

Proceedings of the
Joint Regional Seminar of the Ecotone-SeaBRnet 2007 and
the 9th Conference of the China Biosphere Reserves Network (CBRN)

Cultural diversity:

a foundation for biodiversity conservation
and sustainable development

Maolan Biosphere Reserve, Libo County,
Guizhou Province, P.R. China
7-12 November 2007



United Nations
Educational, Scientific and
Cultural Organization



Organized by:

Chinese National Committee for MAB and
UNESCO Jakarta in cooperation with
the Guizhou Provincial Government and
Government of Libo County, P.R. China

With support from

UNESCO MAB Regular Programme in Jakarta and Bangkok,



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Glossary

AEE	Assessment of Environmental Effects	MAB-IHP	Man and the Biosphere – International Hydrological Programmes
AFD	Agriculture and Fisheries Department (Hong Kong SAR)	MDG	Millennium Development Goals
AFCD	Agriculture, Fisheries and Conservation Department (Hong Kong SAR)	MOF	Ministry of Forestry
BB	Bukit Batu	Mu	Chinese unit of measurement (~ 797.3 sq yd, or ~0.1647 acres)
BR	Biosphere Reserve	NCC	Neo-conservation culture
CBD	Convention on Biological Diversity	NGO	Non-governmental organization
CBRN	Chinese Biosphere Reserve Network	NIR	Neo-lwi rights
CHC	Confucian Heritage Culture	NZ	New Zealand
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora	NZFS	New Zealand Forest Service
CP	Country Parks	PA	Protected Areas
CP3	Country Park Promotion Period	PE&T	Pioneer European exploit and transform culture
CPA	Country Parks Authority	PHKA	Directorate General of Forest Protection and Nature Conservation under the Ministry of Forestry, Indonesia
CPO	Country Parks Ordinance	PRC	People’s Republic of China
CQLP	Conservation and Quality of Life Period	RMA	Resource Management Act
CTBR	Cat Tien Biopshere Reserve	SACAM	South and Central Asia MAB
DFP	Destructive fishing practices	SAR	Special Administrative Region
EABRN	East Asian Biosphere Reserve Network	SeaBRnet	Southeast Asian Biosphere Reserve Network
EMSB	Evaluation of Mechanisms Sustaining the Biodiversity in Lake Tonle Sap, Cambodia	SEF	Sustainable Enterprise Fund
EcolA	Ecological Impact Assessment	SMF	Sinar Mas Forestry
e.g.	Example given	SSSI	Sites of Special Scientific Interest
Et al.	Et alii (and others)	TFSW	Traditional Fung Shui Woodland
Etc..	Et cetera (and so on)	TM	Technical Memorandum
FIT	Funds in Trust	TMC	Traditional Maori Culture
FMU	Financial Management Unit	TNP	Tongariro National Park (New Zealand)
FSW	Fung Shui Woods	UNESCO	United Nations Educational, Scientific and Cultural Organization
FCC	Forum for Community Communication	WCED	World Commission on Environment and Development
GDP	Gross Domestic Product	WNH	World Natural Heritage
GSK-BB	Giam Siak Kecil – Bukit Batu (Indonesia)	WW II	World War II
HCVF	High conservation value forest		
IUCN	The World Conservation Union		
KCMI	Komodo Collaborative Management Initiative		
KNP	Komodo National Park (Indonesia)		
KSDA	Nature Conservation Agency under the Ministry of Forestry, Indonesia		
MAB	Man and the Biosphere Programme		
Programme			

Introduction

There has been a growing recognition in recent years of the roles of culture and cultural diversity in nature conservation and sustainable development; more particularly regarding the roles and responsibilities indigenous peoples can play in managing and conserving the often complex ecosystems they inhabit. The relationship between indigenous cultures and their natural environment involves a complex series of interactive adaptations over time. This inter-relationship makes it almost impossible to describe most ecosystems in Asia with popular environmental terms such as “pristine” and “virgin”. Even if these ecosystems sometimes appear to be in their original state, it is perhaps more accurate to describe them as ‘optimized ecosystems’ or ‘cultural ecosystems’. This is the case for many of the natural reserves, national parks and restricted protected areas today.

Many have argued that, to pursue biodiversity conservation as one of the central pillars for sustainable development, conservation interventions should strongly take into account cultural diversity, including traditional knowledge, local practices, indigenous beliefs, local taboos, customary rights and rules, as well as related cultural expressions and practices. However, the intensified economic development in Asia has been seen causing accelerated erosion of cultural diversity along with biodiversity loss, putting the interdependence-ship of culture diversity and biodiversity in many places at stake. Due to policy gaps and lack of knowledge, understanding and recognition, sometimes even conservation and ecotourism projects ignore the local and inherent cultural diversity of the areas concerned. Such an ethnocentric approach often results in management conflicts and in some cases even further marginalizes indigenous groups, causing social and equity problems.

The United Nations World Commission on Environment and Development describes the disappearance of indigenous cultures and their related knowledge as “a loss for the larger society, which could learn a great deal from their traditional skills in managing very complex

ecological systems”¹. UNESCO, in its mid-term strategy (2002-2007) and current biennium workplan, has put it as a priority to ‘Enhancing linkages between cultural and biological diversity’. Biosphere Reserves, on the one hand, are expected to develop a consolidated knowledge-base of the inter-dependence of cultural and biological diversity and of cultural practices supporting local-level sustainable use of biodiversity. On the other hand, it is important to increase awareness among national level policy and decision makers on the role of sacred sites, cultural landscapes and community conservation areas in the sustainable use of biodiversity. This approach is also in line with the UNESCO Convention on Cultural Diversity, established in 2001 and put into force in 2005.

It is under this framework, and through consultation in 2006, that Ecotone-SeaBRnet and CBRN had decided to join their meetings to address this challenging issue. The joint regional seminar and national conference held from 7-12 November 2007 provided a unique opportunity for experts, managers, practitioners and community representatives to meet and exchange their views and experiences on this subject.

Executive summary

The joint Regional Seminar of the Ecotone-SeaBRnet 2007² and the 9th Conference of the Chinese Biosphere Reserve Network (CBRN) brought together experts, managers and practitioners as well as local government officials and community representatives. The aim was to address the challenging and increasingly acknowledged issue of cultural diversity and its role in biodiversity conservation and sustainable development in the Asian and Pacific region.

The seminar was attended by the 12 countries involved in Ecotone and the Southeast Asian Biosphere Reserve Network (SeaBRnet), namely Cambodia, China, Indonesia, Japan, Laos PDR, Malaysia, Myanmar, New Zealand, Philippines, Thailand and Vietnam. The participant from Republic of Korea was not able to attend and provided the paper for distribution. Further participants included representatives from other MAB regional networks such as the South and Central Asia MAB (SACAM) and the East Asian Biosphere Reserve Network (EABRN) as well as representatives from UNESCO Offices in Beijing and Jakarta. Experts from various institutions and organizations were invited to provide key note speeches and their expertise in discussions and information exchange as well as were local community and government representatives.

Located in the impressive setting of the Maolan Biosphere Reserve, the seminar provided the unique opportunity for the exchange of expertise and information obtained through MAB related studies, surveys and cases from the field regarding cultural diversity and its intrinsic link with biodiversity.

Knowledge gaps and weaknesses in conservation and development policies in the Asia and Pacific region were identified and approaches for improvement debated.

As a result recommendations on the new orientation of Biosphere Reserves as 'learning laboratories' for sustainable development and on the orientation of the MAB programme in the future were developed.

During an extensive two-day field visit, participants met and discussed with the community members of different ethnic groups living in the biosphere reserve. The participants engaged in a fruitful discussion with the Governor of Libo County, Mr. Choubiao Chen, and the Maolan Biosphere Reserve Directors, Jincheng Ran and Luming Wei on the successes and challenges of the BR management based on the impressions and information gained during the field visits.

This joint seminar resulted in two fundamental documents outlining the future approach of SeaBRnet and CBRN regarding the linkages between cultural diversity, biodiversity and sustainable development in the Asian context: the Maolan Declaration agreed by members and friends of SeaBRnet, and the Libo Consensus signed by representatives from Biosphere Reserves and National Parks in the P.R. China.

The seminar was organized by the Chinese MAB National Committee, Guizhou Provincial Government and the Government of Libo County of P. R. China with support from UNESCO MAB Regular Programme in Jakarta and Bangkok, and the Japanese Fund in Trust Programme to the UNESCO Sciences in Asia-Pacific.

2 Ecotone-SeaBRnet 2007 is referred to the Ecotone Phase II 3rd Workshop and SeaBRnet 5th Meeting

Maolan Biosphere Reserve

The area of Maolan was officially nominated as a Nature Reserve in 1987 and one year later as a National Nature Reserve. Due to its high biodiversity it was designated as a UNESCO Biosphere Reserve in 1996 and just recently been inscribed on the UNESCO World Heritage List as part of the South China Karst (2007) which is made up of the stone forest in Yunnan Province, Libo County in Guizhou Province, and Wulong County in Chongqing City.

The Biosphere Reserve is located in Libo County, Guizhou Province (South China), in the South of the Guizhou Plateau at 414-1,071 m a.s.l. (East Longitude 107°7'-108°8', North Latitude 25°7'-25°39'). It comprises 21,285 ha of which 83.05 km² constitute the core zone, 81.3 km² the buffer zone and 48.5 km² an experimental zone.

In correspondence with the zoning scheme of the Biosphere Reserve the core zone is free of human presence and activities. In the buffer zone some communities can be found with low population number and minimal infrastructure. The experimental zone is the main area of human settlements and activities with a high population and increasing infrastructure. The total number of inhabitants in the Biosphere Reserve is around 8000 with a density of 37,6 person/km².

Maolan Biosphere Reserve exhibits a peculiar landscape – a mix of Karst geomorphology with a relic original forest ecosystem - a landscape rarely be found in China or in areas of the same latitude worldwide.

Lying in the moist monsoon area, a transition area from central subtropics to south subtropics, the reserve belongs to the Subtropical Forest Province of China of the Palearctic Biogeographical Region. Forests are extensively distributed among groups of Karst peaks, either tier upon tier on the Karst funnels or continuously on the open depressed areas. The total forest cover rate in the Reserve amounts to 87.3 % and 92 % in the core zone. Influenced by Karst geology and topography, limestone-mixed evergreen and broadleaf forests can be found, which are floristically close to Yunnan and Guizhou Provinces.

There are seven first class national protected plants in Maolan including Yew, Magnolia, and white flowered orchids. Among the 109 species of second national protection are bluish green pine, short leafed Douglas fir, Pimento, Incienso, and 85 kinds of orchids. With

its unique karst physiognomy the Biosphere Reserve is a ecological niche for 26 endemic species such as the Libo Bamboo. Seed plants amount to 1,300 different species. Among these are 8 first and second classes of national protection as well as 15 endemic species. More than 20 species have been newly discovered, such as the mangliete (*Manglietia calcarea*), thorn bean (*Carpinus lipoensis*) and indosasa (*Indosasa lipoensis*).

Due to the wide distribution of wild plum species including plum trees of 200 years age, Maolan has been considered as 'China's wild plum flower center' by the China Plum Association. Given the favorable weather, the Authority of Maolan plans to plant 323 different kind of plum tree species discovered worldwide as a tourist attraction.

The rich fauna of Maolan Biosphere Reserve belongs to the oriental region and exhibits many rare as well as endangered species. Over 300 species of vertebrates and 140 species of birds can be found. More than 30 species are under national protection, e.g. South China tiger (*Panthera tigris amoyensis*), rhesus monkey (*Macaca mulatta*), leopard (*Panthera pardus*), small Indian civet (*Viverricula indica*) and mainland serow (*Capricornis sumatraensis*). 138 animals have been newly discovered such as the Libopi gecko, Maolan Leafhopper, Maolan fungus gnat, Maolan blind ground beetle and the Maolan Anue Spider.

The Biosphere Reserve embraces 8 townships (Lihua, Yongkang, Dongtang, Wongang, Laocun, Jia'ao, Yaoshan, and Jialiang), 23 administrative villages, and 75 local communities.

Being in the poor and remote mountain area of southern Guizhou, where minority ethnic groups are concentrated, balancing conservation with livelihood improvement is of crucial importance. Besides the Han people there are

six different ethnic groups living in the Reserve, namely the Shui, Buyi, Yao, Miao, Maonan, and Zhuang. With 7400 inhabitants the Buyi, Shui, Yao, and Zhuang account for 93% of the total population with a large share of the Buyi and Shui people. Until today, most inhabitants make their living from forestry and agriculture (rice, rape, sweet potato and medicinal plants). With an average of usable land of only 0.00062 km² per person other income sources are crucial. These include traditional industries such as cloth spinning, plum harvesting, mat weaving, and herb collection. In 2000 the average annual income per person was 840.2 Yuan.

To support local communities efforts have been made with respect to water conservancy construction, bridge building, road construction, power supply, afforestation, wild animal domestication, education, as well as hygiene and public health. The Reserve is managed based on a participator approach to consider the needs of its inhabitants. To achieve harmony between biodiversity conservation and the strengthening of the local economy the "Libo Karst Economic Development Company" has been founded which initiated ecotourism and the planting of economic valuable trees and medicinal plants.

With its unique beauty and value of the natural landscape, biodiversity, geological, geomorphological and hydrological features and the rich tangible as well as intangible cultures Maolan Biosphere Reserve represents an excellent example of a 'learning laboratory for sustainable development' and a vivid example of the intrinsic linkage between biological and cultural diversity.

Since its founding, an array of scientific research has been carried out in the Reserve by national and international institutions. Researches have mainly dealt with forest ecology, specific species (e.g. wild orchids, cave animals, forest prey birds) and hydrogeology. Recently, the reserve has been included in the "Planning of the Establishment and Development for a Monitoring Network for the Forests, Deserts and Wetlands in China" and the establishment of a permanent research station for the Maolan Karst Forest Ecosystem is under consideration.

Welcome remarks³

The first day of the seminar was opened with welcome remarks from representatives of UNESCO, MAB Offices and the local government and Maolan Biosphere Reserve.

On behalf of UNESCO: Mr. Han Qunli (Director of UNESO Teheran Cluster Office representing Secretariat of Ecotone-SeaBRnet), Mr. Tian Xiaogang (Secretary General of the National Commission of the People's Republic of China for UNESCO).

MAB Offices: Prof. Kazuhiko Ogino (Representing MAB Japan), Dr. Nguyen Hoang Tri (Secretary General of MAB Vietnam, Vice President of MAB Bureau of the International Co-ordinating Council).

Local government: Mr. Wu Yue (Representative of Government of Guizhou Province, China), Mr. Zhong Li (Representative of the State Environment Protection Administration of China), Ms. Haili Zhou (Representative of the State Environment Protection Administration of China), Ms. Meng Yuanfen (Vice Governor of the Qiannan Autonomous Prefecture).

