the Act concerning conservation area and its ecosystem (Act No.5/19) has just issued in 1990 or ten years latter after the declaration. Until Januari 2011, government of Indonesia has managed 50 national park across the country. It covers the area of about 16 million hectares. Eventhough, there are continuum of problems in the management of conservation areas particularly national park, there is a unavoidable fact that the remaining natural ecosystem/habitat in Indonesia only can be found in these conservation areas. As a result of unsustainable explotation management in production forest within last 30 years, forest degradation and forest loss is the final results. Nowadays there is a strong phenomena that most logged-over areas ex concession areas become some sort of open access type of resources : "no body property is every body access". In line with land use change particualrly across Sumatra, threats to national parks also increase in the alarming stage. It cause by many internal management problems or constraints and pressures from external factors. The main issue in park management in Indonesia is how to improve the management effectiveness at the field level and back up by consistent policy instrument from district, province and national levels. International support in the form of financial and technical to improve the governance at district, provincial and central government as well as for park authorities can be the reasonable solution. In addition, cross-sectors involvement such as civil society, non government organization, practitioners, universities and private sectors are among the significant actors that should participate since planning, implementation, monitoring and evaluation stages of park management is prerequisites.

Leuser Biosphere Reserve

This park has long history of establishment. Started from 1927 when local Acehness leader propose to Dutch government to protect forest along the Alas Valley from logging. This small effort has continued in 1934 when Tapaktuan Declaration lauched with the massage to protection Leuser Forest.

GLNP is surrounded by forest area that can be treated as Buffer Zone in the BR Concept. They are named as Leuser Ecosystm by Leuser Foundation (Map by UNESCO-Jakarta Office).

As a follow up, the Zelfbestuurs Besluit (ZB) No 317/35, 3 July 1934 issued to protect Gunung Leuser Nature Reserve covers the area of about 142,800 Ha. ZB is the decree from Governor of Aceh and its colony (Gouverneur van Aceh en Onderhoorgheden). Conservation movement contionued with the issuance of ZB No 122, October 1936 for Kluet Wildlife Sanctuary (20,000 Ha), and Decree of Sultan Langkat (30 October 1938) for establishment of Langkat Sekundur, South Langkat and West Langkat as a wildlife sanctuary cover the area of 2,13,985 Ha. In 1970, Kappi Wildlife Sanctuary was declared which covers the area of 150,000 Ha. In 1980, the Mt Leuser NP that consists of those former conservation areas was declared and covers the area of 792,675 Ha. In 1997, this park was expanded into the total area of 1,094,692 Ha. Due to its important if biodiversity as well as habitat consewrvation and life support system, this park was as Biosphere Reserve in 1981 and ASEAN Heritage Park in 1984. Together with Kerinci Seblat NP and Bukit Barisan Selatan NP, Gunung Leuser NP was inscribed in the natural world heritage list in 2004 as the Tropocal Rainforest Heritage of Sumatra (TRHS) cluster site.

As a life support system, GLNP as a home of more than 3000 flora and habitat of 4 big mammals such as elephant, orang utan, tiger, and rhino. Almost 65% of mammals of Sumatra live in GLNP. Furthermore, this park is an important water cathment area where more than 4 million inhabitant of 10 district (2 provinces) depend upon the healthiness of this park. The water production of 172 rives coming from GLNP is 95.445.964 m3 per year (Wiratno, 2010)

Ketambe research sttaion for orangutan established since 1972

Challenges

Managing huge park face so many challenges. Monitoring system must be developed in order to assess to healthiness of the park. In GLNP, encroachment particularly for oilpalm planting

is the main problems face by park authority. In Besitang lowland rainforest (former Sekundur Wildlife Sanctuary), more than 4,000 Ha converted into palm oil and more than 16,000 Ha has been some levels of degradation (forest cover loss).

Degraded Besitang lowland rainforest due to encroachment of palm oil. The level of deforestation (1995-2002) is 1,832 Ha/year or 152 Ha/month, or 5 Ha/day! (Wiratno, Feb 2011).

The new policy of DG of Forest Protection and Nature Conservation is to establish monitoring system at site level as well as at Jakarta. At site level, results from monitoring has to be followed by groundchecking to draw the real problems, player maps, driving forces, etc. They also have to start developing potential partners from local that possible to collaborate with park authority in solving the problems. In 2010, DG of Forest Protection and Nature Conservation has set up a working group to combate encroachment in conservation areas. This working group has to help park authorities to increase capacity in monitoring and solving problems of encroachment in conservation areas particularly in parks. The work has been going on and there are 12 provinces selected as a priority site for working group to fucus on. GLNP in North Sumatra is one of the priority target for working group. Another challenges is the issue of how to develop network and collaboration with various key partners in order to set up common agenda. The common understanding in setting up joint priority is very important to achieve the goal of combating encroachment in the park. In a joint work there should be a joint efforts and sharing resources as well. For instance, park authority might focus on law enforcement whereas the partners (local governmnet, local NGOs) might work more seriously on socio economic and institutional issues at local level to develop partnership in guarding the park after law enforcement has been completed. Effective joint work has been done and proven when I was a park manager (2005-2007). Fauna Flora International, Conservation International, Friends of Earth (Walhi Sumut and Aceh), Sumatran Orang utan Conservation Program (SOCP), Orangutan Information Center (OIC), Lembaga Pariwisata Tangkahan (LPT), and local NGOs a such as Gepal and Oppel (in Besitang). Even, the partnership has enlarged by getting support from Spanish Government through Ministrio De Medio Ambiente Y Medio Rural Y Marino, stated in 2007 until now….. [Thank you very much for strong and consistent commitment from Spanish Government and the team behind the project].

Opportunities

Managing conservation areas or parks or anywhere and also in Indonesia can't limit behind "border" of the park. Park is part of the dynamic and continues process of land use change around the park due to any development activities, i.e., population growth, road network, newborn cities, etc. In Sumatra, many parks has been surrounded by monoculture palm oil/rubber estate, forest estate. Fragmented habitat of wildlife is the ultimate result that increase human wildlife conflict.

Ascertain the complexity of conservatiuon objectives in one side and (rapid) development lead to land use change, forest depletion, and environmental degradation in other side, the school of though proposed by BR concept particularly the Seville Strategy for Biosphere Reserve is more and more relevant to be think

of and possibly adopted. As mentioned that the network is a key component in MAB's objective for achieving a sustainable balance between the sometimes conflicting goals of conserving biological diversity, promoting economic development and maintaining associated cultural values. The Biosphere reserves are sites where this objective is tested, refined, demonstrated and implemented. It is also in line with the Durban Accord launched in the Vth IUCN World Park Congress.
That is what we need to be tested in 6 BRs in Indonesia. The spirit of collaborative work in conservation in dealing with many development issues that might increase threats to park is building trust through continue real cooperation at field level. In Indonesia, one of the key partners is local government, local community, and private sectors. So, collaboration should not limit only with NGOs but also with local government. Developing participatory approach started from planning phase is very essential to share information, understanding and comprehencing regarding problems, conflicting objectives, potencies, and opportunities.

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Nomination Process and Management for a Potential Biosphere Reserve in Sabah, Malaysia

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Introduction

One of the key elements of the Man and the Biosphere Programme (MAB) is to promote public awareness on the balance between human activities and the use of natural resources in a given ecosystem. Tasik Chini (7,000 ha) of Pahang state was registered as the first Biosphere Reserve (BR) under the MAB programme in Malaysia in 2009. In Sabah state on the island of Borneo, efforts are under way to register the Crocker Range Park as the second BR in Malaysia (first in Sabah). The nomination process began in the late 2008, and a series of public consultations and other activities are in progress as of February 2011 with the target of submitting an application by October 2011.

This paper aims to present how the actions taken at different levels can fulfil the mandates and objectives of the MAB, and how such aspects are reflected in a larger context of biodiversity and ecosystem conservation in Sabah. The nomination process is in progress as part of Japan's Official Development Assistance (ODA) so

that the roles and functions of the bilateral international cooperation scheme with the Japan International Cooperation Agency (JICA) are also briefly presented, particularly in terms of strengthening conservation governance of Sabah under the Bornean Biodiversity and Ecosystems Conservation Programme Phase II (BBEC II).

Crocker Range Park as a biosphere reserve

The Crocker Range Park is located in the west coast of Sabah. It was designated as a forest reserve in 1968 and later gazetted as a park under the Parks Enactment in 1984 to protect the main watershed of western Sabah, natural fauna and flora, and recreational opportunities. The park is surrounded by numerous indigenous communities such as Kadazan, Dusun and Murut, whose populations are growing at a moderate rate. It is adjacent to a World Heritage site of the Kinabalu Park with the Mount Kinabalu (4,095 m), the highest mountain of the Crocker Range and Sabah (Figure 1).

Figure 1 Location of the Crocker Range Park (blue) and Kinabalu Park (yellow)

The Crocker Range Park of about 144,000 ha holds some unique and significant ecological and cultural features suitable for the nomination as a biosphere reserve (Crocker Range Biosphere Reserve: CRBR). The outstanding characteristics are summarised as follows:

Reasons for biosphere nomination

1. Significant ecological value: The Crocker Range is considered an important water source for major cities and townships in the area (important ecosystem services).
2. Educational platform: Since the area is identified as an important water catchment, it is an ideal educational platform for local people. Meanwhile, the Kinabalu Park as a World Heritage site is useful for helping tourists understand the values of nature.
3. Cultural importance: Indigenous communities around the park (buffer and transition zones) have traditional ecological knowledge (TEK).
4. Research opportunity: One of the most important ecosystem services of the area is the function of water supply i.e. it offers research topics such as forest hydrology and ecological changes (fauna & flora) particularly in sensitive ecosystems like cloud forest (mossy forest), lowland dipterocarp forest, etc. These studies can contribute to monitor climate change as well.
5. Economic needs and benefit: The use of the MAB as a brand name (also Satoyama Initiative and Heart of Borneo) may deliver some extra economic and conservation benefit. Communities adjacent to protected areas (buffer zone) are often located in remote areas and require livelihood support so it can be a conservation strategy if those communities are prioritized for providing subsidies to link between rural development (poverty alleviation) and conservation activities under the MAB programme.
6. Ecological needs and benefit: Establishment of an ecological connectivity to the Kinabalu Park, a World Heritage site in Sabah can uplift conservation values (Figure 1).

Nomination process and management

1. **A state policy on protected area management in relation to the MAB nomination under the BBEC II**
   Integrated protected area management is examined in the Crocker Range Park, mainly from the aspects of: (i) management activities inside the park (core zone) and (ii) outside the park (buffer and transition zones) (Figure 2). The MAB nomination process will be evaluated subsequently and contribute to the development of Sabah Conservation Strategy that includes a state policy on protected area management. It is expected that the procedures of conservation-related activities inside (i.e. CUZ) and outside (i.e. buffer and transition zone management) the park can be applied to other types of protected areas (i.e. forest reserves and wildlife sanctuaries) in Sabah, using the methods and procedures used in the nomination process of the CRBR.

2. **Activities inside the park: Joint management in the community use zone (CUZ)**
   To deal with indigenous communities inside the park, an area for joint management called Community Use Zone (CUZ) between the communities and the park management authority (Sabah Parks) is introduced under the MAB programme. The CUZ management takes place inside the park, thus mainly managed by the Sabah Parks.

3. **Activities outside the park: Joint management in buffer and transition zones**
   Unlike the CUZ with a single management authority, the buffer and transition zones of the potential CRBR extend across 8 districts outside the park so the relevant agencies including those district offices, Department of Irrigation and Drainage (DID), Agriculture Department, and others are best coordinated by a third party such as the state focal point for the MAB programme, the Sabah Biodiversity Centre (SaBC). Therefore, a technical working group for the nomination of the CRBR is established with the leadership of SaBC. The nomination process including public consultation has been mainly organised by SaBC with support from the Sabah Parks and others (i.e. DID). Specific actions and incentives in prospect are presented to local communities as part of livelihood support and awareness building to make consensus on the CRBR nomination.
   The nomination process led by SaBC is summarised below:

Nomination process

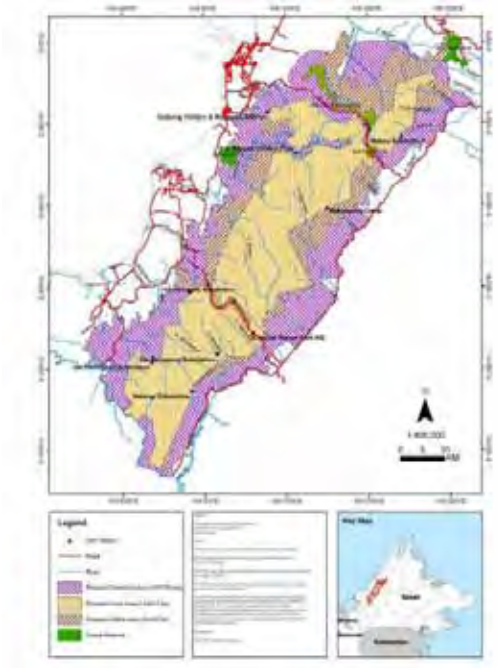

Figure 2 Zoning for the future Crocker Range Biosphere Reserve (CRBR): Core Zone (yellow for the Crocker Range Park & yellow green for a forest reserve), Buffer Zone (brown) and Transition Zone (purple)

1. Preparation of a draft zoning plan for the CRBR (Figure 2): Under the management of the CRBR technical working group chaired by SaBC, a basic zoning plan with the Core Zone (Crocker Range Park of 144,000 ha), Buffer Zone (64,000 ha) and Transition Zone (118,000 ha) are prepared. A total area of CRBR is approximately 326,000 ha.

2. Briefing and consultation: Significance of the CRBR are explained to (i) Heads of the Sabah State Government, (ii) Politicians (Ministers and key politicians), (iii) Heads of Districts (8 Districts), (iv) Leaders of the communities within the buffer and transition zones (approximately 50 villages) and transition zone (approximately 100 villages) and (v) Villagers particularly in the buffer zone
3. Study trip to existing biosphere reserves: Study trips to Chibodas Biosphere Reserve and Giam Siak Kecil–Bukit Batu Biosphere Reserve (GSK-BB) in Indonesia have been organised with representatives from the Sabah Parks, Sabah Biodiversity Centre and 8 District Offices (November 2008 and April 2010)
4. Promotion of collaborative research programmes: A joint research project between the local university, Sabah Parks and overseas universities on ecosystem functions (i.e. tropical rainforest, ecosystem service, climate change, etc.) has been developed.
5. Education: A water related CEPA (communication, education, participation and awareness) programme in the CUZ and buffer zone, connecting upland and lowland communities, has been developed and implemented.

Roles of JICA as a bilateral aid agency

1. Japan's ODA project: Bornean Biodiversity & Ecosystems Conservation Programme (BBEC). JICA's BBEC Programme in Sabah aims to facilitate practical actions to promote endogenous process of capacity development in conservation. This course of actions may be regarded as a participatory action research. To this end, JICA has been assisting the state in (i) technology transfer: building up research and other technical knowledge and skills of different agencies on conservation (BBEC I: 2002-2007) and (ii) policy support: strengthening conservation governance by implementing the state law, Sabah Biodiversity Enactment 2000 (BBEC II: 2007-2012).

   One of the main challenges of the BBEC II is the practical implementation of the Sabah Biodiversity Enactment 2000, which legitimises SaBC to lead and coordinate multiple agencies for the implementation of integrated conservation in Sabah. SaBC was established in May 2008, and an MAB nomination for the Crocker Range Park began in November 2008 with the leadership of SaBC.

   BBEC II uses the brand name of the MAB strategically in the governance process, linking multiple agencies with SaBC's institutional coordination to seek the synergy effect under the single framework. When dealing with international initiatives, it would be ideal if international aid agencies can contribute to translate the concepts into locally-based practical actions to link up conservation and tangible benefit.

2. Planning process as strengthening governance for protected area management.
   Two years of the nomination and management planning process with technical assistance by JICA is considered governance process to support Sabah State Government. Under the BBEC II, JICA helps more than 10 agencies, with a collective and participatory effort with intensive discussions in numerous meetings, workshops and seminars. For the CRBR nomination in particular, JICA technically supports the Sabah Parks and communities located inside the park for the implementation of the CUZ management in the core zone and also assists SaBC to proceed with the buffer and transition zone management of the future CRBR.