Maolan Biosphere Reserve: Mr. Chunshuai Qin (Representative of the Local resident of Maolan BR, China)

Welcome remarks were followed by a ceremony during which Mr. Tian Xiaogang and Mr. Han Qunli handed certificates over to the new members of the Chinese Biosphere Reserve Network (CBRN): Inner Mongolia Tumuji National Nature Reserve, Inner Mongolia Hui River National Nature Reserve, Inner Mongolia Honghuaerji National Nature Reserve, Inner Mongolia Daxing'an Mountains Hanma National Nature Reserve, Guangdong Pearl River Estuary Chinese White Dolphin National Nature Reserve, Jiangxi Wuzhifeng National Nature Reserve, Guizhou Kuangkuoshui National Nature Reserve and Leigong Mountain National Nature Reserve

Mr. Han Qunli,

Director of UNESCO Tehran Cluster Office,
representing Secretariat of Ecotone-SeaBRnet

Dear Mr. Wu Yue, Deputy Secretary-General of Guizhou Provincial Government,

Dear Mr. Tian Xiaogang, Secretary-General of UNESCO National Commission of China,

Dear Dr. N. H. Tri, Vice President of MAB International Coordinating Council, and Secretary General of MAB Vietnam,

Representatives from the Governments of Guizhou, Qiannan District and Libo County,

Dear participants from the Member States of UNESCO Ecotone-SeaBRnet and Chinese Biosphere Reserve Network,
Community representatives, experts, Ladies and Gentlemen,

I am truly honoured to be the first speaker this morning and to welcome you all on behalf of UNESCO to this joint UNESCO MAB regional seminar Ecotone-SeaBRnet 2007 and the 9th Session of National Conference of Chinese Biosphere Reserve Network (CBRN), which is entitled as '*Cultural diversity: a foundation for biodiversity conservation and sustainable development*'. Allow me to convey the best wishes from the Director-General of UNESCO, Mr. Koïchiro Matsuura, and warm regards from all colleagues of UNESCO Offices in Beijing, Jakarta, Paris and Tehran. To you all, welcome to Libo, welcome to Maolan Biosphere Reserve - the new World Heritage

3 As several remarks were delivered in Chinese, only the speeches in English are available in the report

site! To the colleagues coming from Asia-Pacific region, welcome to China!

In the coming five days, we will discuss the linkage between cultural diversity and biological diversity, and explore particularly the fundamental roles of cultural diversity in nature conservation, as well as the potentials of such a linkage in pursuing the sustainable development goals of today. We will have the opportunity to visit the Maolan Biosphere Reserve and meet local and indigenous communities, in order to learn about the special site characteristics, history and socio-cultural contexts, and the ways of local communities in living and managing their natural resources. We will see both challenges and opportunities and witness the efforts of the local communities and governments, including developing ecological and cultural tourism (Libo hosted the 2nd Provincial Tourism Conference). We hope that, through such discussions and field contacts we could deepen our views and understanding regarding the fundamental nature of in-situ biodiversity conservation in Asia-Pacific Region, and bring new thoughts and approaches in Biosphere Reserve applications in future.

Dear colleagues, ladies and gentleman, it is not by coincidence that UNESCO takes Biodiversity and Culture Diversity as a Main Line of Action in its current biennium programme. As we know, Man and the Biosphere (MAB) Programme in its very essence is to inquire into peoples interactions with biosphere, thus it has been an interdisciplinary programme, with social and cultural programmes as inherent components. The Seville Strategy of Biosphere Reserves of 1995 made this remarkably clearer and stronger by putting the Goal I of the Strategy as Using Biosphere Reserves to conserve biological and cultural diversity. This is indeed a far-sighted and advanced call, and sets the direction for Biosphere Reserve development around the world. In practice, however, not many Biosphere Reserves have worked on this or even paid attention to cultural diversity aspects, a fact that makes our meeting in Libo this week particularly relevant.

It must be mentioned that, in a broader international context, UNESCO has been vigorously promoting cultural diversity since the late 1990s. This effort has resulted in the establishment of a number of new international conventions, such as the Convention for Safeguarding Intangible Heritage of 2003 and the Convention on the

Protection of the Diversity in Cultural Expressions of 2005. The main basis for establishing such Conventions are the strong recognition by international communities on the importance of culture values and cultural diversity in creating a rich and varied world, increasing the range of choices and nurtures human capacities and values, and culture diversity as a mainspring for sustainable development for communities, peoples and nations. The Conventions recognize the importance of traditional knowledge as a source of intangible and material wealth, and in particular the knowledge systems of indigenous peoples, and its positive contribution to sustainable development, as well as the need for its adequate protection and promotion. There is apparently a need for all of us working for Biosphere Reserves to look into these newly established international Conventions and to benefit from the use of the deliberations of these instruments in our respective Biosphere Reserves.

For Ecotone-SeaBRnet countries, this joint Meeting is held at an opportune moment: Last week, UNESCO has concluded its 34th Session of General Conference in Paris. With the endorsement of its 193 Member States, UNESCO has adopted its new mid-term strategy for 2008-2013, and new biennium workplan and budget for 2008-2009. In these new plans, Biosphere Reserves as the World Network of UNESCO will continue to provide learning sites and strategic linkages for cooperation on biodiversity conservation and sustainable development. Our deliberations in Maolan will be taken into the detailed workplan preparation of UNESCO. In February 2008, UNESCO will host its 3rd Conference for the World Network of Biosphere Reserves (now having 529 sites from 105 countries) in Madrid, Spain, in order to build a new plan of cooperation on 'Biosphere Futures - Biosphere Reserves for Sustainable Development'. Our achievements in Libo will serve as an important input from our region to the Madrid Conference, thus channelling our new ideas, concepts, initiatives, instruments and recommendations into global practices.

On our host country side, the Meeting is also at an important conjunction of times. Locally, Maolan has just become a new World Heritage site – as part of the South China Karst, which brings so much joy, honour and exciting new opportunities, and at the same time assigns much heavier responsibilities. Nationally, there has been rapid increase of environmental concern and

awareness, as environmental sustainability is making its strong contrast to the great economic achievements of the country. The recent notion made by the President of China on Ecological Civilization in the course of national development, or Ecological Culture in some other translations, will have strategic and long-term influence, in favour of a new development paradigm that is human-centred, environmentally-sound, scientifically-supported and socially and culturally harmonious.

I congratulate MAB-China and the Governments of Guizhou Province and Libo County as well as the managers of Maolan Biosphere Reserve for having taken this important subject for a joint Chinese national and regional discussion. It is truly excellent to have an opportunity for a large number of Chinese Biosphere

Reserve managers and the experts from Ecotone-SeaBRnet countries to meet. My special thanks go to the Government of Japan for its continued financial support to the organization of Ecotone-SeaBRnet meeting series since 1990. I thank all the friends from Ecotone-SeaBRnet, for contributing their knowledge and valuable time, and travel all the way to Libo, which itself is a strong demonstration of commitment to UNESCO missions through MAB and Biosphere Reserves. The agenda ahead of us is very interesting but also challenging. Let us be very efficient and best use our time to reach the main objectives of the Meeting.

I wish you all the success for this important joint Conference. Thank you.

Dr. Nguyen Hoang Tri

Secretary General, Vietnam MAB National Committee;
Vice Chairman, MAB Bureau of the International
Co-ordinating Council (ICC)

Mr. Han Qunli, Director UNESCO Teheran Cluster Office,
Representative Secretariat of Ecotone-SeaBRnet,
Mr. Xiaogang Tian, Secretary General of Chinese National
Commission for UNESCO,
Mr. Yue Wu, representative of Government of Guizhou
Province, China,
Distinguished Guests, Ladies and Gentlemen,

Firstly, I am very appreciate, on behalf of the MAB Bureau of the International Co-ordinating Council (ICC), and highly welcome to the successful nomination forms from China, Federated States of Micronesia (FSM) and Vietnam to designate the new biosphere reserves. They are Chelabing and Xingkai Lake biosphere reserves in China, And Atoll, Federated States of Micronesia and the Western Nghe An Biosphere Reserve in Vietnam. The World Network of Biosphere Reserves is now consisted of 529 sites in 105 countries.

I am very pleased to welcome this important event given by continuous efforts of our friends and colleagues in Southeast Asia, East Asia and the Pacific to organize the Ecotone-SeaBRnet Meeting: 'Cultural Diversity – A foundation for Biodiversity Conservation and Sustainable

Development' in the Maolan Biosphere Reserve, Libo County, Guizhou Province of China.

This workshop is contributing to the new period of the Man and Biosphere Program (MAB) and The World Network of Biosphere Reserves (WNBR) with Madrid Conference 'Biosphere Future – UNESCO Biosphere Reserve for Sustainable Development' to be held in February next year. During that meeting we will discuss to find solutions to following critical challenges by questions:

- How are biosphere reserve zones contributing to conservation and development taking into consideration constraints and opportunities inherent in each zone?
- How can biosphere reserves be used for innovative research and capacity building enhancing the role of ecosystem goods and services in development?
- How can the MAB and Biosphere Reserve Regional Networks be strengthened to become the main drivers of MAB and Biosphere Reserve agendas?
- How can biosphere reserves be used for learning, governance and adaptive management approaches for sustainable development of land/seascapes?
- and contribution to build the MAB Vision and Mission, Madrid Action Plan and Madrid Declaration, names of MAB, biosphere sphere reserves among others.

The increasing challenge of the biosphere reserve is the identification of the appropriate authorities who can

influence governance and management regimes not merely in the legally protected core; but in the totality of core, buffer and transition zones that defines the biosphere reserve. This is a particularly critical challenge in post-Seville sites where as much as 80% or more of the designated area is often without any legal protection. The protected area manager is not the arbitrator of stakeholder interests outside of the protected area. Identification of an authority or authorities who has the mandate and resources to co-ordinate stakeholder interests throughout the entire biosphere reserve will be the key to innovation and success in the next phase of the evolution of the concept and practice

This meeting is held in a wonderful landscape and beautiful site of the Maolan Biosphere Reserve, established in 1996, the central sub-tropical karst forest ecosystems supporting high biodiversity of rare, precious and endangered species, including tiger, leopard, civet etc along with 'Stream flowing, birds flying and singing in the green mountain'.

Although the site is located in a remote area with majority of ethnic minorities and poverty, the authority of Libo County, Guizhou Province have a lot of efforts to promote participating management and activate the harmonization of preservation of cultural diversity with conservation of biodiversity by sustainable use of medicinal plants, eco-tourism and setting up 'Libo Karst Economic Development Company'. This is a valuable lessons learned to be discussed and to exchange ideas among participants in the workshop.

I wish the workshop would be fruitful during presentation and discussions and enjoy beautiful landscape during the fieldtrip

I would like to conclude my remarks by Yao and Buyi People Saying: 'To see is to believe'.

Thank you very much for your attention.

Prof. Kazuhiko Ogino

Emeritus Professor, University of Shiga Prefecture,
representing Japanese MAB National Committee

Mr. Han Qunli, Director, UNESCO Teheran,
Representative of UNESCO SeaBRnet,

Dr. Tian Xiogang, Secretary –General, National
Commission of the People's Republic of China for
UNESCO,

Dr. Nguyen Hoang Tri, Secretary-General, MAB Vietnam,
Vice-President of MAB-ICC,

Dr. Han Nianyong, Secretary-General, Chinese National
Committee for MAB,

Mr. Wu Yue, Representative of the government of
Guizhou Province,

Mr. Governor Cheng Chou Biao, Libo County, Guizhou,
the People's Republic of China,

Distinguished Guests,

Ladies and Gentlemen,

On behalf of the MAB Committee and delegates of
Japan, I would take the opportunity to express my hearty
congratulation for all the success of the Conference to be
held today.

The Joint Regional Seminar Ecotone-SeaBRNet 2007 and
9th Conference of the China Biosphere Reserve Network
is organized to aiming at clarifying cultural diversity as a
foundation for biodiversity conservation and sustainable
development. This is the very important theme for all
of us, human-beings living concurrently on earth today.
Those humanity attribute as culture, social structure and
people's way of thinking undoubtedly form the basement
of biodiversity development or natural ecosystem
rehabilitation on earth at large.

Yesterday, on our arrival at this beautiful country, Libo, we
received the most impressive welcome by the people, by
the government of Libo County. We also met old friends
and new generation and members of MAB activities. It
looks for me the inheritance of the MAB activities is very
successful from old to new generation and Members.
We should work together to solve the crucially important
theme of cultural diversity as a basis of biodiversity. I am
fully convinced of the success of the meeting this time.

Finally but not least, I am very much grateful to UNESCO
Jakarta for their sincere contribution toward the very well
organized Conference.

Thank you for your kind attention.

1

Keynote Speeches

Cultural Diversity - A Platform for Biodiversity Conservation?

Mr. Koen Meyers

Technical Adviser for Environmental Sciences - UNESCO Office, Jakarta

Traditional, local, customary, native, indigenous ►
Culture

- The United Nation World Commission on Environment and Development describes the disappearance of indigenous cultures as “a loss for the larger society, which could learn a great deal from their traditional skills in managing very complex ecological systems.” (1987);
- Rio Earth Summit (1992);
- UN Decade of the Indigenous Peoples (1994-2004).

Convention of Biological Diversity (CBD)

Article 8(j)

States that each contracting Party shall, as far as possible and as appropriate: Subject to national legislation, 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 wider 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.

Ecosystem Approach under CBD

Principle 2:

Management should be decentralized to the lowest appropriate level.

Principle 11:

The ecosystem should consider all forms of relevant information, including scientific and indigenous and local knowledge, innovations and practices.

Seville Strategy for Biosphere Reserves

Goal I: Use BRs to conserve natural and cultural diversity.

Goal II: Utilize BRs as models of land management and of approaches to sustainable development.

Objective II.1: Secure the support and involvement of local people.

Culture is an inherent component of Man and Biosphere (MAB) Programme from its inception.

The World Network of Biosphere Reserves as of 2007:

- 529 sites in 105 countries

The UNESCO Biosphere Reserves in the Asian - Pacific region are home to more than 10 million indigenous or tribal peoples, who have been living in some of these sites for over thousand years.

Biosphere Reserves criteria:

Encompass a mosaic of ecological systems representative of major biogeographic regions, including a gradation of human interventions. Some of these interventions might be invisible to protected area managers. Many pristine ecosystems are in fact managed systems. Their values are both tangibles and intangibles.



Culture and the Natural Environment: Intrinsically Linked

Culture is a powerful tool in biodiversity conservation.

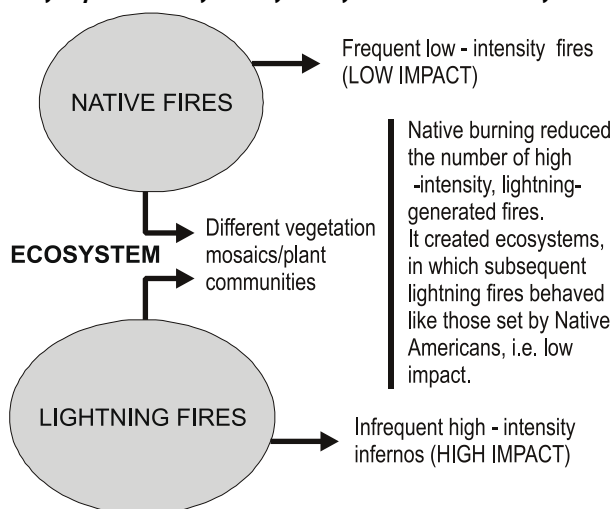
Culture is much more than folklore:

- Values
- Community laws
- Language
- Natural resource management systems
- Socio - economic systems
- Cosmology
- etc.

Culture and Protected Areas: The Yellowstone Legacy?

- Yellowstone was designated as the world's first National Park in 1872 and became a UNESCO Biosphere Reserve in 1976.
- National Park: Nature to be the inheritance of all people, who gain more from an experience in nature than from the exploitation of the land.
- Yellowstone is derived from native name "Mi tsi a-da-zi" (Rock Yellow River).
- The first Superintendent P.W. Norris's 1870s statements mentioned "primitive savages".
- Native peoples were evicted from/or denied access to the park.
- Native peoples were very important in protecting the park's ecosystem and in defining its biodiversity outcome.

Legacy of disregarding Indigenous knowledge



Real Indians still call Yellowstone home!

Looking for authenticity? Check out real Indians in their native attire dancing and performing at authentic powwows at the Wind River Indian Reservation



Example of two types of forest clearance (Lowland forests) by Indigenous Peoples in Indonesia

► Different ecosystem outcome



Kalimantan - Borneo: Slash and burn



Siberut - Sumatra: Slash and mulch

Interaction between indigenous peoples and nature is more than mere management. Nature as the basis of live and cosmology.

Conservation:

Is often reflected in cultural practices and attitudes rather than in outlined knowledge.

Taboos supporting conservation

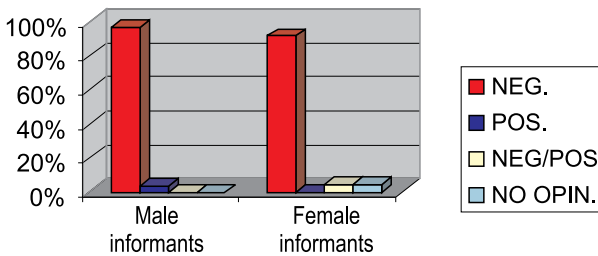
During Pregnancy:

- The future parents are restricted from being involved in labour activities that include cutting, piercing, boring, perforating or stabbing. Activities such as cutting trees and rattan, making ropes or canoes, working on the field are taboo as it would perforate and deform the fetus.
- The parents are restricted from eating meat of primates or turtles as it will make birth difficult.
- The parents are restricted from fishing otherwise the child will be unhealthy.

Understanding the Complexity

(Conventional) Protected Areas and Indigenous Communities: Weak Relationship

Opinion Poll on Siberut National Park (BR)



Opinions of Communities in regard to Siberut National Park

- ... they think they are important and that we always have to follow their decisions...
- ... the National park does not understand that this is our land and that we live on it...
- ... they act as Siberut is their land and not ours...

- ... they never consult us...
- ... they stay in the middle of our village but never talk to us...
- Whenever they talk to us, I feel like I am at primary school. They are the teachers, and we are the students.

Are protected areas inspired by the US park concept the right system for Asia-Pacific?

- ▶ Fragile balance between indigenous cultures and natural environment.

Rationale for Role of Indigenous Peoples in Conservation Activities

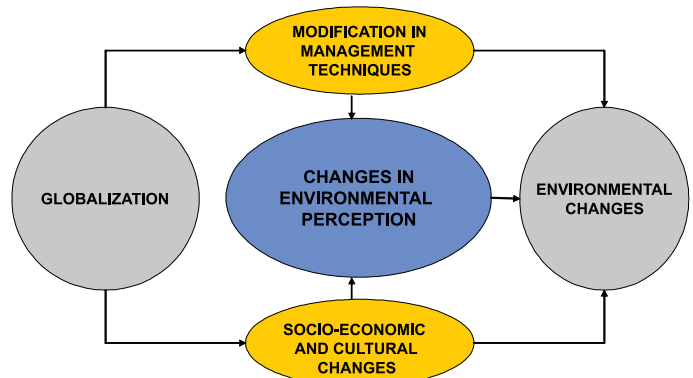
Indigenous peoples are strategic actors:

- Closeness to the resources that need protection.
- Traditional/indigenous knowledge about the resources that need protection.
- Socio-cultural/spiritual values that would tend to preserve it.
- Great responsibility and incentive to manage it properly because their livelihoods depend on it.
- ▶ Better managers than centralized management agencies.

Current Events: Rapid Societal Change and Ecosystem Degradation

Transition from subsistent to market economy and erosion of customary ecological knowledge and management systems.

Rapid Societal Change

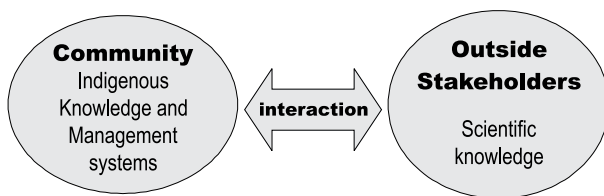


No community is homogenous. Interests vary in relation to status, age, gender, and other factors. Diversity of local perspectives can make it difficult to achieve nature conservation and sustainable management of natural resources ► **Conflict over resources**

Rethinking Development

- Advanced versus Backwards
- Market-oriented versus Subsistent
- Rich versus Poor
- Educated versus Non-educated
- Superior versus Inferior
- Scientific versus Unempirical

Communication and Understanding



Co-management: A More Successful Approach

Principles for Cooperation:

- People centered
- Culturally appropriate
- Participatory and needs-based
- Adaptive

For more information:

<http://www.unesco.org/jakarta>

Cultural Diversity - Sources of Wisdom for Biodiversity Conservation and Sustainable Development

Dr. Han Nianyong

Secretary-General, Chinese National Committee for MAB

The 15th Annual Conference of China Biosphere Reserve Network (1993-2007)

Annual CBRN Conference Themes:

- Launch of CBRN, Beijing (1993)
- Symposium on sustainable development of China's natural reserves, Tianmu Mountain (1994)
- Internal management and assessment of reserves, Yancheng (1995)
- Implement biosphere reserves "Sevilla Guidelines", Changbai Mountain (1996)
- Community participation in management and assessment, Wuyi Mountain (1997)
- Ecological tourism management and assessment, Bogeda (1998)
- Science and technology management and assessment, Fanjing Mountain (1999)
- Symposium on public education on natural reserves, Xianhu Botanical Garden (2000)
- Ecosystem management, Xilin Guole (2001)
- Assessing Jiuzhaigou ecological tourism, Jiuzhaigou (2002)

- Reports on inter-natural reserves cooperation, Dalai Lake (2003)
- Quality economy—developing organic/green products at natural reserves, Wudalian Lake (2004)
- Implementing UN Decade of Education for Sustainable Development Beijing (2005)
- Recommendation for the Law (Draft) China Nature Protected Area, Manzhouli 2006
- Cultural Diversity: Promoting Biodiversity Conservation and Sustainable Development Libo 2007

1. Why do biodiversity conservation and sustainable development need to pay attention to cultural diversity?
2. A few points on attending to cultural diversity

Story of Shankou Mangrove Biosphere Reserve

The locals keep a long history of protecting mangroves. In the past if people were found cutting mangroves, they would have been arrested and their grain ration confiscated. The local villagers elected two people to protect the mangroves; each villager contributed one *jīn* (approximately 1.1 lb) of grain to them as their salary. This kind of management was carried out for a long time by local “tribal heads”. They, as leaders among all families, enjoy high prestige among all people in the villages. They do not only play the traditional leading role in family affairs, but have expanding influence in community affairs. For example, in the 1980s, the local governments began to rely on the authority of the tribal heads to implement family planning in the villages. When the Reserve was first established, the traditional protection mechanism that had been existent for a long time was not found or utilized by the Reserve authorities and their closed management resulted in conflicts with the locals. In 2001 the Reserve authorities decided to utilize “tribal heads”, the traditional community management system and the two began to manage mangroves together. By taking advantage of existing social resources, such cooperation not only reduces costs, but also achieves great effect that could hardly be matched through the simple forms of public education and police supervision. Today the villagers are self-disciplined. There was also incident that some

villager attempted to cut mangroves without being found by Reserve authorities, but they were sent to the Reserve administrations by tribal heads for receiving penalties. There are altogether ten tribal heads with varying family names at Shankou Mangroves Reserve; and mustered by the Reserve administration, they convene semiannually for updates and specifics on administration-tribe cooperation for preserving the mangroves.

Questions to ponder:

- Why are village regulations and folk conventions more effective than formal reserve rules sometimes?
- What causes us to ignore these unwritten regulations and conventions?
- Shall system innovation accommodate traditional management system?

Story of Snake Island Laotie Mountain Nature Reserve

There is a little island of less than one square kilometer in total area located about 10 kilometers away from Laotie Mountain in Liaoning province. On this island there lives one special kind of snakes that live by catching and feeding on migrant birds that pass by the island in each Spring and Fall. This is a rare bio chain in the world. In order to protect the migratory birds, the Reserve administration and the local residents of Laotie Mountain have had conflicts for twenty six years. The administrators forbid and crack down upon any bird-catching activities, but cooking bird dishes and gaming with birds have been conventions in the area for a long time. So the ban has hardly been effective. How to end this everlasting “war”? The administrators begin to realize that behind the illegal behaviors are customs that have been inherited for years and that they can hardly be ended by force. The administrators are studying to make use of the local residents’ skills of identifying bird species and catching birds for examining migratory birds, student education and internship, and ecological tourism.

Questions to ponder:

- What is it we are faced with: cultural customs or criminal violations? Why did we ignore the former?
- How to treat the two differently?
- Can old customs be transformed into new means for a living or new ways of development?

Story of Xishuangbanna Biosphere Reserve

Due to various reasons, the number of wild elephants is rising in Xishuangbanna, which leads to intensifying conflicts between the animals and residents as wild elephants often enter villages to damage crops and harm the people. This, however, never happened in the past according to the seniors; as in the past the population was not large, people farmed with the slash-and-burn method, and there was enough cogongrass at the edge of the forests, the wild elephants had enough space to rest and enough grass to feed themselves. Today, there are only cultivated fields and rubber estates aside from the forests. The wild elephants do not find enough food and they are forced to change their eating habit by feeding on crops, which lead to conflicts between them and the local people. The slash-and-burn method of living in the tropical forests was a result of long-term evolution after wearing in various factors of Mother Nature but was abandoned as backward when we were under pressure of economic growth and population increase. In return, we are revenged for the simple-minded change of conventions.

Questions to ponder:

- Can traditions be changed at will?
- How to absorb wisdom from traditional methods of production in the course of preserving biodiversity?

Story of Maolan Biosphere Reserve

Developing agriculture at Karst areas, where lands are not suitable for farming, only leads to desertification, but in Maolan, thanks to the absence of large-scale agricultural development, there exists the only Karst forest that has been kept in its original state. What has also been left, however, is poverty. Hence there is the contradiction: lagged growth results in preserved ecology; good development brings destroyed ecology. The local government and Reserve administration are helping residents to develop folk cloth and folk paper so as to eliminate poverty. But the Reserve administration experienced a detour: They tried to enforce management of the communities by “banning all”, resulting in banning with no actual effect as the local people had to chop the trees for a living. The controversies lead to their change of method from “banning all” to helping the residents with

ways of making a living: herding cows, herding chickens, utilizing marsh gas, producing folk cloth and so on. To express their appreciation, the locals put up a tablet on roadside recording the various good deeds of the reserve administration. As things are turning toward the better, the local government, Reserve administration and the people are faced with another challenge: how to get rid of poverty through inherited native culture and to avoid ecological destruction due to economic growth.

Questions to ponder:

- What helped preserve the Karst forest in Maolan, the reserve administration / local culture?
- Can ecology be preserved only at the price of poverty?
- How to bring indigenous culture into full play for poverty lifting and growth?
- Is attending to local culture beyond the responsibility of reserve administration?

Story of Jiuzhaigou Biosphere Reserve/Natural World Heritage Site

Jiuzhaigou (Nine-Village Valley) was once a poverty stricken mountainous area. The original inhabitants are mainly Tibetans, who believe in the sacred mountains and integrate farming and herding as their ways of production. Thanks to their conventional ways of living and their belief, the forests and sceneries have been well protected and the forests have never experienced serious damage by manufacturers. In the 1980s, Jiuzhaigou began to develop tourism. During the 20-plus years since, the number of tourists has skyrocketed and it now reaches around two million per year. While helping the natives to get rid of poverty through tourism, Reserve administrators have taken measures successfully to preserve the environment and release the pressure on the environment brought about by increasing number of tourists, including discontinuing the farming and herding by local inhabitants and banning family hotels within the Resort. However, while trying every effort to face market challenges, resolve environmental issues and help residents lift poverty, the administrators did not expect the disappearance of indigenous culture.... Having realized this problem, the Resort administrators are exploring to open a new ecological tourism route to balance development and preservation of local culture.

Questions to ponder:

- Is building up fortune the only purpose of getting “rich”?
- What does the progress based on “farmers turning into urban dwellers” bring to local culture?
- What is the core value of indigenous culture, folk song, dance and costume or ways of living?
- Can natural heritage and indigenous culture each survive the absence of the other?

Story of Reindeer Ewenki

About three hundred years ago, a group of people, driving a flock of reindeers, said goodbye to the forests along the upper reach of Lena River in Siberia and immigrated to the right bank of Eerguna (Argun) River at Daxing’anling. They made a living on hunting, used herded reindeers to carry their belongings, and lived in an area of about 20,000 square kilometers. Their population is maintained at a very small size of between 100-200 people. They worship the God of Fire, their totem is bear and they believe in primitive Samen religion. Regardless of the arduous material life in the mountains and forests, they live a harmonious life with Mother Nature. They are regarded as one tribe of the Ewenki and given the name of Reindeer Ewenki. After the founding of the PRC in 1949, their traditions were viewed as primitive and backward and were thus forced to change several times. What led the changes were relocations. In 2003, arranged by local government, they were relocated to a new village that is far away from the forests. At the time there was press report of the relocation titled: The Last Hunting Tribe Says Goodbye to Forests and Mountains and Steps into Modernization. However, the reindeers could barely adapt to being raised in pens. Some of the hunters followed their reindeers and went back to the forests, but their hunting rifles had already been confiscated during the relocation. They can only live on by guarding their last reindeers. They have long hoped to establish a reserve so that their hunting life and their reindeers would not be bothered by outsiders.

Questions to ponder:

- What are the main reasons for ecological deterioration, “modernization” or “traditions”?
- Can “advanced” and “backwardness” be measured by materialistic standard only?

- What does immigration mean to indigenous culture? Growth or extinction?
- How to actualize grassroots wishes of establishing reserves?

Story of Alashan Desert in Inner Mongolia

Alashan is located in the far west of Inner Mongolia; it is also the driest place in China and even in the world. There grow the plants that adapt to the extreme drought in various ways; the land also cultivates a special grassland culture of the inhabitants — herding Bactrian camels. It is a very special culture that adapts to the dry weather and an efficient way of utilizing water. Nevertheless, with the economic growth and population increase, the grassland has retrogressed. Meanwhile, the herdsmen and the local government have different views toward ecological governance. The local government carries out policies focusing on relocating the herdsmen so that they live in a concentrated area and do farming with water from wells or diverted from rivers.

But the herdsmen do not believe herding camels leads to the retrogression of grassland, neither can they get used to farming as a new way of production. What exact method shall be used to deal with the local ecological problem? Will changing the traditional camel herding, which is highly efficient in water use, to highly water-consuming farming really do the trick? Or will it create new ecological problems? This is a case worth pondering over, and one key aspect is how to treat traditional culture that has been getting along well with the environment.

Questions to ponder:

- Can ecological governance achieve success without indigenous culture?
- Can new technologies easily replace local traditions?
- How to actualize grassroots wishes of establishing reserves?

Story of Xilin Gol Grassland of Inner Mongolia

In order to protect the grassland, to stimulate production morale of the herdsmen, and to release pressure of population increase, the local government carried out a new policy in the 1980s, which was to contract the grassland to each family and at the same time, to encourage them to fence their own piece of grassland. In

the following twenty years or so, tens of thousands of tons of iron wire and steel were transported to the grassland and the grassland was divided into many pieces with each belonging to a family. People believed that this kind of protection could prevent abuse and retrogression of the grassland. However, the retrogression did not stop but got worse because fenced grassland is not conducive to livestock's habit of roaming about to graze grass, and that the fact they are confined in limited areas leads to their over treading on grass and hence destruction of the grassland. Why does a policy that was meant to avoid "public land tragedy" lead to opposite result? It drives us to think about one question: is the nomadic culture that we once believed to be backward really backward?