   Sabah State Government has fully participated in the planning process, while one of the challenges includes acquiring public involvement and understanding as many of the villages are scattered in remote areas. Local people's knowledge on protected area management and the MAB programme is limited naturally, making the nomination process and actual management of the area complicated and difficult so that CEPA is one of the first priority actions particularly in the core and buffer zones.

Conclusion

The MAB nomination process of the CRBR is a pilot activity for the implementation of an integrated protected area management, which includes activities inside and outside the protected area. The target of the process is to develop conservation governance that enables replication of similar actions in different types of protected areas. Agencies involved in this process include not only the park authority such as the Sabah Parks but also other state government agencies (i.e. SaBC and others), bilateral aid agency (i.e. JICA) and NGOs. It is expected that the application of the CRBR is to be submitted to UNESCO by October 2011. This nomination process for the CRBR in Sabah can be an exemplary model for practitioners who work towards both national and international targets such as Malaysia's national biodiversity conservation policy and Aichi target 2020 of the Convention on Biological Diversity (CBD).

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The MAB nomination presented in this paper is a collective effort by numerous state agencies, NGOs and individuals. Sabah State Government particularly the Sabah Parks and Sabah Biodiversity Centre are acknowledged for their leadership and aspiration in conservation.

The Nomination Process of New Biosphere Reserves: Giam Siak Kecil-Bukit Batu And Wakatobi

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Abstract

The biosphere reserve (BR) concept introduced by UNESCO through MAB Program is a robust alternative approach and tool to achieving sustainable development. This program has proved its value beyond protected areas and is increasingly embraced by scientists, planners, policy makers and local communities to bring a variety of knowledge, scientific investigations and experiences to link biodiversity conservation and socio-economic development for human well-being through multi-stakeholder management.
The nomination form of proposed new Biosphere Reserve consists of three parts: (1) Part one is a summary indicating how the nominated area responds to the functions and criteria for biosphere reserves set out in the Statutory Framework, and presents the signatures of endorsements for the nomination from the authorities concerned; (2) Part two is more descriptive and detailed, referring to the human, physical and biological characteristics as well as to the institutional aspects; and (3) An annex to be used for updating the Directory of Biosphere Reserves on the MABnet, once the site has been approved as a biosphere reserve.
The procedure of the proposed BR is (1) Initiative to nominate Biosphere Reserve; (2) Forming Work Group to prepare nomination; (3) Collect data: Biodiversity, Physic, Socio-economic and culture, etc.; (4) Establishment of Zonation System; (5) Identification of the three zones of BR; (6) Fill Nomination Form; (7) Establishment of Management and Action Plan; (8) Recommendation and Support Letters from Authorities; (9) Discussion and Consultation; (10) Socialization of the proposed BR; (11) Workshop; (12) Finalization of Nomination; and (13) Summit the Nomination to MAB UNESCO Headquarter in Paris.

Keywords: Nomination, New Biosphere Reserve, Nomination Procedure, Giam Siak Kecil-Bukit Batu Biosphere Reserve, and Wakatobi

Introduction

Like many other countries, Indonesia face serious environmental degradation particularly forest degradation. This situation will continue and perhaps worsen due to acceleration of climate change with adverse consequences to societies and ecosystems. Accelerated loss of biological and cultural diversity with unexpected consequences that impact the ability of ecosystems to provide services is critical for human well-being and it should be addressed. It is imperative for Indonesia

to effectively respond to these emerging challenges. Establishing and practicing rules and legislation and law enforcement are no longer the right choice for the protection of landscape ecosystems.
The biosphere reserve (BR) concept introduced by UNESCO through MAB Program is a robust alternative approach and tool to achieving sustainable development. This program has proved its value beyond protected areas and is increasingly embraced by scientists, planners, policy makers and local communities to bring a variety of knowledge, scientific investigations and experiences to link biodiversity conservation and socio-economic development for human well-being through multi-stakeholder management.
BR should be of great value to Indonesia as a model for national and local sustainability programmed. BR could serve as learning sites for policy professionals, research and scientific communities, management practitioners and stakeholder communities to work together to translate principles of sustainable development into locally relevant praxis. Indonesia believes that to ensure sustainable development it is imperative to integrate the socio-economic and natural resources conservation and continuous improvement of ecosystem quality. Only through this development, the community welfare can be achieved while respecting socio economic and cultural aspects. The rise of the new understanding that economic development needs the sustainability of natural resources provides hope in the realization of the biosphere concept of management in Indonesia. As a tool, the BR enables stakeholders to achieve stable and healthy economic development practices and strong attitude in understanding the importance of natural resources conservation for the future of man-kind. In order to achieve this condition, a multi-stakeholder cooperation must be developed in establishing a Biosphere Reserve.

Nomination Form

The nomination form of proposed new Biosphere Reserve consists of three parts:

1. Part one is a summary indicating how the nominated area responds to the functions and criteria for biosphere reserves set out in the Statutory Framework, and presents the signatures of endorsements for the nomination from the authorities concerned.
2. Part two is more descriptive and detailed, referring to the human, physical and biological characteristics as well as to the institutional aspects.
3. An annex to be used for updating the Directory of Biosphere Reserves on the MABnet, once the site has been approved as a biosphere reserve.

The information presented on this nomination form will be used in a number of ways by UNESCO:

a. For examination of the site by the Advisory Committee on Biosphere Reserves and by the Bureau of the MAB International Coordinating Council;
b. For use in a world-wide accessible information system, notably the UNESCO-MABnet, facilitating communications and interaction amongst persons interested in biosphere reserves throughout the world.

The form should be completed in English, French or Spanish. Two copies should be sent to the Secretariat, as follows:

1. The original hard copy, with the original signatures, letters of endorsement, zonation map and supporting documents. This should be sent to the Secretariat through the Official UNESCO channels, i.e. via the National Commission for UNESCO and/or the Permanent Delegation to UNESCO.
2. An electronic version (on diskette, CD etc.) of the nomination forms and if possible of maps (especially the zonation map). This can be sent directly to the MAB Secretariat:

Part 1. Summary

The summary of nomination indicating how the nominated area responds to the functions and criteria for biosphere reserves set out in the Statutory Framework, and presents the signatures of endorsements for the nomination from the authorities concerned. The details of nomination summary are:

1. Proposed name of the Biosphere Reserve. The propose name of new BR have to completed according to the name agreed upon by the parties (all stakeholders). For example: name "Giam Siak Kecil-Bukit Batu, Riau" is given by agreed upon all the stakeholders in this area. In Indonesia, the name of BR is identical with the name of National Park as a core area, except the name of Cibodas BR. The name of Cibodas is taken from the name of the region.

2. Country: Country where the propose new BR is located

3. Fulfillment of the three functions of Biosphere Reserves

    3.1. Conservation: Explain the proposed BR can contribute to the conservation of landscapes, ecosystems, species and genetic variation. Stress the importance of the site for conservation at the regional or global scales.

    3.2. Development: Explain the sustainable development function of proposed BR and development foster economic and human development which is socio-culturally and ecologically sustainable. Indicate the potential of the proposed biosphere reserve in fulfilling this objective.

    3.3. Logistic support: explain that the proposed BR can be support for demonstration projects, environmental education and training, research and monitoring related to local, regional, national and global issues of conservation and sustainable development.

4. Criteria for designation as a Biosphere Reserve: Article 4 of the Statutory Framework presents 7 general criteria for an area to be qualified for designation as a biosphere reserve which are given in order below:

    a. Encompass a mosaic of ecological systems representative of major bio-geographic regions, including a gradation of human intervention: The term "mosaic" refers to a diversity of natural habitats and land cover types derived from human uses such as fields, managed forests, agroforestry, plantation, etc. The term "major biogeographic region" is not strictly defined but it would be useful to refer to the map of the "World Network of Biosphere Reserves" which presents 12 major ecosystem types at a global scale.

    b. Be of significance for biological diversity conservation: Give only a general indication here that the proposed BR has the numbers of endemic species, or rare and endangered species at the local, regional or global levels, and also has species of globally economic importance, rare habitat types or unique land use practices (for example traditional grazing or artisanal fishing) favoring the conservation of biological diversity.

    c. Provide an opportunity to explore and demonstrate approaches to sustainable development on a regional scale: Describe in general terms the potential of the area to serve as a pilot site for promoting the sustainable development of its region or eco-region.

d. Have an appropriate size to serve the three functions of biosphere reserves: describe the size area of proposed BR consist of core area, buffer zone and transition area. It is no indication minimum size of the BR, but the most important is the proposed BR has an appropriate size to serve the three functions of BR (conservation function, sustainable development and logistic support).

e. Through appropriate zonation: In implementing those three functions integratively, a zonation approach is applied, in which the site of biosphere reserve is devided into 3 different areas with specific functions and roles:

   (a) A legally constituted core area or areas devoted to long term protection: It is the area for conservation and it must have a firm, long-term legal protection for preserving the biodiversity, monitoring the undisturbed ecosystems or undertaking non-destructive research, and other "passive" activities such as education and training.

   (b) A buffer zone: It is the area encircling or adjoining the core area that is determined to provide protection to the core area against the negative impacts of human activities. The area of buffer zone can be a site owned by individuals, communities, institutions or others. The managemnet of this area is conducted by the owner, but it should be run in accordance with the government regulation. Basically, activities that can be done in this area are those that are sound ecologically, such as research, education, training, ecotourism, and sustainable utilization of biodiversity or other renewable resources; and

   (c) An outer transition area where sustainable resource management practices are promoted and developed: It is typically the largest part of the biosphere reserve area fuctioning to develope cooperation with local communities. It is established side by side with the buffer zone and may be owned by individuals, organizations, private institutions, or other legal bodies. This area is a place to develope models for sustainable development, in which the owner(s) together with relevant stakeholders develop an appropriate management of natural resources for the area.

f. Organizational arrangements: Organizational arrangements should be provided for the involvement and participation of a suitable range of inter alia public authorities, local communities and private interests in the design and the carrying out of the functions of a biosphere reserve. The management institution consists of the "managers" representing the local government, administration, groups, private bodies, NGOs and scientists. In order to develop the Biosphere Reserves as a "laboratory for ideas" it is important useful to establish an ad-hoc working group to take the tasks of management institution and to perform depth examination on specific topics. The management institution has the following tasks: (1) Establish agreement on the scope of Biosphere reserve area (including zoning) based on the regional site spatial arrangement policy (district/ municipal, province, or national), (2) Develop understanding on the vision, mission, and common objectives of Biosphere reserves management; (3) integrate the parties policies (planning) concerning the development of Biosphere reserves; (4) monitor the implementation of regulation by the

parties relevant to the concept of biosphere reserve; (5) formulate plans and priorities for the management activities of biosphere reserve; (6) formulate solutions à conflict of interest between the parties, and (7) prepare the proposal à fund rising, and (8) carry out development activities.

g. Mechanisms for implementation: Does the proposed Biosphere Reserve have?

   (a) Mechanisms to manage human use and activities in the buffer zone or zones? Describe the responsible of this area and mechanism to manage this area (core area, buffer zone and transition area)

   (b) A management plan or policy for the area as a Biosphere Reserve? Explain that the proposed BR has a management and action plan

   (c) A designated authority or mechanism to implement this policy or plan? Explain and describe that the proposed BR maintains the integrity of the present legal status of the areas and the license holders/ managers or landowners.

   (d) Programs for research, monitoring, education and training? (Describe briefly research/activities monitoring (ongoing or planned) as well education and training activities)

Planned activities:

a. Research: explain and describe the research activities in this proposed BR. These research activities are being proposed to ensure that all information is supplied to the decision makers to support the development of a fully inclusive plan that reflects the principles of the MAB UNESCO.

b. On-going studies: describe the on-going studies in this area

c. Monitoring: explain briefly the monitoring system of the activities in the proposed BR

d. Education and Training: explain and describe the education and training program in the proposed BR.

Endorsements:

The nomination form of the proposed BR is needed to be endorsed by the authorities in charge of the management of this proposed BR. The details endorsement coming from:

1. Signed by the authority/authorities in charge of the management of the core area(s):

2. Signed by the authority/authorities in charge of the management of the buffer zone(s):

3. Signed as appropriate by the National (or State or Provincial) administration responsible for the management of the core area(s) and the buffer zone:

4. Signed by the authority/authorities, elected local government recognized authority or spokesperson representative of the communities located in the transition area.

5. Signed on behalf of the MAB National Committee or focal point

Part II. Description

This part describe in detail of bio-physical aspect, social aspect, institution aspects and three functions of BR.

1. Location: Explain the position geographic of proposed Biosphere Reserve: Latitude and Longitude (East Latitude and North Longitude), with reference to a map if necessary.

2. Area: Explain in detail the size of terrestrial core area(s), size of terrestrial buffer zone(s), size of terrestrial transition area(s). Brief rationale of this zonation (in terms of the various roles of biosphere reserves) as it appears on the zonation map. In the cases where a different type of zonation is also in force at the national level, please indicate how it can coexists with the requirements of the biosphere reserve zonation system.

3. Bio-geographical region: Explain in detail the bio-geographic region of the proposed Biosphere Reserve (with reference to a map if necessary).

4. Land use history: Explain and describe of brief land use history of the proposed BR (core area, buffer zone and transition area).

5. Human Population of Proposed BR: Explain the number of people living within the proposed biosphere reserve (in core area, buffer zone and transition area). Brief description of local communities living within or near the proposed Biosphere Reserve (Indicate ethnic origin and composition, minorities etc., their main economic activities (e.g. pastoralism) and the location of their main areas of concentration, with reference to a map if necessary). Also describe the Name(s) of nearest major town(s) and Cultural significance (Briefly describe the proposed Biosphere Reserve's importance in terms of cultural values (religious, historical, political, social, ethnological)

6. Physical Characteristics: Physical characteristics that must be explain and describe consist of several aspects:

   (a) General description of site characteristics and topography of area: Briefly describe the major topographic features (wetlands, marshes, mountain ranges, dunes etc.) which most typically characterize the landscape of the area.

   (b) The major of topographic features which typically characterize the landscape of the proposed of BR: Explain also the lowest elevation above sea level, the highest elevation above sea level, and for the coastal/marine areas, maximum depth below mean sea level.

   (c) Climate: explain and briefly describe the climate of the area using one of the common climate classifications.

   (d) Geology, geomorphology, soils: Briefly describe important formations and conditions, including bedrock geology, sediment deposits, and important soil types.

7. Biological Characteristics: Explain of the biological characteristics of proposed BR consist of (a) The list main habitat types (e.g. tropical rain forest, tropical montana forest, savanna, coral reef, mangrove forest, etc.); (b) Land cover types (e.g. residential areas, agricultural land, pastoral land). Note: For each type circle REGIONAL if the habitat or land cover type is widely distributed within the bio-geographical region within which the proposed Biosphere Reserve is located to assess the habitat's or land over type's representativeness. Circle LOCAL if the habitat is of limited distribution within the proposed Biosphere Reserve to assess the habitat's or land cover type's uniqueness. For each habitat or land cover type, list characteristic species and describe important natural processes (e.g. tides, sedimentation, glacial retreat, natural fire) or human impacts (e.g. grazing, selective cutting, agricultural practices) affecting

the system. As appropriate, refer to the vegetation or land cover map provided as supporting documentation.

(1) Describe of the first type of habitat/ land cover of the proposed BR and the biological characteristics such as:

(a) Characteristic species: explain what kind of species dominated in the first type of habitat of the proposed BR

(b) Important natural processes: explain the important process in this area, for example important process in the peat swamp forest is humification, etc.

(c) Main human impacts: explain and describe of the main human activities impacts, for example: illegal logging, land conversion for agriculture, extractivism activities, etc.

(d) Relevant management practices: explain briefly the relevant management practices in this area, for example in buffer zone: agroforestry, mixed cropping, etc.

(2) Describe the second type of habitat or land cover of the proposed BR, such as:

(a) Characteristic species: explain what kind of species dominated in the second type of habitat of the proposed BR

(b) Important natural processes: explain the important process in this area, for example Hydrology mechanism, food chain, and migration area for bird, etc.

(c) Main human impacts: explain and describe of the main human activities impacts, for example: illegal logging, land conversion for agriculture, illegal fishing, etc.

(d) Relevant management practices: explain briefly the relevant management practices in this area, for example: water management, fisheries, animal husbandry, etc.

8. Conservation Function: Explain and describe briefly the conservation function of the proposed BR, such as:

   a. Contribution to the conservation of landscape and ecosystem biodiversity: Describe and give location of landscapes, ecosystems, habitats and/or land cover types of particular significance for the conservation of biological diversity.

   b. Conservation of species biodiversity: Identify main species (with scientific names) or groups of species of particular interest for the conservation of biological diversity, in particular if they are rare or threatened with extinction; use additional sheets if need be.

   c. Conservation of genetic biodiversity: Indicate species or varieties of traditional or economic importance and their uses, e.g. for medicine, food production, etc.

9. Development Function: Explain and describe the development function of the proposed Biosphere Reserve, such as:

   a. Potential for fostering economic and human development which is socio-culturally and ecologically sustainable: (1) Describe how the area has potential to serve as a pilot site for promoting the sustainable development of its region or "eco-region".; and (2) Describe how the area has potential to serve as a pilot site for promoting the sustainable development of its region or "eco-region".

   b. If tourism is a major activity: explain and present how many visitors come to

the proposed Biosphere Reserve each year? Is there a trend towards increasing numbers of visitors? (Give some figures if possible).

(1) Type(s) of tourism: explain and describe the tourism type, for example study of flora and fauna, recreation, camping, hiking, sailing, horse riding, fishing, hunting, etc.

(2) Explain and describe of tourist facilities and description of where these are located and in which zone of the proposed biosphere reserve.

(3) Indicate positive and/or negative impacts of tourism at present or foreseen for the proposed of BR.

c. Benefits of economic activities to local people: Indicate for the activities described above whether the local communities derive any income or benefits directly or indirectly from the site proposed as a Biosphere Reserve and through what mechanism.

10. Logistic support Function of the proposed BR are:

a. Research and monitoring: explain and describe briefly the research activities (past research activities, present research and planned research) and monitoring in the proposed BR.

(1) To what extent has the past and planned research and monitoring program been designed to address specific management questions in the potential Biosphere Reserve? (For example, to identify areas needing strict protection as core areas, or to determine causes of and means to halt soil erosion, etc.).

(2) Brief description of past research and/or monitoring activities:

Indicate the dates of these activities and extent to which the research and monitoring programmes are of local/national importance and/or of international importance.

(3) Brief description of on-going research and/or monitoring activities:

(a) Abiotic research and monitoring , such as climatology, hydrology, geomorphology, etc.;
(b) Biotic research and monitoring, such as: biological diversity, potency of biodiversity, endemic species, etc.; and
(c) Socio-economic research consists of demography aspect, economics, traditional knowledge, etc.

(4) Brief description of planned research and/or monitoring activities, consist of: (a) Abiotic research and monitoring (climatology, hydrology, geomorphology, etc.; (b) Biotic research and monitoring (flora, fauna); and (c) Socio-economic research consist of the demography, economics and traditional knowledge.

(5) Estimated number of national scientists participating in research within the proposed Biosphere Reserve on permanent basis and an occasional basis.

(6) Estimated number of foreign scientists participating in research within the proposed Biosphere Reserve on a permanent basis and an occasional basis.

(7) Estimated number of foreign scientists participating in research within the proposed Biosphere Reserve on a permanent basis and an occasional basis.

(8) Estimated number of masters and/ or doctoral theses carried out on the proposed Biosphere Reserve each year.

(9) Research station(s) within the proposed Biosphere Reserve permanent or temporary: Mention and describe the permanent research station exists within the proposed Biosphere Reserve and indicate the location, distance to the core area, name and address of the most relevant research station.

(10) Permanent research station(s) outside the proposed Biosphere Reserve: Mention and describe the permanent research station exists outside the proposed Biosphere Reserve and indicate the location, distance to the core area, name and address of the most relevant research station.

(11) Permanent monitoring plots: Indicate the year established, the objective of monitoring, the type and frequency of observations and measurements, and whether an internationally recognized protocol is being used, for example the plot permanent LIPI in GSK-BB Biosphere Reserve for monitoring peat swamp forest biodiversity; plot permanent LIPI in Cibodas BR for Carbon Stock Study, etc.

(12) Research facilities of research station(s): Mention and describe briefly the research facilities of research station such as: meteorological and/or hydrological station, experimental plots, laboratory, computerized databases, Geographical Information System, library, vehicles, etc.

(13) Other facilities: Explain the other facilities exist in proposed BR, such as: facilities for lodging or for overnight accommodation for scientists, internet connection, web site, etc.

b. Environmental education and public awareness: Explain and describe the capacity building of the proposed BR, such as: environmental education, sometimes now referred to as education for sustainable development, can be aimed at schoolchildren, the adult population of the local communities, and visitors from home and abroad.

   (1) Describe environmental education and public awareness activities, indicating the target group(s)

   (2) Indicate facilities for environmental education and public awareness activities, such as: visitors centre, interpretative programmes for visitors and tourists, nature trails; eco-museum demonstration projects on sustainable use of natural resources, etc.

c. Specialist training: Acquisition of professional skills by managers, university students, decision-makers etc. Describe specialist training activities: for example research projects for students; professional training and workshops for scientists; professional training and workshops for resource managers and planners; extension services to local people; training for staff in protected area management.

d. Potential to contribute to the World Network of Biosphere Reserves: Collaboration among Biosphere Reserves at the national, regional and global level in terms of exchanging scientific information, experience in

conservation and sustainable use, study tours of personnel, joint seminars and workshops, Internet connections and discussion groups, etc. The data have to describe in this part are:

(1) Collaboration with existing Biosphere Reserves at the national level; Indicate on-going or planned activities on collaboration with others BR at national level.

(2) Collaboration with existing Biosphere Reserves at the regional or sub-regional levels, including promoting trans-frontier sites and twinning arrangements (indicate on-going or planned activities): Here, "regional" refers to the regions as Africa, Arab region, Asia and Pacific Latin America and the Caribbean, Europe. Trans-frontier Biosphere Reserves can be created by two or more contiguous countries to promote cooperation to conserve and sustainably use ecosystems which straddle the international boundaries. Twinning arrangements usually consist of agreements between sites located at some distance in different countries to promote activities such as cooperative research projects, cultural exchanges for schoolchildren and adults, etc.

(3) Collaboration with existing Biosphere Reserves in thematic networks at the regional or international levels (indicate ongoing and planned activities): Networks of sites which have a common geographic theme such as islands and archipelagoes, mountains, or grassland systems, or a common topic of interest such as ecotourism, ethnobiology etc.

(4) Collaboration with existing Biosphere Reserves at the international level indicate ongoing and planned activities: Notably through Internet connections, twinning arrangements, bilateral collaborative research activities, etc.

11. Uses and activities: Explain and describe briefly the uses and activities in the proposed BR (core area, buffer zone and transition area).

    a) Core area:

    - Describe the uses and activities occurring within the core area(s): While the core area is intended to be strictly protected, certain activities and uses may be occurring or allowed, consistent with the conservation objectives of the core area.

    - Possible adverse effects on the core area(s) of uses or activities occurring within or outside the core area(s): Indicate trends and give statistics if available.

    b) Buffer zone(s):
    - Describe the main land uses and economic activities in the buffer zone(s): Buffer zones may support a variety of uses which promote the multiple functions of a Biosphere Reserve while helping to ensure the protection and natural evolution of the core area(s).
    - Possible adverse effects on the buffer zone(s) of uses or activities occurring within or outside the buffer zone(s) in the near and longer terms.

    c) Transition area:
    The Seville Strategy gave increased emphasis to the transition area since this is the area where the key issues on environment and development of a given region are to be addressed. The transition area is by definition not delimited in space, but rather

is changing in size according to the problems that arise over time. Describe briefly the transition area as envisaged as the time of nomination, the types of questions to be addressed there in the near and the longer terms. The size should be given only as an indication.

- Describe the main land uses and major economic activities in the transition area(s)

- Describe the possible adverse effects of uses or activities on the transition area(s)

12. Institution aspects
    This part contents the institution aspects of proposed BR, including:

    a. State, Province, Region or other administrative unit: Fill in the list in hierarchical order administrative division(s) in which the proposed Biosphere Reserve is located (e.g. state(s), counties, and Regency)

    b. Units of the propose biosphere reserve: Indicate the name of the different land management units (as appropriate, e.g. protected area, territories of municipalities, private lands, community lands, etc.) making up the core area(s), the buffer zone(s) and the transition area).

        - Explain briefly, are these units contiguous or are they separate? A Biosphere Reserve made up of several geographically separate units is called a "cluster Biosphere Reserve". Please state if this is the case of the proposal.

    c. Protection Regime of the core area(s) and, if appropriate of the buffer zone(s):

        (1) Core area(s): Indicate the type (e.g. under national legislation) and date since when the legal protection came into being and provide justifying documents (with English or French summary of the main features);

        (2) Buffer zone(s): Indicate the type (e.g. under national legislation) and date since when the legal protection came into being and provide justifying documents (with English or French summary of the main features. If the buffer zone does not have legal protection, indicate the regulations that apply for its management).

    d. Land use regulations or agreements applicable to the transition area (if appropriate): Indicate and describe briefly the land use regulations or agreements applicable to the transition area of proposed BR.

    e. Land tenure: Land tenure of each zone: Describe and give the relative percentage of ownership in terms of national, state/provincial, local government, private ownership, etc. for each zone (core area, buffer zone, transition area and foreseen changes in land tenure: Is there a land acquisition program, e.g. to purchase private lands, or plans for privatization of state-owned lands?

    f. Management plan or policy and mechanisms for implementation: The Seville Strategy recommends promoting the management of each Biosphere Reserves essentially as a "pact" between the local community and society as a whole. Management should be open, evolving and adaptive. While the aim is to establish a process leading to elaborating a comprehensive management plan for the whole site reflecting these ideas and involving all stakeholders, this may not yet exist at the time of nomination. In this case however, it is necessary to indicate the

main features of the management policy which is being applied to guide land use at present for the area as a whole, and the "vision" for the future.

(1) Indicate how and to what extent the local communities living within and next to the proposed Biosphere Reserve have been associated with the nomination process (This can range from being an entirely locally driven initiative, to a more "top down" approach led by government authorities or scientific institutions. Describe the steps taken and the stakeholders involved)

(2) Main features of management plan or land use policy: Describe the "vision" of what the proposed Biosphere Reserve is expected to achieve in the short and longer term, and the benefits foreseen for the local communities and other stakeholders.

(3) The designated authority or coordination mechanisms to implement this plan or policy (Name, structure and composition, its functioning to date)

(4) The means of application of the management plan or policy (For example through contractual agreements with landowners or resources users, traditional users' rights, financial incentives, etc.)

(5) Indicate how and to what extent the local communities participate in the formulation and the implementation of the management plan or policy (informed/consulted: decision making role etc.)

(6) The year of start of implementation of the management plan or policy: Mention and indicate the year of start of the implementation of management plan and action plan.

g. Financial source(s) and yearly budget: Biosphere Reserves require technical and financial support for their management and for addressing interrelated environmental, land use, and socio-economic development problems. Indicate the source and the relative percentage of the funding (e.g. from national, regional, local administrations, private funding, international sources etc.) and the estimated yearly budget in the national currency.

h. Authority (ies) in charge: Explain and indicate the authorities in charge of the BR management: The proposed Biosphere Reserve as a whole:

- Core area: Indicate the name of the authority or authorities in charge of administering its legal powers (in original language with English or French translation)

- Buffer zone: Indicate the name of the authority or authorities in charge of administering its legal powers (in original language with English or French translation)

- Transition area: Indicate the name of the authority or authorities in charge of administering its legal powers (in original language with English or French translation)

13. Special Designations: Special designations recognize the importance of particular sites in carrying out the functions important in a Biosphere Reserve, such as conservation, monitoring, experimental research, and environmental education. These designations can help strengthen these functions where they exist or provide opportunities for developing them. Special designations may apply to an entire proposed Biosphere Reserve

or to a site included within. They are therefore complementary and reinforcing of the designation as a Biosphere Reserve. They are therefore complementary and reinforcing to designation as a Biosphere Reserve. Check each designation that applies to the proposed Biosphere Reserve and indicate its name.

- ( ) UNESCO World Heritage Site
- ( ) RAMSAR Wetland Convention Site
- ( ) Other international/regional conservation conventions/directives (please specify)
- ( ) Long term monitoring site (Please specify)
- ( ) Other (Please specify)

14. Supporting Documents:
The supporting documents to be submitted with nomination form consist of maps (see below). Clear, well-labelled maps are indispensable for evaluating Biosphere Reserve proposals. The maps to be provided should be referenced to standard coordinates wherever possible. Electronic versions are encouraged. The supporting documents consist of:

(a) General location map: A general location map of small or medium scale must be provided showing the location of the proposed Biosphere Reserve, and all included administrative areas, within the country, and its position with respect to major rivers, mountain ranges, principal towns, etc.

(b) Biosphere Reserve zonation map (large scale, preferably in black & white for photocopy reproduction): "A Biosphere Reserve Zonation Map" of a larger scale showing the delimitations of all core area(s) and buffer zone(s) must be provided. The approximate extent of the transition area(s) should be shown, if possible. While large scale and large format maps in color are advisable for reference purposes, it is recommended to also enclose a Biosphere Reserve zonation map in a A-4 writing paper format in black & white for easy photocopy reproduction. It is recommended that an electronic version of the zonation map be provided.

(c) Vegetation map or land cover map: A VEGETATION MAP or LAND COVER MAP showing the principal habitats and land cover types of the proposed Biosphere Reserve should be provided, if available.

(d) List of legal documents (if possible with English or French translation): List the principal Legal Documents authorizing the establishment and governing use and management of the proposed Biosphere Reserve and any administrative area(s) they contain. Please provide a copy of these documents, if possible with English or French translation.

(e) List of land use and management plans: List existing land use and management plans (with dates and reference numbers) for the administrative area(s) included within the proposed Biosphere Reserve. Provide a copy of these documents.

(f) Species list (to be annexed): Provide a LIST OF IMPORTANT SPECIES (threatened species as well as economically important species) occurring within the proposed Biosphere Reserve, including common names, wherever possible.

(g) List of main bibliographic references (to be annexed): Provide a list of the main publications and articles of relevance to the proposed Biosphere Reserve over the past 5-10 years.

15. Addresses: Indicate the address of proposed BR consist of the address of government agency, organization or administering entity of the core area and administering entity of the buffer zone, etc.

(a) Contact address of the proposed Biosphere Reserve: Government agency, organization, or other entity (entities) to serve as the main contact on the MABnet to whom all correspondence within the World Network of Biosphere Reserves should be addressed.

(b) Administering entity of the core area:

(c) Administering entity of the buffer zone

16. Annexes: The annexes of the nomination of proposed new BR area:

(a) Biosphere Reserve Description
(b) Specific variables (please fill in the table below and tick the relevant parameters)
(c) Publication on the Proposed Biospher Reserve
(d) Map of the Location of the Proposed Giam Siak Kecil-Bukit Batu Biosphere Reserve
(e) Situation Map of the Proposed Giam Siak Kecil-Bukit Batu Biosphere Reserve
(f) Zonation Map of the Proposed Giam Siak Kecil-Bukit Batu Biosphere Reserve
(g) Land Cover Map (Landsat Imagery year 2007) of the Proposed Giam Siak Kecil-Bukit Batu Biosphere Reserve
(h) List of Vegetation Species in the Core Area of the Proposed Giam Siak Kecil – Bukit Batu Biosphere Reserve
(i) List of Fauna in the Core Area of the Proposed Giam Siak Kecil – Bukit Batu Biosphere Reserve
(j) Valuable Plants in the Core Area of Giam Siak Kecil – Bukit Batu Biosphere Reserve
(k) Endorsement Letters

I. Nomination of Giam Siak Kecil-Bukit Batu Biosphere Reserve

It is a good sign that awareness and responsibility on natural resources conservation and its ecosystem are growing significantly in Indonesia. Sinar Mas Forestry and Partners (SMF) committed to permanently protect 72,255 ha of primary natural forest within their concesion area. SMF and partners innovatively proposed to the Government of Indonesia and the Indonesian MAB National Committee for the establishment and development of a new Biosphere Reserve representing tropical peat swamp forest in tropical zone located in Bengkalis Regency and Siak Regency, Province of Riau. This proposed Biosphere Reserve will merge around 72,255 ha of primary natural forest of SMF and Partners forest concession areas with Giam Siak Kecil Wildlife Reserve (84,967 ha) and Bukit Batu Wildlife Reserve (21,500 ha), hence the name Giam Siak Kecil-Bukit Batu Biosphere Reserve. SMF and Partners commit to permanently conserve the primary natural forest between Giam Siak Kecil Wildlife Reserve and Bukit Batu Wildlife Reserve as biological corridor, while managing it as pilot project for REDD mechanism. To sustain SMF business, the company also commits to actively involved in monitoring of the proposed core area.
The proposed Giam Siak-Bukit Batu Biosphere Reserve has three main functions: (1)

contribution to the conservation of landscape, ecosystem, species and biodiversity, (2) support the sustainable economic development by considering the ecological and socio cultural aspect of the community, and (3) logistic support for research, monitoring, education and training related to conservation and sustainable development at the local, regional, national or global level. These are aligned with the National Act of Republic of Indonesia No. 5 of 1990 concerning Conservation of Living Natural Resources and their Ecosystems.