Grassland native culture and environment are both challenged and impacted

Policy/ Measure	Culture Impact		Ecological Impact (Negative)
	Easy to accept	Shock	
Settlement/ Shed Pen	Enhanced education & medical care; Improved ability to fight natural disasters		Retrogression of grassland at settlement spots
Grassland contracting	Improved incentive with property right	Rational economic person Some back to poverty	Fragmented management of ecologic system
Fenced grassland	Protect grassland use rights	Worsened inter-personal relations Prevents roaming; Unbalanced livestock development Damaged recreation, health and aesthetics	Greater pressure on unit grassland Destroys grazing habit and nutritious balance Lowered ability to avoid disasters Retrogression of "spots" expands to retrogression of "plains"
Ecological Immigration/ Milk cow village	Employment	Failure to adapt	Grassland cultivation Unreasonable exploitation of underground water
Improve livestock species	Increase revenue	Failure to adapt	Damage grassland, lose local livestock species
Land occupation by industry	Receive compensation	Lose homes	Pollution and consumption of water resources

There are misconceptions about what causes ecological deterioration in the grassland area

- Drought
- Increase of population
- Over-capacity herding
- Lack of investment in governance
- Inappropriate system (Land)
- Clashes between development, governance and indigenous culture

Questions to ponder:

- Why do ecological deterioration and "cultural inadaptability" take place simultaneously?
- Is ecological deterioration caused by nomadic herding or by end of nomadic herding?

A few enlightenments after attention to diversity of cultures

1. It is inevitable to encounter need to pay attention in all-around way to diversity of cultures while attempting to biodiversity conservation
 - It is an inevitable issue in the course of modernization and globalization
 - It is an inevitable result of the existence of multiple ethnicities and multiple cultures in China
 - A requirement of changing GDP-oriented development to harmonious development
 - Regional ecological governance stimulates people to expand attention to culture diversity
 - New requirements on the reserves as they are faced with fundamental issues
2. Biodiversity conservation is not only an issue of natural sciences but also associated with social sciences and humanities. However, corresponding management has blind spots in this regard.
3. Community participation in management does not only make sense with regard to achieving fairness in economic return, but also to inheritance of indigenous culture.
4. Life Style, mode of production, traditional knowledge and belief are components of culture closely connecting with biodiversity

5. Sciences should not and cannot replace local knowledge; protection of biodiversity and sustainable development call for complementation between modern sciences and indigenous knowledge.
6. Traditional knowledge is marginalized mainly because they lack of the opportunity to be recorded, catalogued, expressed and disseminated.
7. Paying attention to cultural diversity leads to the eventual issue – what is development? What distinguishes between advancement and backwardness?
8. Our process of knowing: make use of biodiversity – protect biodiversity but isolate this issue from local people – protect biodiversity with locals only participating economically – protect biodiversity in connection with diversity of cultures – ecological problems are essentially cultural problems

Respect the Natural and Cultural Heritage to Promote Sustainable Development

Mr. Chen Choubiao
Governor of Libo County

Distinguished Leaders, Experts, Ladies and Gentlemen:

Welcome to Libo, a beautiful and mystical corner on earth! Today, we focus on the theme of “cultural diversity, promote biodiversity conservation and sustainable development”, in common pursuit of sustainable development. This is of great significance for enhancing our friendship, strengthening cooperation, actively furthering the interactive development of international “Man and the Biosphere” in the Southeast Asian region, promoting the protection and management of world heritage sites, and speeding up the internationalization of Libo’s professional tourism. Here, I, on behalf of Libo County government and in my own name, express warm greetings to all of our distinguished leaders, experts and friends, and my best wishes for a successful conference.

We live in a diverse world, with human culture deeply rooted in the land where it belongs. For thousands of years, on this ancient land of Libo, the people of all ethnic groups carry the natural heritage advocating a simple concept of harmony of production and lifestyle. They love the mountains and the forests, they make friends with them and maintain harmony with the Nature by way of ecological civilization, they keep green mountains and blue water, and they created a splendid culture, the foundation for our promotion of sustainable development. Since Maolan National Nature Reserve was included into the UNESCO “Man and the Biosphere” network of the management of protected areas, with the help, guidance and support from the national, provincial

and Autonomous Prefecture governments, and that of the international organizations, we have been pushing forward the practice of the harmonious development of man and nature on the basis of the principle of “respecting the Nature and carrying on the cultural heritage”: from saving the Shui Characters to rescuing ethnic villages, from the natural forest protection to returning farmland to forests, from the poverty-relief work to comprehensive agricultural development, from the creation of state-level ecological demonstration area to the application for the world natural heritage site, we have made a very fruitful exploration, and have taken sound measures to promote sustainable economic and social development.

Libo: Earth's diversity model

On the southernmost tip of Guizhou Province, Libo is located in the transitional zone between Guizhou Plateau and the hilly areas in Guangxi, hidden in numerous mountain peaks in South China, and adjacent to Guangxi Zhuang Autonomous Region. At the longitude 107° 37' to 108° 18' E, latitude 25°7' to 25°9' N, with an average altitude of about 800 meters, Libo enjoys a humid subtropical monsoon climate, with an average annual temperature of 18.3°C or so, a very pleasant weather with four flowering seasons. Libo County has a total area of 2431.8 square kilometers and a total population of 168,30, 92% of which are minorities, mainly Buyi, Shui, Miao, Yao. The county has the least population density among all counties in Guizhou Province.

Libo is a museum and model of the Earth's diversity, typical of the colorfulness of Guizhou, and is the best gift God give mankind.

Firstly, Libo has a unique natural landscape. Covered with green land, beautiful landscape, and fully developed Karst, Libo is one of the world's three core Karst zones, known as the Earth's last green gem on the same latitude, bringing together all representative features of Karst in the world, and was enlisted as a world natural heritage site on the 31st Session of the World Heritage Conference in New Zealand. The typical Karst features have created breathtaking landscape here, and a long and wonderful tectonic process has given birth to dynamic mountains and gracious water throughout the county. The Zhang River National Scenic Area within the boundary of the county, the "most beautiful place in China", boasts beautiful Seven Small Holes (Xiaoqikong), gorgeous Seven Big Holes (Daqikong), remote and quiet Spring River Gorge Scenic Spot and tranquil scenery, which demonstrates the pure and transparent beauty of Karst water, the elegance of Karst primeval forests, and the magnificence of Karst mountain peaks. World Natural Heritage expert, Dr. Jim Sancerre has used an analogy to describe Libo: "if China Southern Karst" is the crown of the world's Karst, Libo is the most dazzling emerald on the crown". Well-known Karst geologist Fudeboshi once praised Libo as "Mecca in the hearts of the Karst pilgrims".

Secondly, Libo has rich biological diversity. Libo has both extensive and intensive natural ecology with high originality. Today, when the world Karst faces serious

desertification, we have in Libo lush forestry growth. The forest coverage rates 62%, a feature that has made Libo into the category of national ecological demonstration zones. As a member of core values of the "Karst in Southern China", and an outstanding representative of world Karst, it fully demonstrates geological and biological evolution of the cone Karst, with a unique Karst forest ecosystem and significant biodiversity, including numerous endemic and endangered animals and plants and their habitats, and is a natural testing ground for the research of the "background" of forest vegetation and the structure and balanced function of the forest ecosystem in the hatching ground for bare cone Karst. Because of its location in the southern margin of the subtropical zone, Maolan Nature Reserve has complex and diverse habitats for Karst and a vast space of forest ecology. It hosts a relatively concentrated, original and stable Karst forest ecosystem among the regions of similar latitude, containing a wealth of plant and animal species and genetic resources. There has discovered 1532 species of vascular plant, 400 species of spinal animals, and 1500 species of insects. Among them there are over 170 species under national protection, such as Rhesus monkey, clouded leopard, anacondas, the South Taxus, of Paramecia, palm leaf tree, and so on. It indeed is a huge and unique biological resources gene pool.

Thirdly but not lastly, Libo has a multi-ethnic culture. Libo is a county inhabited by minority ethnic groups. For thousands of years, a sound ecological civilization in this area has nourished ten ethnic groups for centuries, including Buyi, Shui, Miao, Yao, and others. They love mountains and respect forests, they worship Nature, build stockade leaning on the mountains and live by ethnic groups, they construct unique residential houses, wear bright costumes and celebrate numerous festivals, and they have carried out such a diversity of traditions "that are different from area to area if they are located more than 50 kilometers from one another". One character is the ancient worship for the Nature. Since ancient times, Yao "pray to heaven and earth, mountains and rivers, even the trees, but not their ancestors"; Nuo Opera of Buyi carries the ancient cultural heritage in a tree-worship ritual activities; the traditional pray to holy mountain ancestors endured; Miao believe in old trees as gods, and entrust Kinokami to foster weak children—all these practices have virtually led to the people's natural protection. A second

character is rich arts of ecological culture. Shui Character is comparable with Oracle, full of pictorial symbols and patterns derived from the geographical environment and the natural world, which illustrates the knowledge of the ancient inhabitants about the ecological environment and their experience in it; Yao's original dance, "monkey drum dance", is both simple and active, which performances the close contact of Yao ancestors with monkeys and remembrances their gratitude to the monkeys for the latter's escorting of the former during migration in the ancient times. A third character is a unique ecological folk culture. Ancestors of all ethnic groups in Libo, since ancient times, were aware of the importance of farmland and environmental protection. Praised as "museum of living fossil for China's hole funerals", Green Yao's hole funeral customs is a typical example of farmland protection and ecological conservation; White-Pants Yao funeral customs implement flat burial with no monument, no tomb-sweeping, which leaves the tomb land cultivatable; Shui, Buyi and other ethnic groups still preserve the custom of ShengziZhongshu, i.e. a tree will be grown after the birth of a child, and he or she will grow with this tree, but after the death of this person, this tree will be cut down and made into coffins, buried at the same location of the tree, and a new tree will be planted at the spot. The dead will then turn into trophoblast soil. Miao, for generations and generations, have followed "animism", a primitive religious worship, which strictly forbids falling, excavation and destruction of old trees, mountains and waterways near the villages, and even see a "stockade tree" as a "divine tree", prohibiting picking dead branches and collecting fallen leaves, leaving them rot to nourish the trees. All the ethnic groups follow the mountain when constructing houses and building sidewalks to avoid damages to the ecological vegetation. In ancient inscriptions there are provisions such as "no burning of mountains and no random loggings", bearing the heritage of ancient ecological civilization, which adds unique cultural elements and connotations to the Karst ecological environment.

Challenges: The impact of modern civilization

Since the beginning of reforming and opening up, China's economic and social development has made

noteworthy achievements, the comprehensive national strength has greatly improved, and the economic and social development has reached a new point. The modern civilization enters every corner of the society. With accelerated process of regional economic integration, Libo is rapidly merging into the wave of modernization. Having remained closed and backward for long, and witnessing regional discrepancy and unbalanced urban and rural development levels, people of all ethnic backgrounds, especially those living in Karst habitat, are faced with the impact of modern civilization.

Firstly, the indigenous ethnic groups are experiencing value changes. Relatively closed, and culturally conservative in the past, confronted with the new demand for higher level of material and cultural life, the ethnic groups are faced quickly with the impact of economic waves—the gap between local labor income and earnings of those who migrate to the outside world is huge and the original modest living style was interrupted. Short-sighted wealth and material accumulation has led to irrational use of land, ecological, and other natural resources. The long-preserved harmonious relation with the Nature has been confronted with severe challenges, and the cultural contract between the people and the natural environment has been breached.

Second, the indigenous culture is under attack of a more powerful culture. Vulnerable minority cultures are experiencing the pressure from the modern way of life and the mass media, and as a result, many ethnic cultural elements have gradually died out, people are losing confidence in safeguarding their local cultures, the ethnic languages further degrade, traditional arts are disappearing, carriers of cultural heritage are not adequately respected or paid attention to, with the death of folk artists disappear unique folk arts, and a crisis of cultural break-down occurs. The younger generations with insufficient understanding of ethnic culture tend to believe that "what is ethnic is backward". A cultural inferiority grows, in them. In the one-sided pursuit of "modernization", they oath learning the essence of ethnic culture, and are quick in forgetting the culture of their own ethnic groups when merging into the more power culture. The ancient and simple worship of the Nature is lost.

Third, urbanization quietly changes people's lifestyle. As the market economy penetrates and the process of urbanization speeds up, traditional cultural ecology is

changing. The houses leaning on the mountains have been replaced by modern building materials and simple architectural models. Many ethnic architectural elements are gone. Because of the lack of statutory support for the dates of traditional holidays, celebration activities are gradually marginalized, traditional customs that used to be full of cultural connotations and have existed over a long history are being removed, and traditional festivals like Mao festival for Water, New festival for Miao and Small Year festival for Buyi have lost their liveliness of old times; leisure time activities are quietly changing too, with the traditional activities backing out and the popular media especially television claiming the major role in farmers' entertainment. The once rich and colorful folk events are no longer a common thing around us, a large amount of modern industrial products have flooded into ordinary homes, and folk arts and crafts are gradually withdrawing from the wild fields of country side.

Future: A strategic choice for sustainable development

Cultural diversity is the common wealth of the whole human being, while biodiversity is the foundation for survival, and they are interrelated and interdependent. If biodiversity is the material basis for the achievement of sustainable development as well as guarantee of the continuance of man and biosphere, then cultural diversity is the spiritual basis. The close relationship and harmonious coexistence between cultural diversity and biodiversity have been a core competitive resource from Libo's sustainable development. Some places with similar natural and humanistic value were greatly impaired, but still well-preserved in Libo County. Therefore, we not only need to face challenges of assimilation under the pressure of globalization, we also need to ensure the villagers' right to live and develop. Facing the future, we will stick to the principle of *respecting nature, inheriting culture* and confirm a new idea of governance - *it is also a political achievement to protect hills green and waters clean*, in order to make Libo County as a role model in diversity conservation and sustainable development.

1. Promote the organic combination of primitive natural ecology and cultural ecology, and build a resource system with a core value of social progress and sustainable

development. Economic globalization and expanding urbanization are unstoppable historical trend, so in an open cultural system, it is also an inevitable trend that different countries and peoples will collide, penetrate and amalgamate. Cultural diversity and biodiversity may show some weak characteristics in modern society, but they still belong to the most valuable resource with a great core competitive power. Like other regions in the world, traditional cultures struggle in a marginalized state of the weak, and accordingly it is the common mission of people who live in this wonderland to strengthen cultural diversity and biodiversity protection. We will actively explore, file and protect the knowledge, customs, beliefs related with biodiversity, and we will also establish an idea of open-up development and present special resource value of cultural diversity and biodiversity to the world. This will also deepen identity and confidence of local people, and further inherit the glamorous ethnic culture nurtured by Karst oasis.

We will try to work in the following aspect: On biological resources, first, we will consolidate the achievements by Maolan Nature Reserve, and conclude some more effective management methods; we will also learn from experts at home and abroad and communicate with them in order to build Maolan Reserve into an international model reserve. Secondly, we will intensify the protection and scientific use of natural heritage and renovate management mode, in order to fully show the splendid scene and brand value of *Zhangjiang* scenic spot and build it into a 5A-standard scenic spot. On cultural level, first, we will implement the *Wotu* Project centering research and protection of folk arts, cultivation of specialists for traditional culture protection and cultural education of new generations. It aims to raise the passion and identity of native people to inherit their own culture, strengthen the initiative of publicizing and developing local culture, and consolidate the rich and colorful ethnic cultures. Secondly, we will attach enough important to resources with cultural value, frame *Development Compendium for Cultural Industry in Libo County* and put traditional cultural industry into development plan. Thirdly, we will further strengthen the protection and research of *Shui Shu*, actively prepare for the application of UNESCO's *Memory of the World*, in order to increase the influence of traditional culture and build value system of nonmaterial culture.