With regard to the proposed Giam Siak Kecil-Bukit Batu Biosphere Reserve, the Indonesia MAB National Committee supports for its establishment. The formulation of this nomination form is developed as one of the requirement for the establishment of a new Biosphere Reserve, and aims to provide detail information on the proposed Giam Siak Kecil-Bukit Batu Biosphere Reserve. This nomination form is also supported by the document of the Proposed Management Plan of Giam Siak Kecil-Bukit Batu Biosphere Reserve Year 2009 – 2013.

Eventually, the proposed Giam Siak Kecil-Bukit Batu Biosphere Reserve is expected to become an alternative solution for the implementation of sustainable development and as a model on the establishment of a new Biosphere Reserve which initiated by private sector.

Background

The threat of the existence and preservation of the GSK-BB area is depend on the commitment level of stakeholders in managing this area remaining useful for economic and ecological interests for this region. The activities that become the main threat to the preservation of this area are:

a. Illegal logging: Illegal logging is still on-going in this area done by local people, especially newcomers (migrants).
b. Encroachment: The widespread development of oil palm and rubber plantations in the province is causing local people to expand their agribusiness interests by way of open land surrounding the conservation area for oil palm and rubber plantations without regard to the status of the area as a conservation area.
c. Forest fire: Forest fires are very vulnerable for the peat land. Forest encroachment has led to irresponsible forest fires occur every year seriously enough, especially in the dry season.

In regard of these problems, we need a new strategy to manage this area and this new strategy is BR concept management.

Ecological characteristics:

- The landscape of tropical peat swamp forest of Giam Siak Kecil-Bukit Batu is part of Sumatra Peat Swamp Forest Eco-region. The area has unique habitat and sustain populations of rare threatened and endemic species.

- Based on satellite image analysis, the peat swamp forest of Giam Siak Kecil-Bukit Batu landscape has decreased from 600,000 ha in 1985 to 350,000 ha in 2002. Part of the remaining and continuous peat swamp forest in the said landscape consists of two declared wildlife reserves: Giam Siak Kecil (84,967 ha) and Bukit Batu (21,500 ha) and the primary natural production forest managed by Sinar Mas Forestry and Partners (aggregate area of 72,255 ha). Sinar Mas Forestry is exclusively supply fibre to Asian Pulp and Paper (APP) Indonesia.
- Peat swamp forest types with its high biodiversity value and unique small lakes (tasik) dominate the core area. One of the major landscapes recognized by biologists and ecologists is the lowland forest area of Giam Siak Kecil Wildlife Reserve. This area has a diversity of habitats that includes wetlands, peat swamp forests, and alluvial bench forests from inland to the sea, covering a myriad of habitats, elevations, and soil types. In this same area, there is another wildlife reserve, Bukit Batu a forest reserve also recognized for its biodiversity and related conservation values.
- The core area as a significant water reservoir is supplying the buffer zone and transition area, and in controlling floods and forest fire. The buffer zone is composed mainly of industrial plantation forest managed by Sinar Mas Forestry and Partners. Within the plantation buffer zone, riparian habitats, and conservation set asides, each in diverse succession stages creating a network of interlinked forest habitat types. The Transition area of Giam Siak Kecil-Bukit Batu Biosphere Reserve largely developed into oil palm plantation estates, rubber plantation, smallholder farms, and settlements.
- The Giam Siak Kecil-Bukit Batu Biosphere Reserve has recorded 189 species of flora including 113 families and 59 genera. With 29 species listed within CITES nine species of protected flora including red palm (Cyrtostachys lakka, Arecaceae), jelutung (Dyera costulata, Apocynaceae), nyatoh (Ganua motleyana, Sapotaceae), tiger orchid (Grammatophyllum speciosum, Orchidaceae), dara-dara (Knema sp., Myristicaceae), mengris (Kompassia malaccensis, Mimosaceae), kantong semar (Nephentes spp., Nepenthaceae), suntai (Palaquium leiocarpum, Sapotaceae), and balam (Palaquium burckii, Sapotaceae). CITES listed species include Gonystylus bancanus (Thymelaeaceae), Acryopsis javanica (Orchidaceae), Cymbidium sp. (Orchidaceae), and Gramatophyllum speciosum (Orchidaceae). Endangered species include Aglaia ignea (Meliaceae), Shorea uliginosa (Dipterocarpaceae), Gonystylus bancanus (Thymelaeaceae), Anisoptera costata (Dipetrocarpaceae), Shorea parvifolia (Dipterocarpaceae), Shorea teysmanniana (Dipterocarpaceae), Sloanea sp. (Bombacaceae), Vatica rassak, and Vatica umbonata (Dipterocarpaceae). In The Giam Siak Kecil-Bukit Batu landscape protected species identified include Alstonia pneumatiphora (Apocynaceae), Calophyllum pulcherimum; Calophyllum soulatri (Clusiaceae), Camnosperma coriaceum (Anacardiaceae), Cratoxylum arborescens (Hypericaceae), Dialium indum (Mimosaceae), Durio carinatus (Bombacaceae), Dyera costulata (Apocynaceae), Ganua motleyana (Sapotaceae), Santiria laevigata (Burseraceae), and Tetramerista glabra (Theaceae). The core area of the biosphere reserve timber species include Gonystylus bancanus (ramin), Palaquium leiocarpus (nyatoh),Durio carinatus (Durian Burung), Shorea teysmanniana (Meranti Bunga), Tetramerista glabra (punak).
- Biodiversity of mammal (1). Primate Group consists of eight species including six protected species: Macaca fascicularis, Macaca nemestrina, Presbytis cristata, Presbytis melalophos, Presbytis cristata, and Presbytis femoralis. (2). Carnivora Group consists of more than 10 species: Helarctos malayanus, Prionailurus bengalensis, Felis bengalensis, Neofelis nebulosa, Panthera tigris sumatrae, and Lutragale perspicillata,

Mydaus javanicus, Viverricula indica, Paradoxurus hermaphroditus, Prionodon linsang. (3). Artiodactyla Group consists of six species include five protected species: Muntiacus muntjak, Cervus unicolor, Tragulus javanica, Tragulus napu, and Sus barbatus. Another species is Sus scrofa. (4). Perissodactyla Group has one species, Tapirus indicus, protected under national law and international conventions. (5). Rodentia Group consists of more than 10 species such as Callosciurus nigrovitatus, Maxomys spp., Sundamys muelleri, Lariscus insignis, and the protected Hystrix brachyuran; (6). Scadentia Group consists of 2 species, namely: Tupaia glis and Tupaia tana; (7). Chiroptera Group consists of 5 species, those are Balionycteris maculate, Cynopterus brachyotis, Cynopterus sphinx, Cynopterus titthaecheilus, Pteropus vampyrus, etc.; (8). One species of Pholidota Group, is protected species, Manis javanica. (9). One species of Dermoptera Group is Cynocephalus variegates; and (10). One species of Elephas Group is protected species, Elephas maximus.

- The aquatic study identified 30 species of fish. Some have economic significance to the local communities: Channa spp., Ballontia hasseltii, and Kryptopterus macrocephalus. Ornamental fish with high economic value identified include the Rasbora spp., Trichogaster spp, Scleropages formosus, and Notopterus notopterus.
- Seasonal lakes create ideal habitats for waders, and migratory bird species. Species identified within The GSK-BB reserve include Ardea spp., Egretta sacra, Egretta intermedia, Dendrocygna arcuata, Anas querquedula, etc. Other species of bird also found in that area, such as Anthracoceros malayanus, Aceros corrugatus, Psittacula longicauda, Pycnonotus spp., Treron spp., Halcyon spp., Haliastur indus, Heliaeetus leucogaster, Spilornis cheela, etc.
- The study result of fauna identified two species of reptiles, Amyda cartilagina and Tomistoma schlegelii, are economically significance to the local communities.
- Hydrological functions to support habitat types throughout the year and limit extent of saline intrusion with estuarine habitats.
- Hydrological system at the peat swamp plays an important role in preserving and controlling the hydrological cycle. The peat swamp landscape has functioned as water catchments area to control flood, drought, and protecting from the sea intrusion. This area can also prevent the fire disasters.
- The function of water catchments area is to protect the water supply for the crops, fishery, animal husbandry, and maintain level river surface for local people's transportation.

Human activities:

- Extractivism forest products include: Non-forest products collected/harvested, hunting, fishing, etc.
- Buffer zone mainly comprised of industrial plantation forest managed by Sinar Mas Forestry and Partners. The remaining area preserved as remaining natural forest.
- Buffer zone containing industrial plantation forest in the long term will manage as an effective buffer for the core zone from illegal logging, shifting cultivation practices and oil palm and rubber cultivation.
- The transition area of the Biosphere Reserve totals to 304,123 hectares and mainly used for: (a) Settlements; (b) Oil palm and rubber plantations; (c) Subsistence farming; and (e) Woodlots. The transition area used for oil palm plantation consists about 40 % of

the total transition area, smallholder rubber farms of 20 %, settlements and farmlands about 30 %, and woodlot of about 10 %.

- Ecotourism is not the main activity for the Giam Siak Kecil-Bukit Batu Biosphere Reserve; however, the Giam Siak Kecil-Bukit Batu Biosphere Reserve has potential ecotourism development of peat swamp forest and its biodiversity. The Giam Siak Kecil-Bukit Batu Biosphere Reserve is unique and close to the tourism market such as Malaysia and Singapore. It is not only offering the uniqueness of peat swamp forest ecosystem type but also offers traditional cultures, for example visiting the Siak Sri Indrapura Palace. Ecotourism opportunities will develop based on market research to identify user preferences.

Protection classification:

The Giam Siak Kecil-Bukit Batu Biosphere Reserve (GSK-BB BR) contains a mix of protected areas including two Wildlife Reserves (Ministry of Forestry) and Natural Forest Production managed by private company (Sinar Mas Forestry and Partners) have committed to conserve the remaining natural forest through voluntary agreements.

Roadmap and Nomination Procedure

The first initiative to develop biosphere reserve in Giam Siak Kecil-Bukit Batu is private sector (Sinar Mas Forestry and Asia Pulp & Paper Indonesia, SMF/APP) in 2003. SMF/APP committed to permanently protect 72,255 ha of primary natural forest within their concesion area and this commitment publish on Sustainability Action Plan (SAP)" in February, 2004.

SMF and partners innovatively proposed to the Government of Indonesia and the Indonesian MAB National Committee for the establishment and development of a new Biosphere Reserve representing tropical peat swamp forest in tropical zone located in Bengkalis Regency and Siak Regency, Province of Riau. This proposed Biosphere Reserve will merge around 72,255 ha of primary natural forest of SMF and Partners forest concession areas with Giam Siak Kecil Wildlife Reserve (84,967 ha) and Bukit Batu Wildlife Reserve (21,500 ha), hence the name Giam Siak Kecil-Bukit Batu Biosphere Reserve. SMF and Partners commit to permanently conserve the primary natural forest between Giam Siak Kecil Wildlife Reserve and Bukit Batu Wildlife Reserve as biological corridor, while managing it as pilot project for REDD mechanism. To sustain SMF business, the company also commits to actively involved in monitoring of the proposed core area.

In 2006, SMF proposed that a conservation plan be developed for this district modeled on the Biosphere Reserve concept pioneered by UNESCO. This model calls for a landscape-level approach to conservation that combines core area, buffer zone and transition area for sustainable use. SMF has also presented this BR concept to Forestry Services of Riau Province and proposed to develop Wildlife Reserve Giam Siak Kecil, Wildlife Reserve Bukit Batu and surrounding area about 172,055 Ha as biosphere reserve area.

In 2007, SMF and Natural Resources Conservation Agency, Riau formed working group and established MoU to prepare new BR development. LIPI and SMF carried out the study on biodiversity, environment services, hydrology and social and culture aspects. This data is very important as based to establish management plan 2009-2013 of the proposed BR (Giam Siak Kecil-Bukit Batu Biosphere Reserve).

In 2008, Y. Purwanto (Indonesia MAB Program National Committee, LIPI), Ristianto Pribadi (Department of Forestry) and Haris Surono (SMF), have prepared and started to complete the nomination form of the proposed GSK-BB as a new Biosphere Reserve. The next step is

presentation, socialization, communication of the BR concept and proposed GSK-BB as new Biosphere Reserve to the important stakeholders such as: local government (Siak Regency, Bengkalis Regency, Riau Province), local societies, Forestry Department, private sector, NGO, presentation in the international event (SeaBRnet meeting in Maolan, China; COP 13 in Bali, World Congress of Biosphere Reserve in Madrid, Spain), presentation of the final nomination of proposed GSK-BB as a new Biosphere Reserve to the Indonesian MAB-UNESCO Program National Committee.

With regard to the proposed Giam Siak Kecil-Bukit Batu Biosphere Reserve, the Indonesia MAB-UNESCO Program National Committee supports for its establishment. The formulation of this nomination form is developed as one of the requirement for the establishment of a new Biosphere Reserve, and aims to provide detail information on the proposed Giam Siak Kecil-Bukit Batu Biosphere Reserve. This nomination form is also supported by the document of the Proposed Management Plan of Giam Siak Kecil-Bukit Batu Biosphere Reserve Year 2009 – 2013 and endorsement letters from key stakeholders and the authorities of the area of the proposed GSK-BB BR.

After going through the lengthy process of discussion and analyses of documents, the Indonesian UNESCO-MAB Programme National Committee on behalf of the Government of the Republic of Indonesia submitted the proposal to UNESCO's Paris Headquarters on September 9, 2009. In May 26, 2009 GSK-BB Biosphere Reserve designated as a new Biosphere Reserves and the 7th Biosphere Reserve in Indonesia. GSK-BB Biosphere Reserve is the first biosphere reserve in the world that its development initiatives undertaken by public private sector. At this time the GSK-BB biosphere reserve has become the reference of the biosphere reserve management collaboration between the parties involving the public private sector.

The GSK-BB Biosphere Reserve is the first BR in the world that initiated and co-manages by private sector (Sinar Mas Forestry).

In regard of the roadmap of nomination, the procedure of the proposed BR is (1) Initiative to nominate Biosphere Reserve; (2) Forming Work Group to prepare nomination; (3) Collect data: Biodiversity, Physic, Socio-economic and culture, etc.; (4) Establishment of Zonation System; (5) Identification of the three zones of BR; (6) Fill Nomination Form; (7) Establishment of Management and Action Plan; (8) Recommendation and Support Letters from Authorities; (9) Discussion and Consultation; (10) Socialization of the proposed BR; (11) Workshop; (12) Finalization of Nomination; and (13) Summit the Nomination to MAB UNESCO Headquarter in Paris.