2. Speed up the transfer from unique resource value of cultural diversity and biodiversity to economic value by tourism industry, and push forward regional sustainable development. It is proved that conflicts cannot be solved by closed management in the reserve and style cultural collection in the museum. With people's cravings back to nature, sustainable value of cultural diversity and biodiversity are increasingly demonstrating a strong core competitive value. We will properly solve the conflict between resource protection and sustainable development, and our approaches and objectives are to convert resource to product and eventually built a particular industry system. Ecotourism has a wide attention, strong mobility and smallest negative impact on environment, so it is a best industry to maintain cultural diversity as well as protect and develop biodiversity. We institute a development strategy of *building an ecological and cultural county and developing the county by tourism* by taking the advantage of resources. And we will aim to build an international specialized tourist city, bridge the international exchanges, fully present the unique charm of cultural diversity and biodiversity, and push the regional integrated development.

3. Exert to solve the survival and development problem of native people by developing ecological economy. It is a long-time transition from the protection of resource to the establishment of industry, so we not only need to consolidate the favorable ecological environment, but also the actual demand of native people. Therefore, we should implement some green ecological protective screen project like the protection of natural forest, returning cultivation land to forest, protection forest construction and so on. Meanwhile, we should spare no effort to convert the idea of ecological protection to the specific action of ecological construction, in order to develop and strengthen the ecological economic industry. We will take advantage of even rains and heat, long sunlight hours and other favorable ecology and climate conditions, restructure and agricultural industry, develop ecological agriculture, form a special industry with silk, sugarcane, tea leaves, fruits and ecological stock-raising industry

etc., develop ecological and organic farm production and processing, and make ecological agriculture as a main way for farmer to gain wealth. We will also actively promote the methane construction, explore the subsidy mechanism of *using coal instead of firewood, using electricity instead of firewood* and try to find alternative energy for villages in order to gradually reduce the dependence on cutting trees for firewood. Besides, we will greatly develop various kinds of tour like the experience of ethnic cultures, adventures in ancient villages, sightseeing of farmland, exploration of natural heritage, regulate the relationship among brand scenic spots, nature reserve and communities, ensure the interest of local people and strengthen self-awareness of ecological resource protection, and seeking a sustainable development approach with the harmonious existence between man and nature, as well as the consideration of ecological benefits, economic benefits and social benefits.

Dear leaders and experts: it is the whole society's responsibility to protect cultural diversity and biodiversity. We appreciate the support and help of UNESCO, MAB Committee, World Heritage Committee, Maolan Nature Reserve as well as attention of experts and scholars to this magic land. Meanwhile, we also sincerely hope that all the walks of society will actively participate in the great journey of cultural diversity and biodiversity protection, and offer ideas and methods for cultural diversity and biodiversity and sustainable development. I believe, the conservation and sustainable development of cultural diversity and biodiversity will make greater achievement by joint effort; I also believe, discussion and communication in this conference will further promote biodiversity, cultural diversity and social-economical sustainable development, and make a great contribution for our bright and prosperous future.

Finally I wish the conference a complete success!

Thank you!

The Relationship between Biodiversity Conservation, Poverty Alleviation and Indigenous Peoples

Mr. Jan van der Ploeg

Institute for Environmental Sciences (CML), Leiden University, The Netherlands

Good afternoon ladies and gentlemen

My name is Jan van der Ploeg. I'm the program coordinator of the Cagayan Valley Program on Environment and Development, the academic partnership of Leiden University in the Netherlands and Isabela State University in Northeast Luzon, the Philippines. Over the past six years I have been working in the Northern Sierra Madre Natural Park in the Philippines. It's an honor to be here in Libo County. I was tasked to give a presentation on biodiversity conservation, cultural diversity and sustainable development. The angle of my presentation will be perhaps a bit surprising: I will talk about the conservation of crocodiles.

I will start the presentation by sketching an overview of international crocodile conservation. Second I will focus on the particular situation in the Philippines. Third, I will introduce you to our conservation work with indigenous communities in the Northern Sierra Madre Natural Park in northeast Luzon. Finally, I will try to draw some lessons relevant for the intricate relationship between indigenous peoples' rights, biodiversity conservation and sustainable development.

Why do I talk about crocodiles? Crocodiles are a conservation success story! Forty years ago all 23 crocodile species were threatened by over-hunting. After World War II, trade in crocodile leather led to the depletion of crocodile populations around the globe. In 1975 the international trade in crocodile leather was regulated by CITES. In several countries sustainable harvesting programs were set up. Crocodile farms were established where eggs collected from the wild, crocodiles raised in captivity and the leather is sold with a CITES Appendix II permit on the global market. The integration of conservation and development objectives proved to very effective: in Australia, Southern Africa and the Americas crocodile populations in the wild have recovered to pre-1945 levels.

At present there are still 10 species listed as threatened on the IUCN Red List. And here is the catch: 6 of them are from Asia. The numbers at the right refer to the total number of non-hatchlings (adult) crocodiles surviving in the wild. Apparently the "use it or lose it" philosophy does not work in Asia.

The Philippine crocodile, the Siamese crocodile, the False Gharial and the Indian Gharial are all classified as critically endangered meaning that there is a high probability that the species will become extinct in the wild on the short term. In Asia habitat loss prevents a recovery of crocodile populations

I will illustrate this with my experiences from the Philippines. There are two crocodile species in the Philippines. The Indo-Pacific crocodile, *Crocodylus porosus*. And the relatively small Philippine crocodile, *Crocodylus mindorensis*. The Indo-Pacific crocodile occurs widely from Australia to India. Globally not threatened because of large populations in Australia and PNG. It grows up to 8 m. The Indo-Pacific crocodile is potentially dangerous for people. The Philippine crocodile, in contrast, is a small freshwater crocodile with a maximum recorded size of 3 m. It is endemic to the Philippines. It poses no threat to humans, unless provoked.

Let us start our inquiry where nowadays all research takes off: Google. I googled "Philippine crocodile" and got some surprising findings.

My first hit was the home page of the Philippine Basketball Association. A star-player of one the largest teams was banned because he called the referee buwaya, crocodile.

My second hit was the homepage of the Philippine Center for Investigative Journalism. In an article on corruption in the government, former President Estrada is called a crocodile.

My third hit: I could buy a Philippine crocodile on Ebay. Something that is strictly prohibited under Philippine law.

These examples make clear that crocodiles have an image problem in the Philippines. Politicians are called crocodile. This slide shows a cartoon from the Philippine Daily Inquirer: not all congressmen are crocodiles; some are alligators. So are selfish athletes and greedy businessmen. In mainstream Filipino society, crocodiles are seen as dangerous pests. Bloodthirsty creatures that should be killed as soon as possible. These perceptions form a major problem for crocodile conservation in the Philippines.

This was not always the case. In a drawing made in 1734 one sees people living perhaps not in harmony with crocodiles but in any case in very close proximity of crocodiles. In fact crocodiles were considered sacred animals.

“The Tagalogs held the cayman in the utmost veneration: and whenever they made any statement about it, when they descried it in the water, they called it Nono, which means “grandfather”. They softly and tenderly besought it not to harm them; and to this end offered it a part of what they carried in their boats casting the offerings into the water.”

Francisco Colin (1663)



Murillo (1734) *Carta hydrographica y chronographica de las Islas Filipinas*

Crocodiles were venerated because they were seen as reincarnations of the ancestors. Crocodiles were a symbol of agricultural fertility and male ferocity. Powerful chiefs traced their ancestry to crocodiles. It was feared that chiefs could change into crocodiles. Here you see an old picture of an Ifugao chief in North Luzon with his buwaya necklace. If a crocodile attacked a person this was seen

as divine justice: the victim would have violated cultural taboos and was punished by the gods. These traditional beliefs are well documented in material and oral culture.

This warp ikat for example clearly shows a crocodile. The weaver also put a man next to the crocodile so that if the crocodile would come alive he would not be hungry.



These beliefs occur throughout Southeast Asia. In the Moluccas for example, the king sacrificed a virgin dressed in beautiful clothes to the crocodiles every year. In local cosmology the king crocodile would marry the virgin. Dutch explorers actually witnessed the event. According to the people the crocodile would refuse the offer if the girl was not a virgin.

The arrival of the European colonizers changed everything. This became the dominant image. A bloodthirsty crocodile tries to eat a young girl. But luckily the hero saves the girl by killing the crocodile.

Crocodiles became a symbol for danger and evil. Here you see a picture from a church: A Filipino Christ saves his congregation by trampling the evil crocodile. In popular culture crocodiles are seen as dangerous man-eaters. On the next page you will see two film poster, one from Cambodia and one from Indonesia where the hero kills the dangerous crocodile. Crocodiles became a symbol for greed, egoism and nepotism. The national hero of the Philippines, Jose Rizal, called the Spanish colonizers crocodiles. Nowadays



this view of the dangerous crocodile dominates. But as we will see the old beliefs did not completely fade away...

Commercial hunting depleted crocodile populations in the Philippines. First people hunted the Indo-Pacific crocodile but when these were exterminated shifted to the Philippine crocodile: the classic whaling-syndrome

Hunting and habitat loss led to the disappearance of the Philippine crocodile in most parts of the archipelago. In 1983 a nation wide survey concluded that there were less than 100 non-hatchling crocodiles surviving in the wild. A captive breeding program was started in 1983 with Japanese financial and technical support. The integrated conservation and development project was modeled on the model of Papua New Guinea. The idea was to set up crocodile farms in the Philippines in order to generate funds for the conservation of crocodiles in the wild. The project succeeded in breeding crocodiles but failed to reintroduce crocodiles in the wild and set up a crocodile leather industry.

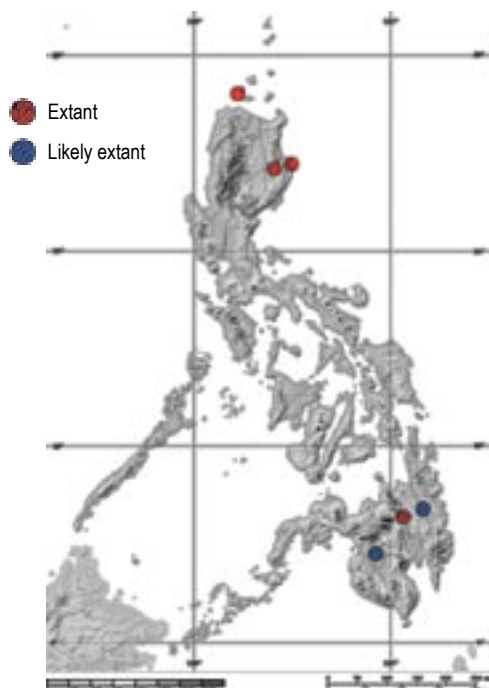
Since 1983 the situation has not improved. At present, the IUCN Crocodile Specialist Group, of which I'm a member, considers the Philippine crocodile the most threatened crocodile species in the world. Map 1 shows the areas where we think Philippine crocodiles can still be found. Take note that the species occurred on all islands except Palawan. In red areas where we are sure. In yellow areas where we can not conduct surveys but where we



The Northern Sierra Madre Natural Park in northeast Luzon. The largest protected area in the Philippines. Here crocodiles survive in increasingly human dominated landscapes.



Dinang Creek. At present one of only three areas where the Philippine crocodile breeds. As you can see the creek is intensively used by people.



suspect crocodiles to occur. The point here is that the areas where crocodiles survive are the ancestral domains of indigenous peoples.

There are two indigenous communities in the Northern Sierra Madre Natural Park. **First: the Kalinga.** The Kalinga are horticulturalists that are increasingly assimilated in Filipino mainstream society. Below is a picture of Mrs. Garatiyu. She is a Kalinga traditional faith healer.



She cures people. She believes that when she is in trance a crocodile spirit possesses her. She told me she risks changing into a crocodile but she has to help people. Why do I tell you this: because of these beliefs the Kalinga are not killing crocodiles. They are afraid the spirit will take revenge.

Second the Agta. The Agta are hunter gatherers that live in the forests of the Sierra Madre. Also the Agta will not kill crocodiles. If they see a crocodile they

respectfully call it grandfather. They say that when you will not harm the crocodile it will not harm you. They fish in rivers with crocodiles; and sometimes see them under water. I also did not believe it when I heard it but I went fishing with this man. And he showed me crocodiles under water.

The point here is that the Philippine crocodile survives in the ancestral domains of the Agta and the Kalinga. People have not killed crocodiles because of the traditional beliefs.

But also in the Northern Sierra Madre Natural Park crocodiles are threatened. Nowadays there are many other ethnic groups living in the protected area and they kill crocodiles. And crocodile eggs are eaten. Fishing with electricity, dynamite and chemicals is a serious threat to crocodiles and to the resource base of local people. Wetlands are drained and converted into rice paddies.

These threats are aggravated by several factors. Most people in the Northern Sierra Madre live from less than 2 dollar a day.

More and more immigrants are coming to the protected area in search for land. Interestingly these are often also indigenous peoples and ethnic minorities, such as the Ifugao.

As a result traditional land use practices are changing. Over the past 3 years farmers have started to plant Bt corn for the global market.

Although the area is officially protected, the Philippine government cannot effectively enforce environmental legislation. This picture is a nice example: I took it last year in the protected area. You can see the billboards. In fact illegal loggers are using the bill boards to dry their wood. Sometimes people claim they don't know the law. Sometimes they make sure the protected area staff gets a share of the profit.



To address these threats we set up a community-based conservation program for the Philippine crocodile in cooperation with municipal governments and rural communities (some of them indigenous peoples). The classic crocodile conservation approach, sustainable use through ranching or crocodile farming, will not work here. There are too few crocodiles left to hunt and the species is listed on CITES Appendix 1. Therefore we designed the conservation program on 2 pillars:

First, community empowerment to conserve wetlands.

Local people are dependent on wetland resources (clean water and fish). In communities there is grassroots support to do something about resource depletion. People know that electricity fishing is very destructive and want to stop it but lack the capability to enforce environmental legislation.

In the project we enable indigenous people to manage their resources in a sustainable way. We give trainings and organize community meetings and workshops. In this vision crocodiles are the flagship species for local environmental stewardship

Second, mobilizing community support for crocodile conservation.

We have set up an intensive communication, education and public awareness campaign. We place billboards, organize theater shows, visit schools to give lectures about crocodiles, etc.

The aim of these activities is to connect people with crocodiles and to revive the cultural heritage of the people. As a result people take pride that such a special animal survives in their village. They are interested to learn something about the ecology of the Philippine crocodile. Crocodiles have become part (again) with local identity.

Does it work? Yes, the number of crocodiles has significantly increased since the start of the project. Eleven successful breeding events occurred. The number of crocodiles that are killed has decreased. Fish stocks have increased and the majority of the people actively support the conservation of crocodiles in their village. The CROC project is widely regarded as a successful model for in-situ crocodile conservation in Asia. An important lesson of the project is that conservation can succeed without direct cash benefits. Immaterial values, such as pride, interest and culture can be equally effective.

Perhaps you are curious how we monitor the crocodile population? At night crocodile eyes reflect light, which makes them much easier to see.

What does this tell us about the intricate relationship between indigenous peoples' rights, poverty alleviation and biodiversity conservation? First, the Philippine crocodile survives in the ancestral domain of the Agta and the Kalinga. That's not coincidence. Indigenous people live in the most ecological valuable areas of the planet. They contribute to the preservation of wildlife species and the management of environmental services, especially in agro-ecological areas. It is principally and practically essential to involve these communities for the effective conservation of biodiversity.

This should not lead to a naïve view of indigenous people living in harmony with crocodiles. The Agta and the Kalinga have not actively protected the Philippine crocodile. In fact we have seen that some of these people are engaged in logging and electricity fishing. Advocating the role of indigenous peoples in natural resource management should start with the qualified acknowledgement that these communities are often important actor in resource depletion. I say qualified because the environmental impact of local people is often much less than the impact of mining and logging companies supported by the State.

It is important to realize that the perception of nature of indigenous people is often fundamentally different than that of the science-based conservationists. Indigenous people in the Philippines see the Philippine crocodile as a spirit. The taboo on hunting the species has little to do with concern about its survival. And when traditional belief systems change so may the taboo.

Everywhere, traditional cultures are rapidly changing. The Kalinga are assimilated in mainstream Filipino society and as a result traditional practices and beliefs are disappearing. And with them environmental stewardship.

But people are not just poor and local. To say that would rob them of agency and morality. Cultural diversity and identity remain critical motivations to conserve biodiversity. As we have seen, indigenous people take pride in living with crocodiles. In the perceptions, lifestyles, practices and values of indigenous peoples, clues can be found for sustainable natural resource management.

Second, indigenous people are the poorest of the poor. In almost all countries they occupy the lowest strata of society. But it's important to recognize that poverty is not a number. You may consider the Agta on this picture poor, but they don't see it their way. Poverty is a deprivation of well-being.

In Asia (but also in other parts of the world) there is a long and painful history of outside, state-sponsored, interventions that have detrimental effects on local livelihoods and the environment.

Because of the fact that indigenous people often directly depend on natural resources and often lack social and political support systems, they are particularly vulnerable to environmental degradation. In this view the recognition of rights to indigenous people (or ethnic minorities, tribal people, aboriginals or how they might be called in different countries) is essential to alleviate poverty and conserve the environment.

In the global policy arena there is at present much debate the synergy between indigenous peoples' rights and biodiversity conservation. I have brought a booklet for distribution that highlights this link between cultural diversity and biological diversity. The question remains to what extent rights of indigenous peoples can be granted. Two positions are visible. First those who argue that indigenous peoples are entitled to their land and can free decide what to do with it as articulated in the UN declaration on Indigenous Peoples that was signed on 13 September 2007. Second those who claim that indigenous peoples' rights should be granted as long as they contribute to environmental management as is stated in Article 8j of the Convention on Biological Diversity. In the Philippines, under the Indigenous Peoples Rights Act of 1997 indigenous peoples have to make a management plan for their ancestral domain that has to be approved by different government agencies.

But too often policy and plans remain on paper and nothing happens at the local level. Putting a billboard somewhere will not prevent logging. At the end of the day the effectiveness of interventions has to be determined in the well-being and rights of people and the number of crocodiles.

Thank you very much!



**Case
Presentations**

Research on Indigenous Knowledge in Indonesia: Protecting Traditional Culture and Conserving Local Biodiversity

Dr. Herwasono Soedjito

Executive Secretary/Programme Director, Indonesian National Committee for MAB Programme

Introduction

Indonesia has high cultural and biological diversity - as knowledge diversity.

Formal knowledge (hard science) and traditional knowledge:

- Formal knowledge in ecology - analyze natural phenomena using a hypothetic - deductive method.
- Traditional ecological knowledge characterizes - close interconnection with environment.

Local societies within and surrounding Biosphere Reserves in Indonesia are still practicing their traditional knowledge. Such as traditional agriculture, herbal medicine, and customary land management.

Scientific research on traditional knowledge started on early 1970s. It is an asset of source of science that readily to be developed in the future. A scientific result of traditional knowledge studies must be valuable because it can be implemented in the modern life since it is proven and has already been used hundreds of years.

Culture and Biodiversity

- Indonesia is known as a mega-diversity country (biologically and culturally).
- Maintenance of cultural values
- Conservation of biodiversity

People of Indonesia

Indonesia has 336 cultural ethnic groups, the third highest cultural diversity in the world after Papua New Guinea and India

Indonesia has 665 different local languages which is distributed in Papua 250, Mollucas 133, Sulawesi 105, Kalimantan 77, Lesser Sunda Islands 53, Sumatera 38, and Jawa-Bali 9.

Some of Indonesia people primarily tribes in Papua, Kalimantan, and Sumatera still live isolated and traditionally that dependent on forest products.

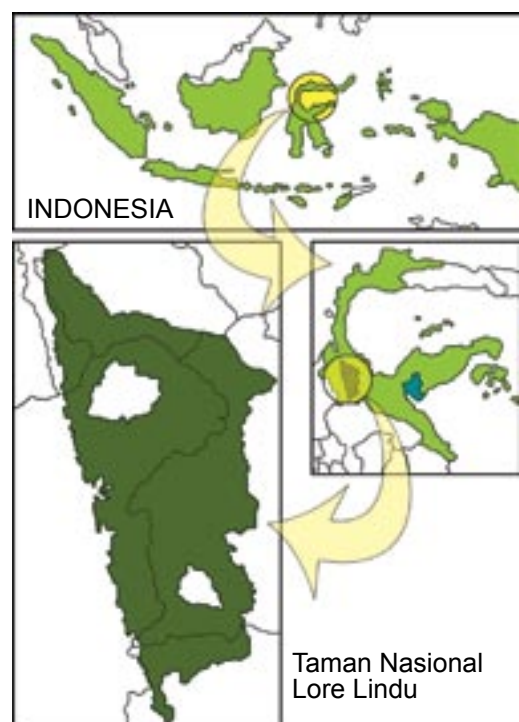
Indonesian Biodiversity

- At least has 47 distinct natural and man-made ecosystems and later reclassified about 90 ecosystem types
- A great many of this forest resources have direct impact for traditional life.
- At least 38,000 species has been identified (55% endemic)
- About 25,000 species of plant, mostly from natural forests - useful for human.

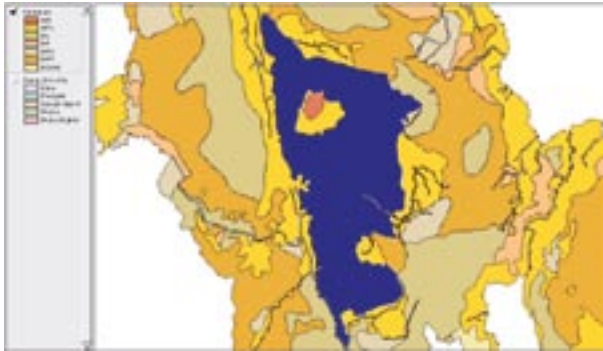
Biosphere Reserve Sites

Lore Lindu Biosphere Reserve

Ngata Toro, Donggala District, Central Sulawesi

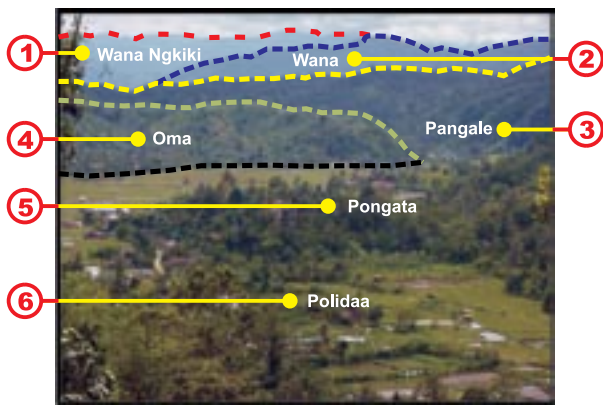


Landuse Classification



Zonation of community landuses

Knowledge of spatial and natural resources management



1. Primary forest, conserve area
2. Habitat of plants and animals & hydrology balance
3. 25 yrs old secondary forest, can be opened with adat permit
4. Secondary forest - opened 15 years ago. Reserve for agriculture land
5. Settlement
6. Rice field and garden

Siberut Island Biosphere Reserve



- Mentawai Islands
- Mentawai ethnic group
- Knowledge of Nature

Forest for Mentawaiian

- Forest is Hidden Culture or Culture of the Beyond
- *Arat Sabulungan*: Forest is home of spirits
- Harmony for Mentawai culture

High Biodiversity - Highest primate endemcity

Eilagat (*Dipterocarpus baumii*), Karai (*Shorea* spp.), Kakaddut (*Horsfeldia irya*), Buluk patpat (*Knema intermedia*), Kalnang (*Myristica maxima*), Ariribuk (*Oncosperma horridium*), Poula (*Arenga obtusifolia*), Rattans (Korthalsia dan Calamus).

Non BR sites

- Tana' Olen, a local conservation concept is still practicing by Dayak people in Kalimantan.
- Sacred Marine and Mountain in Papua have long history.
- People of Bali is also implementing sacred site concept to conserve biological diversity and inherit their culture.

Tana' Olen directly conserve:

- 273 species of plants
- 126 tree species
- hundreds species of animals
- 74 species of fishes



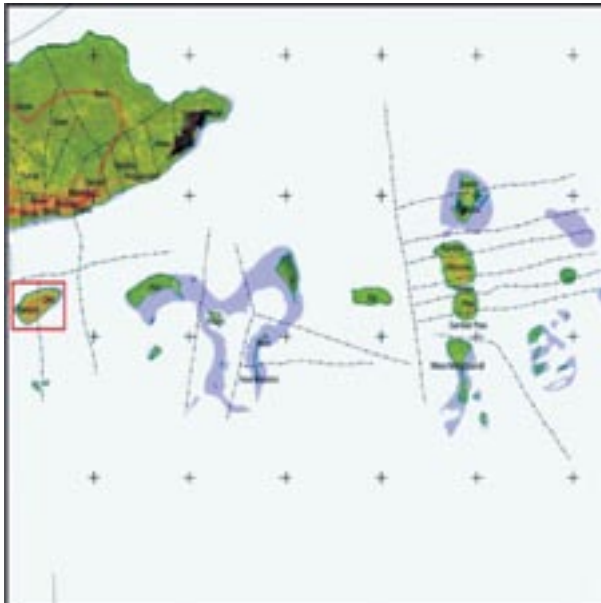
Shorea johorensis: Number 9 in the world?

Sacred Mountain in Papua indirectly conserve:

- 42 varieties of taros
- 36 species of medicinal plants Including "buah merah"

Pakreki Island: Sacred Natural Site, West Papua

Faknik: believe of Biak Numfor



River and Lake in Sumatra

- Lubuk Tamiang, Mandailing Natal
- Tasik Giam Siak Kecil, Riau

Giam Siak Kecil Wildlife Sanctuary: Core Area



Sacred Forest in Java

- Baduy – Banten
- Kasepuhan – West Jawa
- Ciung Wanara – West Jawa
- Alas Purwo – East Jawa



Sacred Sites in BALI



Conclusions

- Research on Indigenous Knowledge in Indonesia must be accelerated.
- Protecting Traditional Culture is Conserving Local Biodiversity.

Multicultural Coexistence is the Key to Sustain Biodiversity

Mr. Yang Tingshuo

University of Jishou

Man is, but one of the biological species of earth's biosphere. However, factors that the development of science and technology and the increase of social cohesion intensified the level and force of human activity on the planet earth. Man's role in the biosphere was further strengthened. The consequences, like a double-edged sword, could lead either to safeguard the sustainability of earth's biosphere and the coexistence of diverse biological pattern, or, to damage earth's ecosystem, whether man does it intentionally or not. The solution rests on our own hands. And to prevent the damage for the benefit of generations to come, we must, in the first place, conserve and nurture the coexistence of diverse ethnic culture.

An ethnic culture, as a system of social norms is gradually built up by the given ethnic group, transforms people's behavior that accumulated through generations into cultural codes as a culture reaches its maturity. Ethnic people's behavior towards natural environment that they reside in can be identified as

- They use natural resources efficiently while maintain the quality of environment carefully.
- They tailor the environment to meet the need for survival of their culture.
- Each ethnic group develops its unique relationship with natural environment that that group of people inhabit.

In addition, ethnic people don't just passively bind themselves to the food chain. Instead, they try to reconstruct the habitat in accordance with their own need, which results in the change of ecosystem and the structure of local food chain. The results of this modification can be contradictory: Either an ecosystem is optimized and becomes more suitable to live; or the change weakens the capability of nature's self-healing mechanism. It is understood that to alter an ecosystem unavoidably creates damage. However, in ethnic area this damage is quite limited thus does not affect the coexistence of diverse biological species.

Our field survey and research over the past twenty years in eighteen workstations in China's southwestern region confirmed above finding. For example, the Miao people living in Ziyun County of Mashan region, Guizhou Province, have cultivated steadily more than 30 kinds of crops and over 150 kinds of plant species for over half of a century, plus hunting and collecting over 200 kinds of

animal species and plants. Species that they utilize while carefully preserve reveal a great variety. There are also many species in the wild that are sustained, even with constant encounter with the people. Though the number of species that Miao people make use of has decreased slightly in quantity over the years comparing to that in the wild, it did not harm the ecosystem. While demand decreases the biological species can be restored. They achieved an efficient utilization of natural resources by means of carefully preserving it.

In mountains adjacent of Guizhou, Hunan and Guangxi provinces, the primary ecological system is subtropical and temperate monsoon upland forest. Wetland is scarce, and therefore lack of large-scale wetland and aquatic life. The people, consisting of Dongs, Shui, Maonan and Gelao ethnic groups in the region love rice and fish for meal. They created a way to cultivate rice meanwhile having fish live in the rice paddies. The contents of their culture are full of wisdom of life and basic surviving skills: forest juxtaposed with rice field, herbivorous herds living around fishponds. The topography of the region changed dynamically by man: from the elevation of 300m to 1,000m over rugged mountains, people built levels of levels rice paddy terrace. It increased aquatic life effectively in quantity. Besides cultivated aquatic plants and animal species, wildlife came to settle in manmade fishponds and rice fiends. As lowland plants and animal species migrating up to the mountain through levels of terraces, the total number of biological species increased a great deal in the area in which land is so scarce. People are able to harvest substantial source of food as they conserve the biodiversity. Man and his ecosystem live in harmony.

It is worth noting that the plant and animal species cultivated respectively by the four ethnic groups mentioned above are different in kind. And the method of utilizing such resources varies. Choices of cultivating and hunting are also different. Such divergence provides living space for local species and increases their chance to survive among different ethnic groups. Today, this region holds the highest biodiversity level in China. The fact of multicultural coexistence balances human consumption of natural resources: when a species vanished in one location, it may find space to live in the neighboring place, which makes extinction impossible. Endangered plant species such as *taxus*, *Michelia figo*, *Rhoiptelea chiliantha*, and *Paulownia tomentosa* that have long extinct in other areas in China have survived here. It is obvious that multicultural coexistence can provide living space for diverse plant species and therefore it conserves biodiversity.

In any natural ecosystem forest regeneration is a slow process. It takes at least 70 years to reforest decertified karst mountains where soil is scarce. Chances for a tree plant or its seed to touch the ground soil are almost unthinkable. A sample result shows that the percentage of soil coverage in the area is less than 1: 100,000. It is to say that there is an only one out of ten thousand spots on ground surface that supports plant's growth per *mu*. In the same scale, supposedly we rely solely on natural seeding to wait for seeds falling on the ground freely. Perhaps there would be only five seeds that are lucky enough to grow out of a number of 1 billion. In addition, these barely survived tree plants would face severe competition of natural selection in which herbaceous plants hold more advantage. The fact is that over the last two decades, even without human disturbance we found only grass grows back on these mountains, occasionally with a few arbors. Surveying the karst mountain area of China's southwest region along highways and railways we hardly see any forested spot, though the land has been blocked from human access for natural regeneration for the last 10 years.