II. Nomination of Wakatobi

Proposed Wakatobi region as a biosphere reserve has done by the Local Government and Wakatobi Wakatobi National Park.
Why Wakatobi proposed as a biosphere reserve area? While that the Wakatobi itself is a conservation area or National Park. The management option of Wakatobi area with the biosphere reserve concept has aims to reduce conflicts of interest between local governments with the National Park as a conservation area manager. For the information, the area of Wakatobi National Park is same area with Wakatobi Regency. In regard with this problem, it was agreed for the Wakatobi region management is using the concept of biosphere reserve management.
Wakatobi is an island whose name is taken from the abbreviation for the name of the four main islands in this region of Wangi-Wangi, Kaledupa, Tomia and Binongko.The sea of Wakatobi have rich coral reef diversity and other marine species, especially species of fish and this area has estimated the one of the richness species of fish in the world
Wakatobi is new regency that has same size with size of National Park of Wakatobi (Stated by UU No. 29/ 2003 on December 2003). This area about 1.4 million ha which is 97 % marine area, only 3 % land). This area has 142 islands and only 7 are inhabited islands. The number of population is about 103.423 peoples which has annual population growth is about 1.92 %. Wakatobi is located in The Heart of Coral Triangle Centre and Wakatobi is part of Sulawesi Major Bio-geographic Region and connected by 2 eco-regions i.e. Savu Sea Eco-region and Bird's Head Eco-region.
Wakatobi is located in The Heart of Coral Triangle Centre, so the biodiversity is very rich. There are about 590 fish species, 396 reef species. Wakatobi has been managing eight important resources as conservation target, as follows: (1) coral reefs; (2) mangroves; (3) SPAGs (spawning aggregation sites); (4) sea-grass, (5) turtle nesting area, (6) Cetacean; (7) sea bird, and (8) high economic value of fishes.
Wakatobi as a representative ecosystem of Banda-Flores Water Sea Coral Reef some of hectare: 54.500 Hectares, there is a Kaledupa atoll reef (about 48 kilometers) as the largest atoll in Asia Pacific.
The total area of proposed Wakatobi Biosphere reserve (WBR) is 1,418,421.88 Ha

Background

Wakatobi is a new regency under Law No 29 (2003) and stated as new regency on December 2003 with an area about 1.4 million ha which is 97 % marine area and only 3 % land. This area has 142 islands and7 inhabitant islands. The number of population is about 103,423 peoples which has annual population growth is about 1.92 %.

Wakatobi as a marine national park dominated by a waters sea that located in The Heart of Coral Triangle Centre. Wakatobi is part of Sulawesi Major Bio-geographic Region and connected by 2 eco-regions i.e. Savu Sea Eco-region and Bird's Head Eco-region.
Some reasons that the background of this region will be manage by the biosphere reserves concept area:

High risk environment degradation

Wakatobi region has a high risk of environmental damage because this area as it is small islands and has a relatively high population density; there is exploitation of marine products that are not environmentally friendly and vulnerable to conflict of interest.

Natural resources

Wakatobi has a lot of important resources such as (a) Coral Reefs (396 species), (b) Coral fishes (590 species), (c) Mangroves (22 major species, 11 associate species), (d) SPAGs (11 sites, 4 sites well-monitored), (e) Sea-grass (9 species of 12 species in Indonesia), (f) Turtle Nesting Area (2 species, 5 sites), (g) Cetacean (7 species of whale, 6 species of dolphin), (h) Sea Bird (85

sp), (i) High economic value fishes (especially napoleon-wrasse, polka-dot grouper) and mackerels), (j) Other species (mollusca 210 species; echinodermata 48 species; anthropod 6 species; algae 15 species; and foraminifera 31 species), (k) Wakatobi has rare habitat types: biggest atoll, sea-cave at Gurita reef, widest lagoon, small-liaison lagoon, reef wall as common types of Wakatobi reef, whole-island nesting sea bird at Moromaho and Kamponaone), and (l) Endemic seabird species at Wanci and Kaledupa: Dicaeum celebicum Koehni (Cabai Panggul Kelabu), Geopelia maugei (Perkutut Loreng).

Position of Wakatobi and existent of the longest atoll in the world

Wakatobi is located in the heart of Coral Triangle Centre and it has 118.000 ha area of coral reef and Kaledupa atoll (48 km) is the longest atoll in the world. This area is also as the highest marine biodiversity area in the world 750 coral species, 942 species of fishes.

Tourism Asset

Wakatobi is the most potential and incomparable diving destination. From a marine tourism perspective, continued tourism development will benefit from the positive reputation that the park already enjoys in international dive circles. Despite Wakatobi's remoteness, the presence of active airstrips on Buton and Tomia represent an important enabling condition for tourism development (though it remains to be seen if the Tomia strip will be available to other operators). While traditional user rights claims will have to be taken into account, the range of uninhabited atolls presents a possible opportunity for tourism concession.

In addition to the many exciting reefs with tourism potential, there are also a number of landbased opportunities to spread tourism benefits to local communities. The hand-dyed, handwoven ikats and traditional fiber woven baskets produced on Kaledupa Island have proven highly popular (at handsome profits!) with visitors to Operation Wallacea, and both the traditional dancers of Kaledupa and the metalworkers of Binongko Island are reportedly highlight for visitors from the MSY Ondina liveaboard. Tours through Bajau stilt villages (using canoes paddled by locals) are also highly popular with visiting guests and locals alike

The richness of marine products

Wakatobi National Park or Wakatobi Regency about 97 % its area are waters, so its products are fishery diversity product. The export value of fishery product is about: tuna (450 ton/month or 450,000 kg/month); pelagic fish (3,500 ton/year or 3,500,000 kg/year); kerapu

fish (150 ton/year); seaweed culture hasn't got optimal production level (150 ton/trip of delivery, potential culture 9,000 ton/season, etc.).

Cultural heritage

Wakatobi population consists of various ethnic groups. The original ethnic groups are Wanci, Mandati, Liya, Kapota, Kaledupa, Waha, Tongano, Timu, Mbeda beda. The local immigrant ethnic groups are Ciacia and Bajau. The newest immingrant ethnis groups are Bugis and Java. The original ethnic groups are still strong but have much experience of acculturation and each ethnic living with a regular, harmonious and mutual respect. Ethnic Bajau is very unique, because their life is highly dependent on marine resources, starting from the settlements which are located on the sea coast by using rocks to build settlements area, until their livelihood is very dependent on the sea. Ethnic Bugis, Buton and Java generally as traders and farmers and only a small part as a fisherman
There are few historical sites in the buffer zone such as the indigenous Wanci, Mandati, etc.
The original peoples of Wakatobi consists of 9 indigenous / local peoples are: (1) Ethnic Group of Wanci; (2) Ethnic Group of Mandati; (3) Ethnic Group of Liya; (4) Rthnic Group of Kapota (Wangi-Wangi Island and Kapota Island); (5) Ethnic Group of Kaledupa in Kaledupa Island; (6) Ethnic Group of Waha; (7) Ethnic Group of Tongano in Tomia Island; (8) Ethnic Group of Timu in Tomia Island; and (9) Ethnic Group of Mbeda -beda in Binongko Island.

In addition, there are two indigenous orlocal peoples which represents the indigenous settlers (immigrant) namely local people of Bajau and Cia-cia from ethnic Buton.
Every ethnic group has a unique language unique. Although the language is different, but among them can still understand each other when doing communication. Typical dance of Wakatobi community such as Honari Mosega (Liya), Pajoge (Wanci), Dance Lariangi (Kaledupa), Sajomoane (Tomia), Saride (Tomia), Dance Balumpa (Binongko), etc.

Nomination Procedure

The proposed nomination Wakatobi as a new Biosphere Reserve is still on-going and this nomination will be submit to MAB UNESCO, Headquarter in September 2011.
The nomination procedure of the proposed Wakatobi as a new BR is:

1. Initiative to nominate Biosphere Reserve: The initiator of the proposed Wakatobi as a new BR is Local Government and Wakatobi National Park.
2. Forming Team Work to prepare nomination: Team work has forming by decree of Regent of Wakatobi (October, 2010). The leader of this team is head of Development Planning Agency of Wakatobi District. The member of this team consist of head of Wakatobi National Park, Head of Fishery Services of Wakatobi

District, Staff of Ministry of Marine Affairs and Fisheries, Director of Environment Services (Ministry of Forestry), Indonesian Institute of Sciences (LIPI), NGOs (TNC and WWF), and experts from Indonesian MAB Program National Committee (MAB Indonesia).

3. Collect data: Biodiversity, Physic, Socio-economic and culture, etc.: These data has collected from the result studies of the research institution, Universities, NGOs, and statistic data of government (Ministry of Marine Affairs and Fisheries, Ministry of Forestry, Ministry of Home Affairs, etc.)
4. Establishment of Zonation System: The establishment of zonation system has done by cooperation work between Wakatobi National Park, Local Government (Wakatobi District) and local societies in this area.
5. Identification of the three zones of BR: Based on the field observation and research document (scientific publication, bibliography, statistic data), the Team Work identified the three zones of the proposed BR.
6. Fill Nomination Form: The nomination form is on-going fill-in and supposed finish in May 2011. The Team Work prepares also the support and recommendation letter from keys stakeholders, authorities of the area, local people, and local government.
7. Establishment of Management and Action Plan: Team Work establishes the integrated management and action plan based on the management plan of Wakatobi National Park and Management Plan of Wakatobi District.
8. Recommendation and Support Letters from Authorities: The proposed nomination of Wakatobi as a new BR has the recommendation and support letters from keys stakeholders (Regent of Wakatobi Regency, Local Societies, Wakatobi National Park, NGOs, Ministry of Forestry, and Ministry of Marine Affairs and Fihseries).
9. Discussion and Consultation: In April 2011, the Team Work will be discuss and consult the proposed nomination of Wakatobi as a new BR in Wangi-Wangi. This meeting will be organized by Development Planning Agency of Wakatobi Regency.
10. Socialization of the proposed BR: Team Work has started socialization of the proposed new BR to local government (Regent of Wakatobi Regency, Local Parliament, Fisheries Services of Wakatobi Regency, Local Societies, NGOs, etc.).
11. Workshop: Workshop will be carrying out on June 2011 in Wakatobi to discuss the final nomination proposed Wakatobi as a new BR before this nomination submits to the Indonesian MAB-UNESCO Program National Committee.
12. Finalization of Nomination: Team Work will be finalizing the proposed nomination of Wakatobi as new BR after the workshop has done.
13. Summit the Nomination to National Committee: The initiators (Local Government and National Park of Wakatobi) will summits the proposed BR to National Committee on July 2011.
14. Summit the Nomination to MAB UNESCO Headquarter in Paris: The Indonesia MAB Program National Committee will submit the proposed BR to MAB-UNESCO HEADQUATER in PARIS on September 2011.

Conclusion

The nomination form of proposed new Biosphere Reserve consists of three parts: (1) Part one is a summary indicating how the nominated area responds to the functions and criteria for biosphere reserves set out in the Statutory Framework, and presents the signatures of endorsements for the nomination from the authorities concerned; (2) Part two is more descriptive and detailed, referring to the human, physical and biological characteristics as well as to the institutional aspects; and (3) An annex to be used for updating the Directory of Biosphere Reserves on the MABnet, once the site has been

approved as a biosphere reserve.
The procedure of the proposed BR is (1) Initiative to nominate Biosphere Reserve; (2) Forming Work Group to prepare nomination; (3) Collect data: Biodiversity, Physic, Socio-economic and culture, etc.; (4) Establishment of Zonation System; (5) Identification of the three zones of BR; (6) Fill Nomination Form; (7) Establishment of Management and Action Plan; (8) Recommendation and Support Letters from Authorities; (9) Discussion and Consultation; (10) Socialization of the proposed BR; (11) Workshop; (12) Finalization of Nomination; and (13) Summit the Nomination to MAB UNESCO Headquarter in Paris.

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State of Biosphere Reserves and co-management in Japan

Takahiro Okano

Associate Professor, Center for Education, Kagoshima University

There are 4 Biosphere Reserves in Japan, Shiga Highland, Mt Hakusan, Mt Odaigahara & Mt Omine, Yakushima Island, all of which were designated in 1980. These BRs are located in a National Park, and the states of natural environment are well protected. The monitoring report, "Catalogue UNESCO/MAB, Biosphere Reserves in Japan", was published in 1999 and 2007 by the Japanese Coordinating Committee for MAB.

Unfortunately, in the 4 BRs, there are no significant actions for sustainable development based on local community efforts. This is because understanding of MAB and BRs has not been sufficient in Japan. In addition, when the 4 BRs were designated, the government did not make an opportunity for the discussion about MAB with the local citizens and scientists, or management plans for the BRs.

On the other hand, there are cooperative activities with local stakeholders for sustainable use of a natural resource and conservation of biodiversity in Japan In Shiretoko, World Heritage Site, the Marine Management Plan was made up at the conference that exchanged local fishermen and scientists. The objective of the Marine Management Plan is to satisfy both of stable fisheries based on sustainable utilization of marine living resources and the conservation of marine life and the ecosystem. The Marine Management Plan is based on both legal restrictions and autonomous management measures carried out by fishers to conserve the marine ecosystems and sustainable fisheries. In Aso, the "Aso Grassland Restoration Committee" was established in 2005 for the conservation and restoration of the Aso grassland by stakeholders. Aso grassland, the largest secondary grassland in Japan, has declined in areas, and the abundances of grassland species are drastically decreasing, because of the reduction of stock farming. Traditional practices of grassland management should be adaptively modified to fit the current grassland condition. A long-term collaborative management is expected to be achieved through the participation of various actors.

These cases suggest that we can arrange collaboration between local citizens, scientists and the governments for management plans of Japanese BRs to develop a co-management scheme in Japanese BRs.

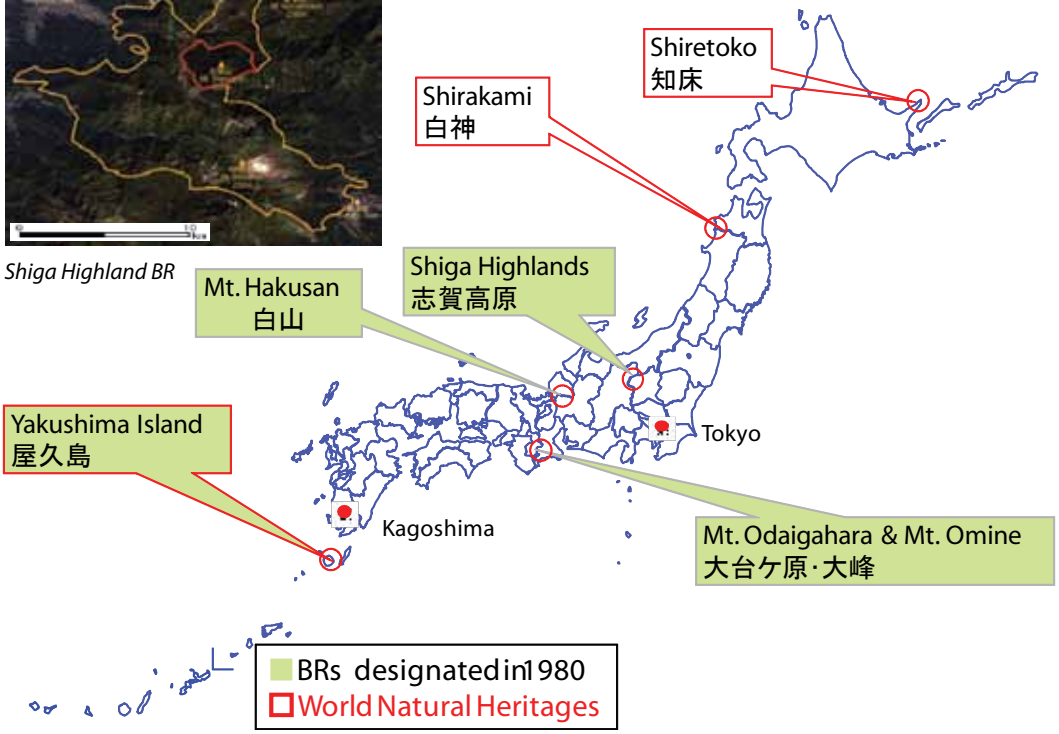
Now, the Japanese Coordinating Committee for MAB is making up the guidelines for designation of new BR in Japan. The draft guidelines require the autonomy of local citizens and the management plan based on the discussion among various stakeholders in the nomination process.