In contrast, in places that Miao, Gelao, and Yi people live the reforestation on decertified karst mountain is possible. They can easily pinpoint cracks on rock that hold soil. Either seeds or seedlings would grow on such spots.

Within three years a tree would grow up to 2 meters. And after five years the forest starts to form. This is five to six times faster than the regeneration under natural condition. In addition, for the fracture that is too small to support a tree, people grow vining plants (*liana*) that would cover exposed bedrock and gravel to keep rock surface from sunlight. After two to three years thick lichen and fern would grow back in shade. They preserve efficaciously the humidity of atmospheric precipitation that further enhances the flourish of plants and accelerates the process of dissolving rock into soil. In this way, no more than three to five years they can turn the barren hill to a plant's paradise.

Overgrazing in poor pastureland in mountains is extremely harmful, which leads to significant decrease of output volume of natural productivity and permanent diminution of biological species. Forcibly reclaim of farmland makes the situation worse. We can find vivid examples in the following regions: Mountainous area of the middle reaches of Jinsha River in Sichuan, upstream of Wujiang River in Guizhou, and Niulanjiang River in Yunnan. By contrast, however, the people of Yi, Zhuang and Miao who live on a traditional lifestyle in these regions are in harmony with their environment. They combine farming and herding. And because of the variety and diversity of the crop and livestock, which sometimes are fed by tree leaves, there is no significant decline of species in total in the area. Instead, it provides living space and opportunity to attract wildlife. Degraded pastureland is able to regenerate in two to three years.

In conclusion, in the last fifty years, however, as the economic growth aims only at market return, natural resources are being consumed at an alarming rate. It may put an end to the tradition of reasonable use of natural resources—a critical value of the local knowledge of ethnic people. And as natural resources decline, the quantity of biological species that man can utilize lessens. It drives the already endangered species to extinction and threatens the biosphere that man lives. Therefore, we must balance the use of biological resources for our own sake. We must safeguard the coexistence of diverse ethnic culture, which is the key to conserve biodiversity.

Considerations of Culturally Appropriate Preservation in Establishing the Proposed Biosphere Reserve in Camau Peninsular, Vietnam

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Abstract

Cultural heritage preservation in supporting the biodiversity conservation has become a much-debated topic in recent decades. This paper contributes to the call for adapted approaches that take a society's cultural diversity into account. It also attempts to draw attention to establish new biosphere reserves and to manage old ones, where biodiversity conservation applied without consideration on values of cultural heritage. To illustrate the preservation of cultural heritages, a case study of using biosphere reserves as 'learning laboratory' for sustainable development from early state of establishment has been introduced by expressing cultural heritage with local cultural context.

The Ca Mau proposed biosphere reserve is located in Camau Peninsular, the forest land in the South, where the mud flat extends seaward about 60-100 m per year. The mangrove forests are extending and people is also 'extending' to the new land with a lot of uncertain issues in both of natural disasters and living badness, and the people seen as 'heroes' to conquer the nature. The legend of 'Bac Ba Phi' a great man with plenty of humors and encouragement comes to the life of each people and communities in this area. The cultural value is becoming the traditional combination of culture and biodiversity, described in the poem:

"Ca Mau, monkeys run on the trees
In river, crocodiles swim and tigers race in forests"

The report also discusses on factors that have recently generated concern regarding culturally appropriate preservation are globalization and multiculturalism. The case of social learning in a Confucian Heritage Cultural context for development of stakeholder analysis for establishing new biosphere reserves is discussed. The Confucian Heritage Culture (CHC) is dominant in China and other countries strongly influenced by China in the region's long history (Vietnam, Japan, Korea, Singapore, Taiwan, Hong Kong and Malaysia). Much research has demonstrated that CHC learners are able to extend when working in groups setting. This has been attributed to a collectivist orientation, plus additional Confucianism values that emphasize interpersonal relationships and in-group cohesion.

The Proposed Mui Ca Mau Biosphere Reserve and National Priority

The National Action Plan on Biodiversity for 2010 and upto 2020, implementing The Convention on Biological Diversity (CBD), has set Camau Peininsular to be one of highest priorities for conservation, development and sustainable use of natural resources. The nomination

form for proposed Mui Ca Mau Biosphere Reserve is under preparation to implement the national strategy and international engagement.

Located in the most remote area in the country, over 2,000 km from Hanoi, this area is considered as a ,pioniere' or ,new lands' of the country with beautiful lanscapes, diversity of habitats and species. People coming here to settle are from almost corners of the country

with colourful figures of cultures and traditions. The conservation efforts along with preservation of culture and religion are integrated into the proposed mechanism of adaptive management of the proposed biosphere reserve.

The proposed biosphere reserve covers a half of million ha, in which there are three core zones of two national parks and a belt of protective mangrove forest of sea-dikes. They are Mui Ca Mau National park of 41,862 ha, U Minh Ha National Park of 8,286 ha and Protective Mangrove Forests of 517 ha. It covers a tremendous budget of biodiversity in relation with cultural and traditional figures.



1. Core Zone 1
2. Core Zone 2
3. Core Zone 3
4. Buffer Zone
5. Transition Zone

A half of million people are living in this area with their culture and tradition from most coners of the country.

Biological diversity

For mangrove forests, there are 60 plant species in 45 genres of 23 families, in which there are 34 mangrove true species and 50 associate species (Phan Nguyen Hong, Le Xuan Tuan, 2006). Representative species are *Rhizophora apiculata*, *Ceriops decandra*, *Ceriops tagal*, *Bruguiera parviflora*, *Bruguiera gymnorrhiza*, *Bruguiera sexangula*, *Bruguiera cylindrica*, *Avicennia alba*, *Lumnitzera racemosa*, *Nypa fructican*, *Excoecaria agallocha*, etc.

There are 15 mammal species, 83 bird species, 43 reptile species and 9 amphibial species. There are 19 bird sanctuaries (Dang Trung Tan, 1998; Le Xuan Canh, 2006). There are 179 fish species in 17 orders, 56 families and 125 genus, in which there are 23 species having economic values with 12,8% of total. There are 79 zooplankton species và 22 benthos species, representatives by *E. subcrassus*, *P. parvus*, *S. speciosa*, *A. clausai*, *A. sinensis*, *O. similis*, *M. slabberi*, *L. pennicillifer*, *D. aestuarina*, *N. polybranchia*, *S. scutata*, *S. malayensis*, *C. truncata*, *A. vietnamensis*, *Aloidis* sp.

There are endangered mammal species (*Pteropus vampyrus*; *Macaca fascicularis*; *M. arctoides*; *Aonyx cinerea*; *Lutra* sp.; *Viverra megaspila*; *Viverricula indica*; *Prionailurus bengalensis*; *Prionailurus viverrinus*; *Manis javanica*; *Callosciurus finlaysoni*) and endangered bird species (*Pelecanus philippensis*; *Pharacrocorax carbo*; *Anhinga melanogaster*; *Egretta eulophotes*; *Numenius madagascariensis*; *Limnodromus semipalmatus*; *Mycteria leucocephala*; *Anastomus oscitans*; *Ciconia episcopus*; *Threskiornis melanocephalus*; *Pelargopsis capensis*). There are 4 globally endangered species: *Egretta eulophotes*, *Numenius madagascariensis*, *Limnodromus semipalmatus* and *Mycteria leucocephala*. There are a high density of birds grouping *Chlidonias hybridu* and *Sterna caspia*.

For swamp forests, Besides, the major species of *Melaleuca cajuputii* there are 79 plant species in 65 genus of 36 families. There are 32 mammal species, 74 bird species, 36 reptile species and 11 amphibial species, in which there are 10 endangered mammal species and 4 endangered bird species. Major plant species include *Ilex cmosa*, *Alstonia spathulata*, *Stenochlaena balustris*,

Flagellaria indica, Sumatra scleria, Dioscorea glabra, Eichhornia crassipes, Pictia stratiotes, Salvinia cucullata, Ipomoea aquatica, Luduwigia adscendens, Centrostachys aquatica, Azolla pinmata, Spirodela polyrrhiza, Lemna aquinoxialis, L. tenera. Common species can be found *Eleocharis dulcis, Cyperus halpan, Cyperus polystachyos, Fuirena umbellata, Philydrum lanuginosum, Phragmites vallatoria, Cyperus elatus, Cyperus digitatus, Cayratia trifolia, Vigna luteola, Panicum repens, Leersia bexandra, Saccnarum spontaneum, Flagellaria indica, Lygodium scandenes và Melastoma affine.*

Cultural diversity

The Ca Mau peninsular is an extended land where people come from all quarters of the country to settle there and develop new economies a long with bringing their cultures and traditions. The culture is characterized by diversified, colorful and harmonized figures and the folk tradition is combined from various religions and diver cultures. They are Hynayana of Khmer from Northern and Central parts of the country, Taoism and Confucianism from Chinese, Catholic from French, Islam from Cham and Cambodia.

In socio-cultural context, the development of religions is a historical fact of human civilization. Buddhism, Confucianism and Taoism are influenced and influence each others in this region. They are agents forming folks and traditions of culture including habits and customs (Tap Tuc). Imported religions and cultures have gradually become folk traditions of people in general and in this area in particular.

The worshipping inauspicious stars, known from Taoism were traditional prayer for peace and happiness on the threshold of the New Year in Buddhist system. The service (Nghi Thuc) of six offerings, originated from warship with a due of ritual of Confucianism has become a traditional ceremony held at communal houses in a village, while it is thought as a ritual of warship founders of Buddhism. This is held for kings to warship their ancestors and Gods of the Heaven and the Earth in term of Confucianism aspects.

Most of customs imported from China has been gradually adapted to form the characterizes of local people, like fasting days, giving alms, setting animal free...These are good and appropriate to educate and improve

environmental and ecological ethics in conservation efforts.

Table 1: Relationship between ceremonies based on folk traditions and biodiversity conservation

	Detailed items	Relating environmental issues
Services	Anniversary of a death	Not much
	Burial service	Squander/dissipate
	Marriage service	Squander/dissipate
	Send-off flamingoes	Not much
	Death's certification	Not much
	Prayer for down deaths	Pollution abatement, environmental ethics
	Prayer to lift a curse	Not much
	Six offerings	Not much
	Ten proceedings	Not much
Dan Trinh	Not much	
Customs	Offering food to forsaken spirits	Pollution
	Worship bad/good luck stars and inauspicious times	Not much
	Offering flowers	Not much
	Picking good luck	Tree destruction
	Worship three-Plagued-year	Not much
	Getting an omen on tablet	Not much
	Determining days of good omen	Not much
	Worship Soc&Vong (monthly worships in the 1st and 15th of Lunar Calendar)	Not much
	Burning papers of a mantra for the rebirth in the Pure-Land	Pollution and squander
Pilgrimages	Eco-tourism promotion	
Festivals	Yuan Xiao Jie (Full-moon night of Jan. of Lunar Calendar)	Eco-tourism promotion
	Yulan Hui (Full-moon night of July. of Lunar Calendar)	Eco-tourism promotion
	Full-moon night of Oct. of Lunar Calendar)	Eco-tourism promotion

Soc and Vong are very common events for local people. Soc is the 1st of a Lunar Month, a new moon night or a beginning, and Vong is the 15th of a Lunar Month, a full moon night or a look and longing in Taoist and Confucian mysticism. These days are bond of sympathy between the three worlds: The Heaven, The Hell and the Earth. Gods of Heaven would witness people's sincerity, the ancestors

would accept their offering' homage. Devils would give up making trouble to people. That is idea of global environmental change in current situation.

Vegetarian days, coming from the notion of compassion in Mahayana philosophy 'Buddhists should take at least two vegetarian days a lunar month at the 1st and the 15th. People prevent from killing animals, from making quarrels and they only try to do well. It is likely originating the environmental and ecological ethics we are developing in these days.

Culture seen from ecology aspects

As seen, religions, traditions and folks are products of interactions between human and nature or ecological processes and laws. Carrying capacity, limited factors and succession are likely controlling adaptation of communities and impacts to and from human activities. Formation and development of culture are possibly explained by ecological aspects.

The succession is controlled by various factors from interactions of environment and communities. In this area, they have primary, secondary succession of plants in mangrove areas and succession from mangroves to seasonal flood-forests dominated by *Melaleuca* sp. A new species and population comes to replace old ones, because conditions of soils, water, and tide are not suitable for them. Likely, local people to settle new lands of mudflats have generations to conquer more forward lands than other people originated from other provinces.

There are two categories of succession, they are 'autogenic' where the succession is happened from within communities by potential capacity of concurrence and adaptation to changed environment of each species, and the 'allogenic' succession is happened by pressures of external conditions, such as coastline changes, water flow change and human activities. Regarding human ecology, the policies and regulation of moving people, promotion of exports, shrimp farm development is all included in this category.

Gender issues are critical to deal with new land expansion and occupation. The work is hard when exploiting a new land and this responsibility should be man in family. Women is considered as 'mother of children as much as possible' for both labors and expansion family as needing

more lands and there are decades of children in each family recorded in the past. During expansion of land, the power will be concentrated into some people who possess powers in both materials and spirit values. The administrative concentration, complication of regulations and corruption are results of the consequences.

Using biosphere reserves as a 'learning laboratory' for sustainable development

In the context of management of biosphere reserves, sustainable development may be seen as the maintenance of land/seascape mosaics that have a mix of natural, rural ecosystems where local communities and other stakeholders actively engage the governance and management authorities to guide decision-making and to generate options for environmental, economic and social well-being for current and future generations. Biodiversity wealth can be linked to policies and practices for creating opportunities for humans to improve their social, economic and cultural conditions.

Learning requires that statements we derive from principles and concepts are regularly tested against real-life situations which such statements claim to describe. Learning laboratories for sustainable development emphasize the importance for the geographical, administrative and legal space that is designated as a biosphere reserve to be considered a context-specific locality for testing the match between policy prescriptions and practices that drive biodiversity conservation and socio-economic change (Agrawal, 2000; Olsson et al. 2007; UNESCO, 1996)

The Proposed Mui Ca Mau Biosphere Reserve has developed a vision to articulate and convey the meaning of the notion of biosphere reserves as learning laboratories for sustainable development around a few essential features that anchor the idea: the space under consideration must encompass the whole biosphere reserve, i.e. the core, buffer and transition areas; The proposed biosphere reserve composes both land and sea by three cores zone of two national parks and one protective forest and a vast buffer and transition zone, covering a half of million hectares.

Conservation and development must be seen as interdependent and applicable to the functioning of all three zones; it is not desirable to think of conservation, even with regard to the biodiversity in the core zone, as being free of any relationship to social and economic development in the broader biosphere landscape; similarly development in buffer and transition zone must clearly be related to environmental improvements, including sustainable use and conservation of biodiversity (Ishwaran, 1994; Selvam, 1996).

Clean energy and zero-emission (of greenhouse gases), that are becoming part of the ecological economics of a warming world introduce new dimensions into sustainable development practices; as a one of the fastest growing economies in the area. It intends to target buffer and transition areas of biosphere reserves as priority locations for experimenting with such new development pathways; and Education, research and long-term monitoring continue to receive the important role that they have always enjoyed throughout the origin and evolution of the concept and practice of biosphere reserves; together they constitute the link that promotes an iterative and learning interaction between policy and practice (UNESCO, 2005).

In order to be able the effective testing of the model of biosphere reserves as learning laboratories the proposed management board is turning to the Chair or Vice-Chair of the People's Committee of the Province where its biosphere reserve are located. It feels that effective co-ordination of all biosphere reserves functions in all three zones is feasible only through the active involvement of governance, management and administrative professionals in charge of the overall Province where the biosphere reserve is situated.