Overview

- State of Biosphere Reserves in Japan
- Co-management in Japan
- Shiretoko- with Fisherman and Scientists
- Aso grassland- with Farmers, Scientists, NGO,
- For New BR

Biosphere Reserves in Japan

Shiga Highland BR



Mt Odaigahara & Mt Omine BR

Yakushima Island BR

Mt Hakusan BR

Unique Vertical Zone of Vegetation

- 0-1000m: evergreen broad-leaved forest
- 1000-1700m: Cryptomeria and other temperate conifers
- 1700-1900m : Pseudosasa meadow

Problems of Biosphere Reserves in Japan

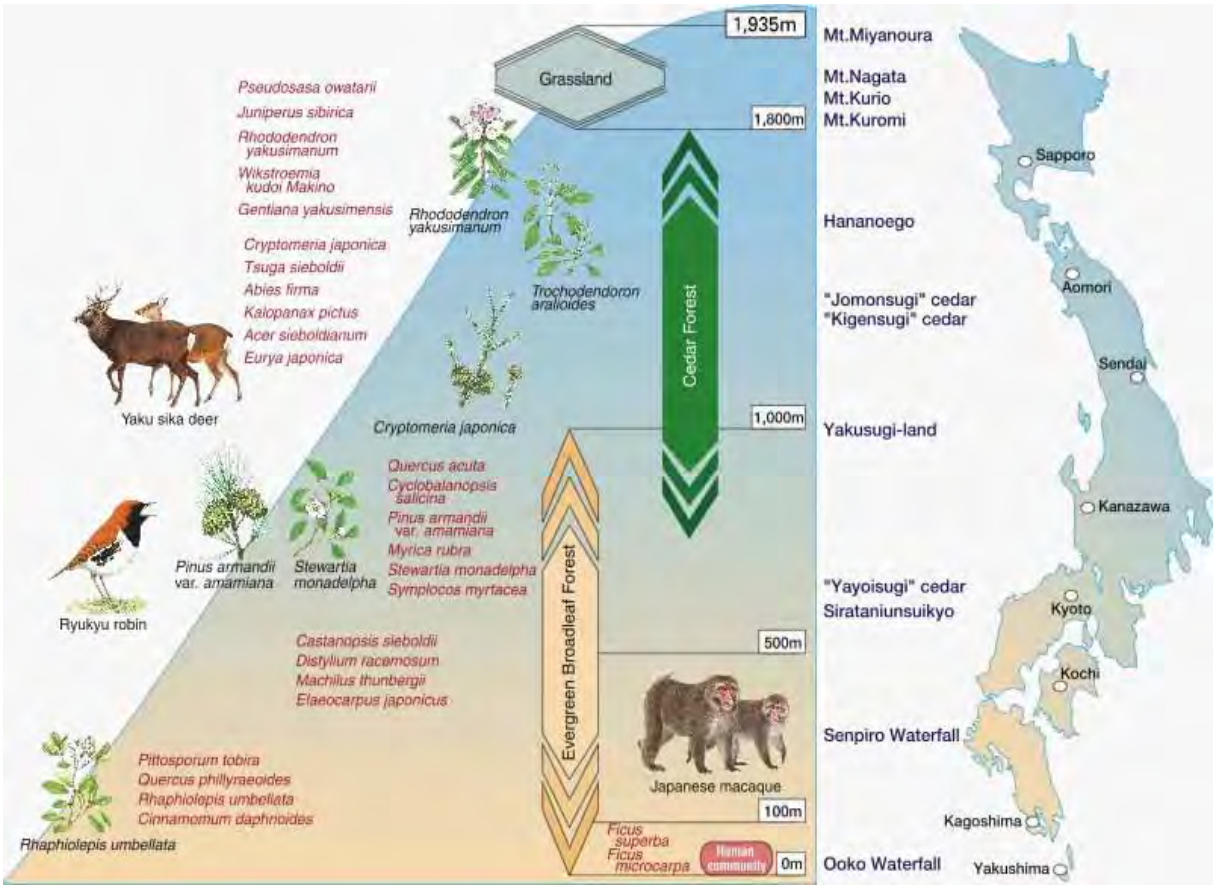
- Lack of action and recognition in 4 BRs!Because
  - No management plan for BR
  - No meeting for BR
- No BR has been submitted since 1980
- No transition areas in all 4 BRs

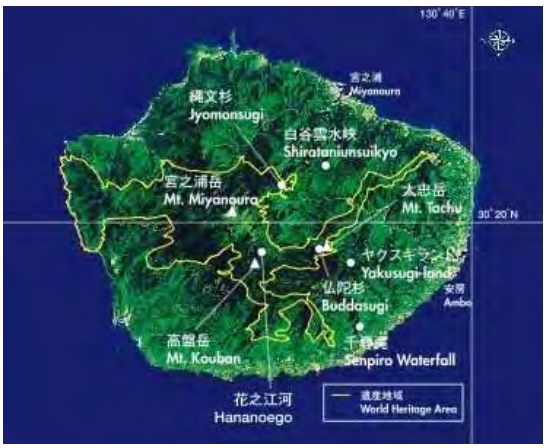
Co-Management in Japan

Yakushima Island Biosphere Reserve

The total area of the BR is 18,958 ha,
the core area is 7,559 ha, the buffer zone is 11,399 ha, with no transition zone.

- Designated in National Park in 1964
- Designated in BR in 1980
- Inscribed on World Heritage List in 1993





The states of natural environment are well protected

Shiretoko World Natural Heritage Site

- The heritage site includes the Shiretoko Peninsula and surrounding marine areas.
- The salmons migrate between the sea and rivers, and become food sources for a wide range of wildlife including large terrestrial mammals and endangered birds of prey as well as various marine mammals and seabirds.

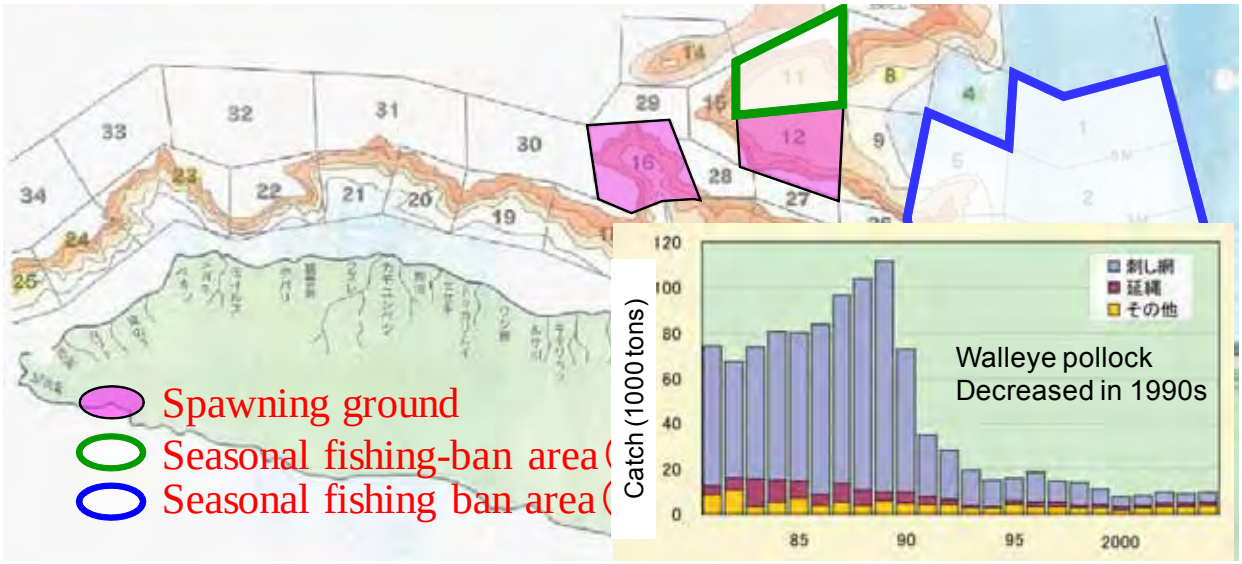
Date of Inscription: 2005 Criteria: (ix)(x)
Property : 34,000 ha

"Friction" in Nomination of Shiretoko World Heritage

- Not a severe regulation to fishery in marine areas.
- IUCN requested further conservation efforts.
- Fishers don't agree to further regulation for World Heritage.
- Scientific Council's solution:
- Increasing effort for conservation by fishersmen
- Adaptive and Autonomous management based on scientific knowledge

Marine Management Plan for Shiretoko World Heritage Site

- The Multiple Use Integrated Marine Management Plan for Shiretoko World Natural Heritage Site was finalized in December 2007.
- Marine Working Group
  (Scientists, Fisheries cooperative associations, Local and Central government.)
- Adaptive management, Autonomous management
- Indicator species
  (salmonids, walleye pollock, Steller sealion, Steller's sea eagle, etc.)
-



Example of autonomous management

- Fishing ban during spawning season since 1995
- Fishing ban area expanded in 2005
- 177 boats fished walleye pollock in 1995
- Decreased to 86 boats in 2004 (49% reduction)
  - Compensation to retired fishers by fishers cooperative association

IUCN "Report of the reactive monitoring mission 18-22 February 2008

The mission team also applauds the bottom up approach to management through the involvement of local communities and local stake-holders, and also the way in which scientific knowledge has been effectively applied to the management of the property through the overall Scientific Committee and the specific Working Groups that have been set up. These provide an excellent model for the management of natural World Heritage sites elsewhere.

The Grassland in Aso

- The largest secondary grassland in Japan
- The grassland is commons.
- The grassland has been maintained by local citizens for farm stocking and agriculture.
- The grassland maintain for 1000 years

The grassland in Aso made by human and nature in harmony

Hotspot area for grassland species in Japan

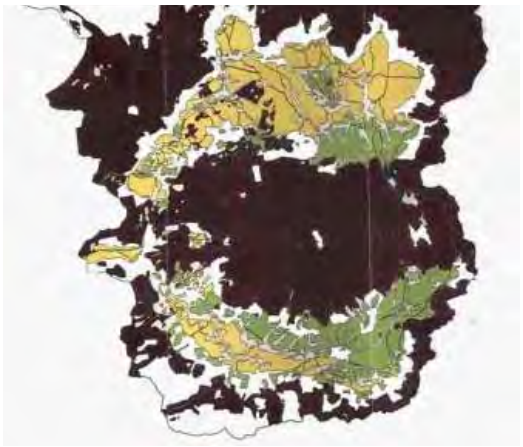
- About 600 species of plants in Aso
- This grassland has been a habitat for variety of grassland plants and animals, including the continental element species and Red Data Book species.
- Last sanctuary of grassland species because grassland has declined all over Japan

primrose

The various benefits of the grassland in Aso

- Beautiful landscape=Sightseeing
- Stock farming
- Biodiversity
- water
- Environment education
- Culture

The area of grassland has declined



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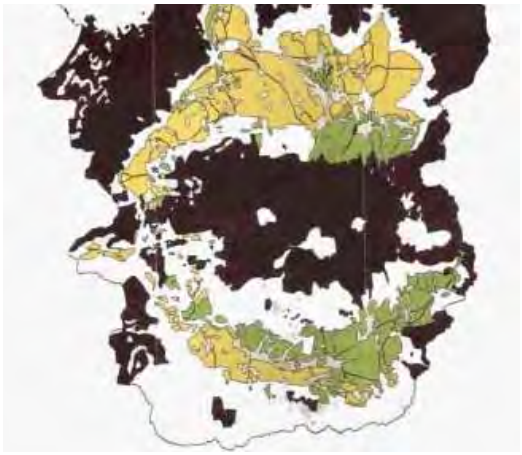
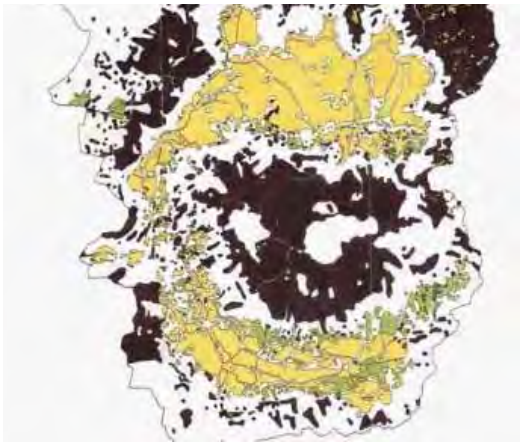
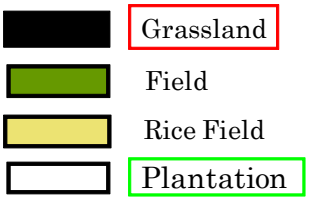


60 years ago



now



The number of breeding cow has been decreasing dramatically in this area

Aso Grassland Restoration Committee

for the conservation and restoration of the Aso grassland by stakeholders

Aso Grassland Restoration Committee was established in 2005

↓

Aso Grassland Restoration Master Plan was made up in 2007

↓

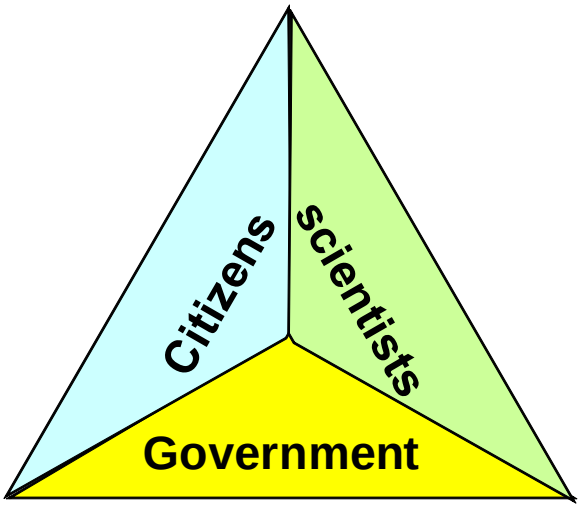
Conservation and Restoration of grassland by co-management based on the master plan

This committee formed by more than 160 members which is some groups, some individuals , Local and Central Government.

Conservation and Restoration of Aso grassland by Collaborative Management

- Develop branding strategy for stock farming
- Continuance of maintenance by local farmers
- Fund-raising
- Burning by volunteer from urban residents
- Education for children
- Fertilizers made from
- wild glass

Conclusion



These cases suggest that we can arrange collaboration between local citizens, scientists and the governments for management plans of Japanese BRs to develop a co-management scheme in Japanese BRs.

Japan Biosphere Reserve Network (J-BRnet)

New Biosphere Reserve Designation

- Biosphere Reserve
  - UNESCO Eco Park
- Now, the Japanese Coordinating Committee for MAB is making up the guidelines for designation of new BR in Japan.
- The draft guidelines require the autonomy of local citizens and the management plan based on the discussion among various stakeholders in the nomination process.

Nino Konis Santana National Park (NKSNP):

A Potential Site for the First Biosphere Reserve in Timor-Leste (TL)

Pedro Pinto
Head Of The Nino Konis Santana National Park
National Directorate Of Forestry

Legal and Policy Frameworkin Support of NKSNP

- TL constitution ensures "citizen's rights to a humane, healthy and ecologically balanced environment and stipulates the protection of the environment for the benefit of future generations";
- The first regulation on Protected Places in TLwas established under UNTAET (regulation 2000/19);
- Government Resolution No. 8/2007, regarding the establishment of NKSNP
- TL has ratified the Convention of Biological Diversity in 2007

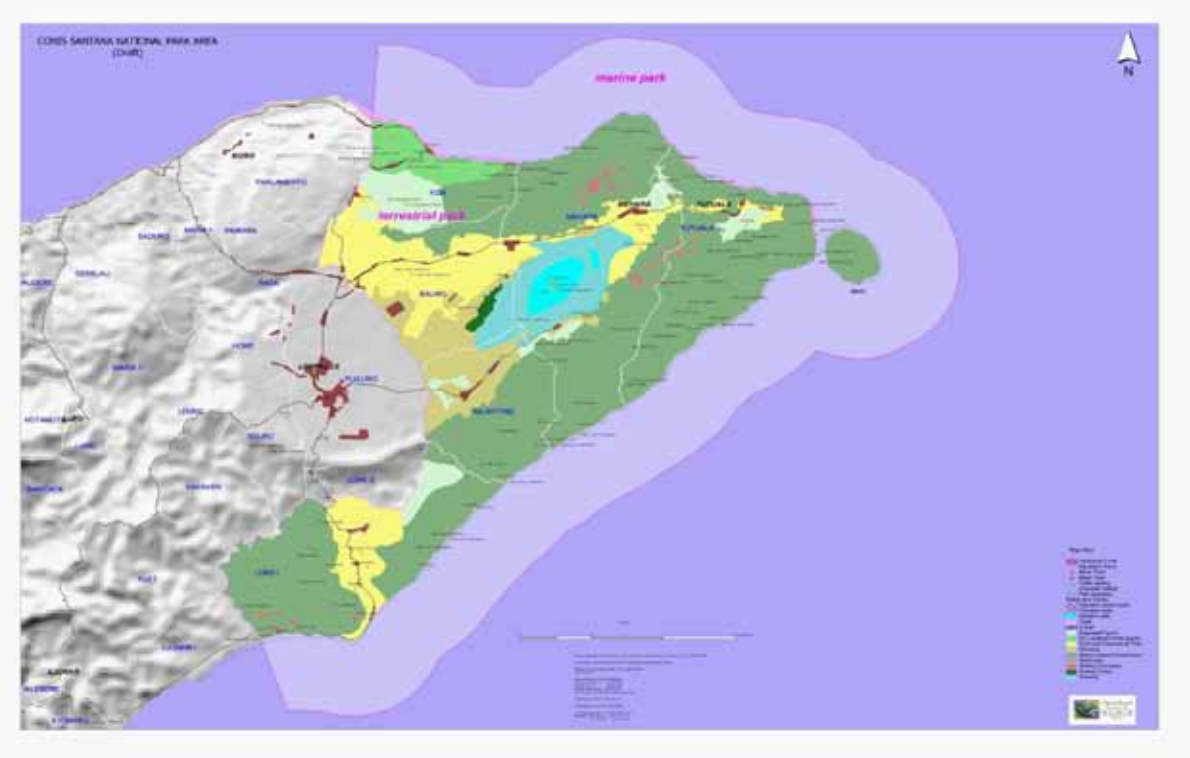
Background Information

Size of The Park

- Total area: 123,600 ha
- Terrestrial: 68,000 ha
- Marine: 55,600 ha

Administrative Division

- Located in Lautem district, three sub-districts.
- There are six villages located in the park and 29 sub-villages.
- Total human population in the park is 15,000.



Protected Areas in TL

Biodiversity Values

- Variety of Habitats and Ecosystems: dry lowland forest, grass land, moist lowland forest, settlement, swamp forest, wetland, mangrove, degraded forest, agriculture/shifting cultivation.
- Two major Forest Types:
  - South: Evergreen/Moist Forest
  - North: Deciduous Forest

Flora:

Largest remaining area of natural vegetation in Timor-Leste and the island of Timor;
High diversity of vegetation types in excellent condition, high degree of connectedness between different habitats, low levels of disturbance.

Intact Beach Forest and Deciduous Forest, highly significant as these specific vegetation types have largely disappeared in the region
Unique example of Ecohydrology-seasonal wetlands (Lake Iralalaro floodplain)

Various habitats in NKSNP

Highly Specific Flora

- Eight threatened plant species: *Dalbergia latifolia* (VU A1cd), *Intsia bijuga* (VU A1cd), *Pterocarpus indicus* (VU A1d),*Santalum album* (VU A1d), *Antiaris toxicaria*, *Neoalsomitra podagrica, Ficus albipila, Carallia brachiata.*

- Ten new plant species for Timor (only found within the park): *Alstonia actinophylla, Crateva religiosa, Baumea rubiginosa, Euroschinus falcata, , Myristica lancifolia, Pouteria* (*Planchonia*) *nitida, Dimocarpus longan, Dendrophthoe curvata, Horsfieldia sp., Ochrosia oppositifolia.*

Terrestrial Fauna

1. Two globally-threatened bird species occur in very good numbers:
   - Yellow-crested Cockatoo (IUCN CriticallyEndangered)
   - Timor Green Pigeon (IUCN Endangered).

2. The area also supports 24 of the 32 Timor/ Wetar endemic bird species and important populations of 15 near-threatened bird species:
   - Beach Thicknee
   - Great-billed Heron

1. 16 endemic bat species (4 possible new species)
2. Estimated 40 reptile and 20 amphibian species, with relatively high number of endemism:
   - 50% for frog species
   - 25% for respectively skink and gecko species
3. A turtle, previously believed extinct, has been rediscovered in Lake Iralalaro
4. One endemic fish (Ceratocephalus sp.) species, totally new to science
5. Important fossil records, including species of giant rat

Marine and Coastal Fauna

Globally threatened species:

1. Dugong (*Dugong dugon*)
2. Marine turtles: occur in good numbers. Remote coastline provide secure nesting beaches;
3. green turtle (*Chelonia mydas*)
4. hawksbill turtle (*Eretmochelys imbricata*).
5. Coral diversity in the area is typically high (approx. 124 genera)

6. Presence of dolphins and sharks;
7. Whales occur during migration season;
8. Spawning event of marine worm (February and March);
9. Regionally significant population of Estuarine Crocodile;

Cultural Values of NKSNP

1. Existence of traditional culture, with a strong link between people and land/ environment
2. Many ceremonial sites, sacred places and forests
   - *Ili Kerekere* (sacred rock paintings eg. *Kwavatxa, Tutuala*)
   - *Kio hakupoto* (forbidden forest)
3. A traditional ritual is the annual harvest of mice seaworms that spawn inshore in February and March.

Historical Values of NKSNP

- Archaeology has shown human occupation in the national park for more than 40,000 years;
- Over 100 sites of archaeological significance, including caves displaying rock art, and excavations;
- Many sites from period of Portuguese colonization, including fortresses;
- Remains of World War II, including graveyards of Australian forces;
- Resistance stronghold for the guerilla movement under Indonesian occupation;

Challenges

- Limited financial and human resources for park authorities;
- Pressure of development and increasing population pressure;
- Management Plan and Zonation not yet established;
- Community participation and collaborative management mechanisms not yet established and operational.
- Illegal hunting and logging (small-scale)

Opportunities

- BR Nomination will improve importance of NKSNP at national and international level;
- BR concept will allow to bridge development needs with nature conservation, including development of alternative livelihoods.
- BR Zonation (Core/buffer/transition) can be used for establishing the national park zonation
- BR Model can be adopted for NP Management. This will reduce potential conflicts between the park and communities and allow for genuine community participation in park management.

Lessons Learned and Practices on the Tree Adoption Programme in Mount Gede-Pangrango National Park (MGPNP) in Support of Sustainable Land Use in Cibodas Biosphere Reserve,

Indra Exploitasia Semiawan, DVM

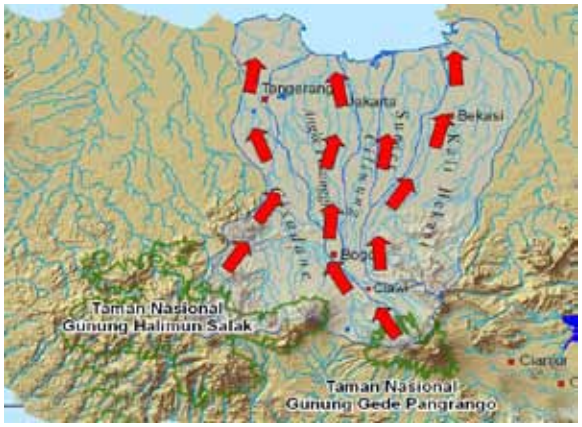
Ministry of Forestry, Indonesia

Current situation

Mount Gede-Pangrango National Park (MGPNP) is a protected area which functions as a core zone of Cibodas Biosphere Reserves (CBR). The MGPNP is administratively located in three Districts of Bogor, Cianjur and Sukabumi, in the Province of West Java. The MGPNP was declared as a National Park on 1980 with an area of 15,196 hectares and was further expanded in 2003 to encompass an area of 21,975 hectares. In 2009, further expansion was undertaken, so that the current total area of MGP NP is 22.851 Ha.
Most of the expanded areas are from production forest managed by Perum Perhutani (State-owned Forest Enterprise).

This National Park is very important as the few remaining montane habitat and ecosystem of Java. Over 1,000 species of higher/flowering plants have been recorded, comprising approximately 120 plant families. The park consists of more than 200 species of orchids: about a third of all the orchid species found in Java. The bird species excite particular interest, attracting ornithologists from all over the world; this is not surprising considering that

more than half of Java's bird fauna can be seen here, including most of the "Javan endemic birds". Threatened or endangered mammals which include the leopard, the Javanese silver gibbon and the Javanese leaf monkey are preserved in this area. Four (4) big rivers and tributaries (Ciliwung, Cimandiri, Citarum, Cisadane) have its origins in springs within the MGPNP making this park is highly important not only for the biodiversity protection but also for human life support system.



For decades the MGPNP have been important sources for livelihood of local people and in some cases have contributed to national economic development. The National Park have contributed significantly to the reduction of poverty and sustainable development. The MGPNP carries out many functions that are benefecial to community and welfare. These include biodiversity, watershed protection, tourism, forest products, carbon, water, research, cultural values and others. The way these functions are transformed into benefits for people, including the rural poor inhabitants living around MGPNP depend highly on the proper management of MGPNP to translate policy on sustainaanble land use into actions within the Biosphere Reserve.

Now, MGPNP is under significant pressure caused by several threats from the impact of development, constraints from incompatible policies with regards to resource uses versus resource protection, different commitments of land use among stakeholders, incompatible policies in the management of production forest and conservation forest, and critical integrating broad-scale conservation planning into other land-use planning innitiatives and sectoral policies (such as agroforestry and livestock management).

To solve the problems and in order to implement few of the mandate of the Convention on Biological Diversity (CBD), MGPNP should promote a significant shift in the perception of the local and national governments concerning the multi level functions of protected areas. It has linked protected areas to larger issues of public concern, such as sustainable development, poverty alleviation, traditional knowledge, access to genetic resources, equitable sharing of benefit sharing and intellectual property rights. Therefore, the management of MGPNP are developing strategy that could make local community as an owner and co managers of considerable areas of land designated as protected area.

MGGNP's Managemet Strategy

The MGPNP is managed by zoning system. There are 7 management zones of the park,namely: core zone, wilderness zone, rehabilitation zone, sustainable utilization zone, traditional utilization zone, javan gibbon conservation zone and special zone. These zones are designed based on standard and criteria developed in accordance with the purpose of the management of each zone in order to maximize the benefits and functions of each zone. The expansion areas of the National Park, on the other hand, are man-made forests consist of tree plantations and in many cases were managed in collaboration with local communities for small scale agricultural activities. These activities were onced legal in the production forest areas, but then it is now illegal when the status of the forest is changed into conservation forest (National Park). In this regard, the specified zones for the expansion area are designated into sustainable utilization zone and traditional utilization zone, where human activities are allowed with strict regulations.

No	Name of zone	Coverage (ha)
1	Core	9.585,895
2	Wilderness	6.767,665
3	Sustainable utilization	1.003,632
4	Rehabilitation	5.068,673
5	Traditional utilization	371,784
7	Special	3,190
8	Javan Gibbon conservation	50,151
	Total	22.851

It is known that zoning system is also used in the management of Biosphere Reserves. Cibodas Biosphere Reserve (CBR) declared by UNESCO on 1977 has an area of about 114,779 ha and Mount Gede Pangrango National Park (MGGPNP) hass been designated as the core zone of CBR. The buffer zone covers an area of about 12,700 ha and consists of tea plantation area, botanical garden, vegetable garden,

villages, and others. Transition area which covers 80,104 ha, is dominated by food crops, plantation and settlements. It is obvious that the integration of MGPNP management within the framework of biosphere reserves will be highly important for the sustainable development of the areas.

The sustainable land use within the CBR is legally supported by the Presidential Decree on Nationally Strategic Area. Part of the Cibodas Biosphere Reserve (district Bogor and Cianjur) has already been included in the what so called Nationally Strategic Area of Bogor-Puncak-Ciajur (Kawasan Strategis Nasional/ KSN Bopunjur), an area which plays important and strategic roles in terms of national spatial planning as referred to in Presidential Regulation no 54/ 2008 concerning spatial planning of Jakarta, Bogor, Depok, Tanggerang, Bekasi, Puncak and Cianjur. One of the provisions of this regulation is the arrangement of sustainable development in the buffer and transition zone, so that economic development and natural resources management of the area must comply with the decree accordingly. However, the other district within the CBR, namely district Sukabumi whose activities of development such as industrial estates, tourism, etc are not particularly regulated under the national policy needs special arrangement within the framework of CBR. Therefore, there is a need to develop an integrated policy on sustainable development inside buffer and transition zones to support the core zones.

In working on the integration of conservation objectives into development of land use planning, since 1994, a multistakeholder partnership in the form of consortium of 14 institutions (which consists of NGOs, private sectors, local community and government bodies) was established to encourage cooperation and to develop the sustainable land use surrounding the park. The consortium names as GEDEPAHALA, which stands for Gede-Pangrango-Halimun-Salak, the name of the mountains which connect the national park (Halimun and Salak mountains are now managed as a national park as well). Accordingly, activities in the park are implemented collaboratively among park authority, international organizations, local NGO's local community, local government, and private sector. Multi-stakeholder partnerships will bring a big impact on conservation. Private sector's full support and involvement are very much needed to support the sustainable land use. On December 2007, the GEDEPAHALA, then launched one of its programs named Adoption Trees, a program that aimes to implement conservation and management to support restoration of degraded lands in accordance with sustainable land use by local and supported by wider communities.

Adoption tree program

Adoption tree is a program designed to achieve objectives on land restoration by involving deeply local people with the financial supports of wider members of community. It is known that many parts of the MGPNP areas used to be encroachment areas and are situated on the slopes of the mountain, with steepness of more than 30 degrees, and are very sensitive to land slides and soil erosion. Vegetation on the bare lands typically consists of shrubs and tall grasses and often cleared by the local people and tillaged for a short-term agriculture activities. To restore this degraded

land, there is a need to initiate program through involving local farmers for planting and adoption program.

The program is to encourage wider public to be more aware of the environment by providing financial supports through adopting planted trees in order to ensure forest protection and conservation. By supporting tree planting inside the national park, the public have given the opportunity to local community to have customary and traditional rights to the land resources while community development outside the national park may be created using the part of the financial supports to provide alternative livelihood to local people. In turn, the local community could be expected to maintain the national park while they have their livelihood increased.

This program employs participatory approach to engage local communities. In consultation with local farmers and other key stakeholders, such as the National Park Authority and local government, the mixed-use design is chosen as the method of planting to better respond to their desires for livelihood development.

The species of trees and plants will be a mixture of forest woods, quality productive fruits and rare plants. Farmers can still benefit from productive fruits and other plants, while participating in protecting, monitoring and nurturing the forests. In the meantime, some funding from the adopter is alocated for developing alternative livelihood (rabbit farming, organic farms, honey bee farms, etc) to forest dependent communities and allows to promote conservation and responsible land-use practices.

In this scheme the adopters are required to support with funds of Rp 108.000,- (about US$ 12) per tree and minimum adoption period is 3 years. The fund would cover the use for cost of seedlings and maintenance, community development, education, awareness, database development, and international communications and media campaign. Local people have had long standing traditions of conservation and restrained resources use, which the conventional model of Protected Areass tends to ignore. The adoption tree pogram innitiate opportunity of increasing public supports on Protected Areas through involving local people in addressing issues of poverty and development, governance and empowerment, benefit and cost sharing in order to achieve more effective protection of Protected Areas. From 2008-2010, the program has an areas of about 112,51 ha and more than 45.002 trees have already planted to rehabilitate the degraded land in MGPNP.

The success of this program is based on the consideration to revive or providing security of sustaianable land use, therefore this is an essential step in creating long-term investment in conservation. This means, the management of NP should provide secure tenure to local community to survival and livelihood resources. In other word, there is no success in conservation without involving and benefitting local people. The value of this program is that the people who undertake protection of the public resources must be compensated fairly by those who receive benefits from such a protection.

Recommendations

a. All partners to a colaborative conservation arrangement, in particular local community and NP staff, need to be clear about their respective roles. This means, rights and responsibility among partners should be defined for the effective programs on the conservation of the MGPNP.

b. Strengthening the policies and regulations, at national and local levels is needed on programs that move towards more equitable relationship between the park and the local community and in the recognition of the importance of MGPNP as the core zone of CBR.

c. Tree adoption is only one form of programs supporting sustainable land use. There are many programs which may be created and promoted to support the MGPNP as the core zone and to make the objectives of the Cibodas Biosphere Reserve are met.

Other Business II:

MAB Advisory Committee, MAB Expert Meeting, Madrid Action Plan Implementation and a Potential Asia-Pacific Regional Network Meeting

Results of the International Advisory Committee for Biosphere Reserves and the Expert Meeting on MAB Research Sites

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This paper summarizes the results of the International Advisory Committee for Biosphere Reserves and the Expert Meeting on MAB Research Sites which had been held prior to the Sixth South-East Asian Biosphere Reserves Network (SeaBRnet) meeting held in Indonesia, 23 to 25 February 2011.

International Advisory Committee for Biosphere Reserves

The 17th Session of the International Advisory Committee for Biosphere Reserves took place at UNESCO Headquarters from 16 to 18 February 2011. This committee consists of 12 members who are appointed by the UNESCO Director-General and who serve in their individual capacities to advise the Director-General on any issues related to the World Network of Biosphere Reserves. In particular, the Advisory Committee assesses the submission of proposed sites to be included in the World Network of Biosphere Reserves and provides pertinent comments on the 'periodic review" for biosphere reserves due every 10 years. The recommendations of the Advisory Committee are submitted to the MAB International Coordinating Council for its consideration which can approve, modify or reject the recommendations made by the Advisory Committee. In 2011, the MAB Council will assemble for its 23rd session in Dresden (Germany) from 28 June to 1 July 2011.

The MAB Secretariat had received 22 proposals for sites to be designated within the World Network of Biosphere Reserves: 10 proposals emanated from the European/ North American region, and three proposals each from the African, Arab, Asian-Pacific and Latin American regions. At its 17th session, the Advisory Committee recommended approval of 16 proposed new biosphere reserves and recommended deferral of 6 sites.

Regarding the Asian-Pacific region, three proposals from China, Maldives and Viet Nam were considered:

- The proposed Mao'er Mountain Biosphere Reserve in China is a scenic mountain site in the southern part of the country with 10 peaks reaching over 2,000 m above sea-level. Its subtropical broad-leaved and coniferous forests comprise a number of rare species such as the highly endemic frog Rana mao'er mountainensis and the salamander Hynobius mao'er mountainensis (with both species named after the mountain range itself). Seven different ethnic groups live in the proposed biosphere reserve testifying to the rich cultural diversity of the site. A GEF funded project has been particularly concerned

with the development of eco-tourism in this area. The Advisory Committee recommended approval of the proposed biosphere reserve.

- If approved by the MAB Council, Baa Atoll in the Maldives would become the country's first biosphere reserve. The site contains terrestrial and marine (coral) protected areas which have benefitted from the GEF funded Atoll Ecosystem Conservation Project. The Advisory Committee recommended approval of the proposed site subject to the submission of additional information on the legal status regarding 7 of the 11 proposed cores areas, and the provision of maps delineating the spatial extent of the proposed site's transition areas.

- The proposed Dong Nai Biosphere Reserve in Viet Nam is, in fact, an extension of the currently existing Cat Tien Biosphere Reserve in southern Viet Nam, through the inclusion of 2 additional core zones. The change in name of the proposed site is also prompted by the fact that the management of the biosphere reserve would come under the guidance of the People's Committee of Dong Nai Province which aims at strengthening collaboration among the different stakeholders in this province. The Advisory Committee recommended approval of the extension of the current site and the change in name for the new Dong Nai Biosphere Reserve.

The Advisory Committee also examined 32 periodic review reports (which are due every 10 years after the nomination of a given biosphere reserve). From the Asian-Pacific region, eight reports had been submitted of which five reports had been prepared by MAB-China (for Baishijuiang, Gaoligongshan, Huanglong, Jiuzhaigou and Shankou Mangrove biosphere reserves), 1 report by MAB-Indonesia on Cibodas Biosphere Reserve, one report by Thailand regarding Ranong Biosphere Reserve, and one report on Viet Nams' Can Gio Mangrove Biosphere Reserve.

As a general observation relating to the periodic reviews submitted by all world regions, the Advisory Committee noted the need for a clear zonation in core areas, buffer zones and transition areas. In fact in several cases, discrepancies between the spatial extents of the three zones were observed in the periodic review reports vis-à-vis the original nomination dossiers for a given biosphere reserve which would necessitate the preparation of a revised nomination dossier. The Advisory Committee welcomed the procedure of MAB-China in preparing the periodic reviews: each scrutinized biosphere reserve in China is subject to a 3-4 days' national seminar involving multi-stakeholder groups (conservation experts, government representatives, local communities, business representatives etc.) which jointly formulate recommendations to improve the conservation and management of the given biosphere reserve.

Based on the submitted periodic reviews, the Advisory Committee also debated delisting of sites from the World Network of Biosphere Reserves: in two cases, the periodic review revealed that these sites doe not fulfil the criteria of the Seville Strategy for Biosphere Reserves. Should these sites not meet the Seville Strategy criteria by 2013, they may be subject to delisting in 2013 following the stated Targets and Actions of the Madrid Action Plan for Biosphere Reserves (2008-2013). Delisting of sites by 2013 may also affect those biosphere reserves which have never submitted a periodic review.

Expert Meeting on MAB Research Sites

On 21 February 2011, the Advisory Committee for Biosphere Reserves also assembled at UNESCO Headquarters in Paris to discuss in an Expert Meeting the desirability of creating a

new label of "MAB Research Sites". This Expert Meeting had been convened thanks to the initiative and funding provided by the Austrian MAB National Committee.

The purpose of the meeting was to deliberate the status of several "pre-Seville" biosphere reserves which, for various reasons, cannot fulfil the criteria of the Seville Strategy for Biosphere Reserves but which remain excellent research sites and which – after 2013 – would continue to benefit from an internationally designated status under the UNESCO-MAB Programme. While one hallmark of a well-functioning biosphere reserve under the Seville Strategy is a site with three existing zones (core, buffer and transition zones), some of the "older" biosphere reserves designated in the 1970s and 1980s have only one zone (i.e. a protected core zone). The Madrid Action Plan stipulates, for example in its Target 13, that "functional zonation in all biosphere reserves [is] established, particularly with regard to the transition area and development function". The associated Action aims to "develop and apply practical tools and guidelines for zonation at the national level" by 2013.

The MAB Secretariat presented an overview on biosphere reserves without proper zonation, i.e. sites that have a core zone only, but no buffer and transition zones, and which focus primarily on research and protection. Most of these sites had been designated during the period since the launch of the MAB Programme and the Seville Conference for Biosphere Reserves held in 1995. A recent on-going study undertaken by the MAB Secretariat revealed that 18 biosphere reserves in the Asia-Pacific region had a single (i.e. core) zone only accounting for 16% of all Asia-Pacific biosphere reserves; in the Latin American-Caribbean region, 14 biosphere reserves (or 13% of the 106 Latin American biosphere reserves) had a core zone only; and in the Arab region, 3 biosphere reserves (or 20% of the current 15 Arab biosphere reserves) fell into this category.

Mr Arne Arnberger (member of the Austrian MAB National Committee) presented two Austrian case studies, one on Gossenköllesee Biosphere Reserve, the other on Lobau Biosphere Reserve (both designated in 1977) which are very important research sites, but which for different reasons cannot be transformed into fully functional biosphere reserves, including the designation of core, buffer and transition zones according to the Seville Strategy for Biosphere Reserves. In line with the Madrid Action Plan for Biosphere Reserves, these two sites would need to be withdrawn from the World Network of Biosphere Reserves by 2013. However, despite of the fact that they have core zones only, many biosphere reserves in Austria and the world over may have a high societal value and/or have a very long tradition as scientific research sites where excellent long-term data series in a wide range of scientific topics are available. A revocation of the biosphere reserve status would then be counterproductive.

The expert meeting deliberated on a possible new category of MAB-related sites bearing in mind the 'guiding principle' that Member States should be encouraged to make every attempt so that all existing biosphere reserves meet the criteria of the Seville Strategy and the Statutory Framework in line with the Madrid Action Plan for Biosphere Reserves. For the pre-Seville biosphere reserves, the expert meeting made the following recommendations for consideration by the MAB Council at its 23rd session in the context of the agenda item related to 'Periodic Review of Biosphere Reserves':

a. The term "MAB Research Sites" should be avoided as research (one of the main functions of a biosphere reserve) is a fundamental component of all biosphere reserves.

b. Those pre-Seville designated biosphere reserves having a core zone for research and protection only and which

cannot meet the criteria of the Seville Strategy by 2013 should be withdrawn from the World Network of Biosphere Reserves.

c. Those pre-Seville Biosphere Reserves which cannot meet the criteria of the Seville Strategy by 2013, but which have demonstrated scientific and/or societal value for the MAB Programme and for which a Member State wishes to retain an international UNESCO designated status, may constitute a new category. These sites would not be part of the World Network of Biosphere Reserves. The new category could be labeled support/study sites for the MAB Programme, for example to:

   - provide scientific data/monitoring for biosphere reserves and for study themes of local, national and international interests;
   - focus on a specific theme, such as on climate change, through networking with other similar support/study sites and biosphere reserves, particularly those in developing countries;
   - study sustainable development, and reserves.

d. For these support/study sites, selection criteria should be established by the Advisory Committee for Biosphere Reserves.

Interim Review of the Implementation of the Madrid Action Plan for Biosphere Reserves and Regional MAB Collaboration in the Asia-Pacific Region

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This paper focuses on actions and response rates related to the Interim Review of the implementation of the Madrid Action Plan for Biosphere Reserves (2008 – 2013) and provides some thoughts on closer regional collaboration among MAB Member States in the Asia-Pacific region.

Interim Review of the Madrid Action Plan

Adopted by consensus at the Third World Biosphere Reserve Congress held in Madrid (Spain) in February 2008, the so-called Madrid Action Plan (1) builds on the Seville Strategy for Biosphere Reserves (2) and aims to capitalize on the strategic advantages of the Seville instruments and to raise biosphere reserves to be the principal internationally-designated areas dedicated to sustainable development in the 21st century. In attempting to orient the MAB Programme and the World Network of Biosphere Reserve activities during 2008–2013 in the face of new challenges in an ever-changing world, the Madrid Action Plan defines four (4) main action areas, with 31 targets and 65 actions that are critical to achieving the vision and mission of the MAB Programme. Targeted actions help its implementation at the appropriate level, may it be local, national or international, within the time-frame set (2008-2013).

Out of the total of 67 Actions of the Madrid Action Plan, 26 Actions were poised to be reviewed by the 2010 timeframe. At its 22nd session held at UNESCO Headquarters from 31 May to 4 June 2010, the MAB International Coordinating Council requested the MAB Secretariat to send out a target specific questionnaire to Member States to report only on those targets whose deadline had been fixed for 2010 (i.e. 26 targets as mentioned above). The MAB Council also decided to allow for flexibility for the level of quantitative and qualitative detail the Member States decided to choose in replying to the mid-term review of the Madrid Action Plan.

Accordingly, on 30 November 2010, the Secretary of the MAB Programme, Mr N. Ishwaran, sent out a UNESCO-MAB Circular Letter to all MAB National Committees, National Commissions for UNESCO, Permanent Delegations to UNESCO, coordinators/ managers of individual biosphere reserves, regional and thematic MAB networks and UNESCO field offices, requesting the submission of reports by 31 January 2011 on the interim implementation of the Madrid Action Plan (MAP). The MAP related target and action numbers are indicated as follows:

MAP Target Numbers	Related MAP Action Numbers
1	1.1, 1.3, 1.4
2	2.2
3	3.2, 3.3, 3.4, 3.5
4	4.1, 4.2
5	5.1
6	6.1, 6.2
7	7.1
8	8.1
9	9.1
12	12.1
17	17.1
18	18.1
21	21.1
22	22.1
23	23.1
26	26.2
28	28.1
29	29.1, 29.2

At the time of the 6th SeaBRnet meeting held in Indonesia (22-25 February 2011), only 27 countries had submitted responses to the MAB Secretariat regarding their assessments of the implementation of the Madrid Action Plan. In the meantime (as of 16 March 2011) the number of countries has risen to 35. It should be noted that the IberoMAB Network (comprising MAB Member States of the Latin American region as well as Portugal and Spain) has provided a synthesis on the mid-term review aggregating the information of 18 countries and biosphere reserves within that network.

In order to facilitate the work of MAB National Committees and managers/focal points of individual biosphere reserves in providing feedback to the MAB Secretariat regarding the interim evaluation of the MAP, the MAB Secretariat has prepared a template form - see example for Target 1, Action 1.1 as follows:

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TEMPLATE for Interim Evaluation of Madrid Action Plan (MAP): 2008-2010 Country: _____ Biosphere Reserve: _____	
a) Target 1	– Effective implementation of the Seville Strategy
b) Action Number 1.1	Assess the achievements of the Seville Strategy
c) Organisation responsible for implementation	MAB Secretariat
d) Partners contributing to implementation of action	MAB National Committees, MAB Bureau, MAB Networks, BRs, IUCN, UNDP and TNC

e) Success indicators: Assessment document of the Seville Strategy	e.i. Quantitative measures of indicators reflecting success:
f) Lessons Learnt	e.ii. Qualitative descriptions relevant to meeting success indicators:
g) Will actions related to this target be continued in 2011-2013?	
h) Comments and suggestions for the implementation of MAP during 2011-2013?	

It is hoped that MAB National Committees, UNESCO National Commissions and managers/ focal points of individual biosphere reserves of the South-East Asian region, as well as of other regions, submit their responses to the MAB Secretariat by early April 2011. A synthesis of the responses will be presented to the MAB International Coordinating Council at its 23rd session in Dresden (Germany, 28 June to 1 July 2011).

Regional MAB Collaboration in the Asia-Pacific Region

To-date, four subregional MAB Networks exist in the Asia-Pacific region. These are:

- South East Asian Biosphere Reserve Network (SeaBRnet): consisting of Cambodia, China, Indonesia, Japan, Lao PDR, Malaysia, Myanmar, Philippines, Thailand and Vietnam;

- East Asian Biosphere Reserve Network (EABRN): with China, the Democratic People's Republic of Korea, Japan, Mongolia, the Republic of Korea and the Russian Federation as Member States;

- South and Central Asia MAB Network (SACAM): Afghanistan, Bangladesh, Bhutan, India, Iran, Maldives, Mongolia, Nepal, Pakistan and Sri Lanka;

- Pacific MAB Network (PACMAB): Federated States of Micronesia, Kiribati, Palau and Samoa.

The experience of the mid-term review of the Madrid Action Plan as prepared by the IberoMAB Network demonstrates the benefits of a well consolidated regional network, which has a functioning secretariat currently being provided by the MAB National Committee of Chile. Obviously, such regional collaboration is largely facilitated by sharing similar languages (Portuguese and Spanish). The sheer size of the Asia-Pacific region with its extremely rich ethnic, cultural and linguistic diversity may render MAB collaboration in a regional framework more challenging.

On the other hand, SACAM Network members have stated their wish for closer collaboration with other sub-regional Asia-Pacific MAB networks. Along these lines, the next SACAM meeting is planned to be held in Iran in June 2011 and the Iranian hosts would welcome one representative each from the SeaBRnet and EABRN subregional networks so as to forge closer cooperation in an Asia-wide context.

It would go without saying that a closer MAB collaboration at regional level must be based on perceived needs and wishes of all countries concerned. Should such a regional network focus on specific thematic areas and what would these thematic areas be? Would there be a fixed secretariat or would it rotate from one country to the other? What roles and backstopping services must be provided by the UNESCO field offices in Apia, Beijing, Jakarta, New Delhi and Tehran? Can financial resources be mobilized from the participating countries so that the networking can be based on solid footing? All these questions cannot be resolved within a short period – but they may be worth for further reflections.

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