The learning laboratory in the proposed biosphere reserve will be implemented through adaptive management and new knowledge about management systems behaviour is continuously generated through observation (monitoring) and the evaluation of outcomes of implemented management strategies. The current knowledge base (what we know now) in an adaptive management cycle allows for continuous improvement of the knowledge base.

Adaptive management and contribution form cultural aspects

Ecosystems are complex and dynamic and adaptive management is a cyclic process through which we can continuously learn more about how to manage complex environmental systems that are characterised by high levels of uncertainty. As a result, our understanding of ecosystems and our ability to predict how they will respond to management actions is limited (WCED, 1987).

Adaptive management in the context of proposed biosphere reserves is relevant at different levels: at the level of the use and conservation of a resource within the biosphere reserve (timber, fish, wildlife, water); at the level of the biosphere reserve itself as a multi-purpose institution; and the biosphere reserve could be seen as tools for demonstrating sustainability, learning, research, science, and for international cooperation and networking.

The adaptive management also involves synthesizing existing knowledge, exploring alternative actions and making explicit forecasts about their outcomes. Management actions and monitoring programs are carefully designed to generate reliable feedback and clarify the reasons underlying outcomes. Actions and objectives are then adjusted based on this feedback and improved understanding.

Adaptive management is an approach when managing within uncertain environments, "Learning by doing" and The Confucian Heritage Culture (CHC) relates a philosopher, Confucius (6th Century B.C), more in the nature of political-social ethics than a religion, influencing even nowadays in more than one political figure of East Asia. The Confucian Heritage Culture (CHC) is dominant in China and other countries strongly influenced by China in the region's long history (Vietnam, Japan, Korea, Singapore, Taiwan, Hong Kong and Malaysia). Much research has demonstrated that CHC learners are able to extend when working in groups setting. This has been attributed to a collectivist orientation, plus additional Confucianism values that emphasize interpersonal relationships and in-group cohesion.

Cultural heritage preservation supports the biodiversity conservation by traditional values. The legend of 'Bac Ba Phi' a great man with plenty of humors and encouragement comes to the life of each people and

communities in this area. The cultural value is becoming the traditional combination of culture and biodiversity, described in the poem:

“Ca Mau, monkeys run on the trees
In river, crocodiles swim and tigers race in
forests”

Social learning in a Confucian Heritage Cultural context should be developed for stakeholder analysis during establishing new biosphere reserve and exchange this idea within national network of biosphere reserves and among nations in our region and in the World Network of Biosphere Reserves as whole.

Conclusion

Cultural heritage preservation supports the biodiversity conservation by various ways in terms of adapted approaches that take a society's cultural diversity into account. It is also elucidated by introducing new UNESCO-MAB initiative of 'Using biosphere reserves as learning laboratory for sustainable development' to establish new biosphere reserves and to manage old ones, where biodiversity conservation applied without consideration on values of cultural heritage. This idea that is considered from early state of establishment has been developed by expressing cultural heritage with local cultural context.

The Proposed Mui Ca Mau biosphere reserves has been designated at a point where practice based learning from context-specific policy experiments may take precedence over further tinkering of the conceptual model to develop new universal or one-size-fits-all models of integrated conservation and development. Learning and knowledge accumulation in a range of biological and social sciences disciplines will be keys to the future of biosphere reserves as learning laboratories for sustainable development. And such learning laboratories could be tools for the preferred use of UN and other multi- as well as bi-lateral systems of international co-operation during the UN Decade (2005-2014) of Education for Sustainable Development (UNESCO, 2005).

References

1. Agrawal, Arun, 2000. Adaptive management in transboundary protected areas: The Bialowieza National Park and biosphere reserve as a case study. *Environmental Conservation*, vol. 27, no4, 2000.
2. Holling, C. S. (ed.) (1978). *Adaptive Environmental Assessment and Management*. Chichester: Wiley.
3. Dang Trung Tan, 1998. Report on surveying bird sanctuaries in Ca Mau Province, DOSTE, Camau (un-published) in Vietnamese.
4. Le Xuan Canh, 2006. Report on investigating current status of biological resources for nature reserves, NCST, (un-published) in Vietnamese.
5. Olsson, P., C. Folke, V. Galaz, T. Hahn, and L. Schultz. 2007. Enhancing the fit through adaptive co-management: creating and maintaining bridging functions for matching scales in the Kristianstads Vattenrike Biosphere Reserve Sweden. *Ecology and Society* 12(1): 28. [online] URL: <http://www.ecologyandsociety.org/vol12/iss1/art28/>
6. Phan Nguyen Hong and Le Xuan Tuan, 2006. Characterizes of Mangroves in Coastal zones of Vietnam (un-published) in Vietnamese.
7. UNESCO, 1996. *Biosphere Reserves: The Seville Strategy and the Statutory Framework of the World Network*. UNESCO, Paris
8. Ishwaran, N. (1994). Conserving Sinharaja: the evolution of a partnership between research and management. Pages 83-89 in: *Coordinating Research and Management to Enhance Protected Areas*. Edited by Dave Harmon. IUCN, Gland, Switzerland. 116 pp.
9. Selvam, V. and Ravichandran, K.K. (1996). Community participation in the restoration of degraded mangroves: a case study of Pitchavaram Mangroves, Tamil Nadu, India. Pages 30-41 in: *Community participation in conservation, sustainable use and rehabilitation of mangroves in Southeast Asia*. Edited by Phan Nguyen Hong, N. Ishwaran, Thi Hoang San, Nguyen Hoang Tri and Mai Sy Tuan. Proceedings of the ECOTONE V Seminar held during 8-12 January 1996, Ho Chi Minh City, Vietnam. Mangrove Ecosystem Research Centre, Vietnam National University, Hanoi, Vietnam.

9. UNESCO (1984). Action plan for biosphere reserves. Nature and resources, Vol. XX, No. 4, October-December 1984, pp. 1-12.
10. UNESCO (1995). Biosphere reserves. The Seville Strategy and the Statutory Framework of the World Network. UNESCO, Paris, France. 18 pp.
11. UNESCO (2005). UNESCO Action Plan of the Decade for Education for Sustainable Development (2005-2014). UNESCO, Paris, France. Pp. 86.
12. WCED (World Commission on Environment and Development) (1987). Our common future. Oxford University Press, Oxford.

Biodiversity Conservation and Local Culture at Sanjiangyuan

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The Separation of biodiversity conservation from preserving the heterogeneity of culture

- The separation of nature reserve from local community.
- The separation of method of conservation from local knowledge.
- The separation of grassland conservation from animal husbandry practice.

The threats to biodiversity caused by the loss of diversity of indigenous culture

- Originates in global warming.
- Originates in Man over the Nature: A mainstream culture of industrial age .
- Originates in the loss of the diversity of indigenous culture.

Biodiversity Conservation at Sanjiangyuan and Pastoral Culture

- The philosophy of re-incarnation cycle and “cause and effect”: Due to the ethical thoughts of cause-and-effect and samsara (re-incarnation cycle).
- The consciousness of the Holy and Pure Land: The Qinghai-Tibet Plateau is a holy land surrounded by auspicious snow mountains and a merciful land purified by the Goddess of Mercy.
- Three Goals of Life:
 - The lowest goal is to own the ability to distinguish what to keep and what to give up so

that one can get rid of agony and get happiness, and the ability to control one’s own behavior and mind.

- The intermediate goal is to enable oneself to distinguish what to keep and what to give up, to own the heart of permanently get rid of agony and to own the ability to control one’s mind and behaviors.
- The highest goal is to enable one to be altruistic, to have a merciful heart full of love to all lives, and to have the ability and wisdom to give.
- A way of production and life that harmonizes with nature— Revere nature, forbid digging rocks and earth, polluting water sources, killing and hunting and other behaviors that are against nature. Live in a nomadic life that rhythms with nature.
- Philosophy of love: Mutual help, cooperation, integrity, and to run the grassland and the gift of the grassland – affectionate livestock - with love.

Case study: The preservation of heterogeneous culture can enhance biodiversity conservation

- Ecological monitoring by village community
- Agreed reserve at village community
- Protection of holy mountain and sacred site
- Eco-culture festival
- Protection of wetland birds

Bridging Traditional Knowledge with Mainstream Technology to Sustain Cultural and Biological Diversity in the Product Development of Wild Honey: Focus on the Indigenous Peoples of the Palawan Biosphere Reserve, Philippines

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Abstract

Declared a Man and Biosphere Reserve in 1991, the Palawan Biosphere Reserve in the Philippines is a biologically diverse province and home to a number of Indigenous Peoples particularly the *Pala'wan*, *Tagbanua* and *Batak* tribes. These IPs are dependent on their traditional wildlife hunting and gathering practices for food. The province-wide federation of the Indigenous Peoples, the *Nagkakaisang Mga Tribu ng Palawan* (NATRIPAL) or the United Tribes of Palawan, is undertaking projects in the area of education, health, organizing, advocacy and livelihood programs towards building a better future for the tribal peoples. A key initiative is the development for the mainstream market of specialty products such as the wild honey traditionally gathered for household consumption and at a limited scale for the local market. The opportunities, challenges and strategies in the development of this specialty product based on customary knowledge and practices of gathering enhanced by mainstream technology and enterprise management scheme(s) is discussed in the context of sustaining cultural and biological diversity of the indigenous peoples of Palawan Biosphere Reserve.

The Palawan Biosphere Reserve

The Palawan Biosphere Reserve, known as the "last ecological frontier" of the Philippines, is located at the westernmost side of the Philippines Islands in the South China Sea. The island province of 1.5 million hectares (ha), composed of 1700 islands and islets, is a biologically rich and diverse province declared as a UNESCO Man and Biosphere Reserve in 1991. It is endowed with rock formations, underground channels and limestone cliffs, such as that of the famous St. Paul Subterranean National Park which is now a World Heritage Site. It is also rich in minerals such as chromite, nickel, mercury, gold, manganese and natural gas. The province's main island is long and narrow. It has sloping landforms, dominated by 64% mountains and hills with only 36% lowland areas available for agricultural development and settlement.

The forest cover of Palawan in 1998 was estimated to be 55.84%, an increase of 4% from 1992. This is an indication of forest recovery, considering that from 1979 to 1985, Palawan experienced forest loss at the rate of 19,000 ha/year. Meanwhile, the key coastal resources of the province comprise of mangrove forests, seagrass beds, and coral reefs. The mangrove forests of the province cover an approximate area of 44,500 ha which is 40% of the total mangroves of country. The diversity of Palawan's coastal resources is comparable to that of the Philippines; it harbors 31 species of mangroves, 13 species of seagrass, and 379 species of corals representing 90%, 81%, and 82% of the known respective species found in the country.

The island province is home to species included in the threatened species list of the World Conservation Union

(IUCN): 13% of animals and 15% of plants are classified as critically endangered, 24% of animal species and 23% of plant species are considered endangered and 19% of animals and 31% plants are classified as vulnerable.

The province had a recorded population of 755,421 in 2000 registering a population growth rate of 3.67% between the years 1995 and 2000. This growth rate is higher than the national growth rate of 3.53%, primarily due to in-migration. Furthermore, Palawan is also known as a melting pot of cultures with approximately 53 ethnolinguistic groups from all parts of the country settling and seeking better lives in the province owing to its abundant natural and land resources.



The Indigenous Peoples of the Palawan BR

The Palawan BR has three major indigenous ethnic groups, namely the **Batak**, the **Tagbanua** and the **Pala'wan** (please refer to Annex-A for brief descriptions). Contact and interaction with other ethnic groups from the lowlands especially in the trade of forest products have strong impacts on the cultural practices of these indigenous peoples (IPs) specifically the Tagbanua and the Pala'wan, many of whom already assimilated external cultural practices.

The 2002 official data on the three main IP groups of the Palawan BR showed a population of 48,111 broken down as follows: Pala'wan 47,535; Tagbanua 38,759; and Batak 576.

The three main IP groups are federated under the Nagkakaisang Tribu ng Palawan or NATRIPAL. It is the largest IPs federation in the Palawan BR with 70 member organizations under its umbrella. It was organized in 1989 with the objective of advocating the recognition of ancestral lands and access to natural resources. Four of its main programs are community organizing, livelihood, resource management and tenurial security.

The importance of the environment in the lives of the IPs of the Palawan BR can be summarized in one of their past workshop themes "Kalikasan: Buhay ng Katutubo" (Environment, the Lifeblood of the Indigenous Peoples), a theme which they themselves formulated. Among the forest resources of significant value to the IPs are the non-timber forest products (NTFP) to which wild honey belongs. The NTFPs are an integral part of the culture and subsistence of the Palawan IPs since these are used for



food and shelter, medicine and food for animals, among others.

The economic value of these NTFPs has been recognized in recent years because of their material contribution to the mainstream economy mainly as source of raw materials for the multi-million dollar furniture industry.

The Wild Honey Enterprise

Indigenous traditional knowledge and practices

The wild honey or *deges* has been an integral part of the IPs of the Palawan BR. Together with the honeycomb or *anara*, it is primarily used as food, food supplement and medicine among the IPs. The IPs of the Palawan BR believes that the strength of wild honey as food and as herbal medicine is enhanced because of the mixture of pollen from the bio-diverse flowering plants of the forest. The relationship between the wild honey and the IPs include many aspects of forest ecosystem other than food for sustenance. The indigenous knowledge include the prediction of bountiful harvest of honey based on the length of the dry season (in the belief that nature compensates for the negative effect of a long dry season by providing more honey), the association of certain species of birds to locate the honeybee colony, and the flowering of certain plants that signals the onset of the honey season.

The traditional method of gathering wild honey involves the use of smoke to temporarily drive away the bees. The IP's indigenous practice of gathering honey is sustainable since they usually leave some parts of the honey and honey comb in their original state for the bees to have food and a comb to build up again. In recent years, however, the harvesting or gathering of all the

honeycomb became common practice with little left for the bee colony. Furthermore, the traditional practice of hand extraction of the honey from the honeycomb reduces the quality of the product. Sweat, dirt and water contaminate the honey thereby reducing its quality and resulting in fermentation which shortens its shelf life. The low quality honey cannot command maximum prices in the market. Having little access to the end-buyers, the IPs did not earn much from honey gathering since their produce were then bought by middlemen who buy their honey in bulk and at very low prices. As honey is commercialized and in a bid to earn more, some of these middlemen dilute the honey with sugar (made into syrup) thereby compromising the product and the integrity of the gatherers. This unscrupulous practice was even adopted by some IPs so that a lot of end-buyers/consumers became wary and unsure if the honey being sold and said to be gathered by IPs was pure or adulterated.

Mainstream technology

The NATRIPAL saw the potential for full commercialization of the wild honey. With assistance from the Non-Timber Forest Products-Exchange Programme (NTP-EP)¹, NATRIPAL ventured into the business of wild honey. Enhancement of traditional knowledge and the infusion of mainstream technology are being done to ensure sustained supply of wild honey, upgrade its quality and penetrate the specialty market for traditional products. The IPs were re-trained on traditional wild honey gathering to prevent destruction of the whole honeybee colony and to ensure sustainability by leaving the bees with some honey comb to build on again. This indigenous knowledge is coupled with and enhanced by mainstream technology of systematic harvesting and proper handling techniques to avoid contamination. The latter involves the use of plastic bags to pack the wild honey for transport. Rather than drawing out the honey by hand, it is now extracted by gravity using drip method, and the extracted honey is made to pass through a series of strainers to remove impurities.

A mini laboratory to ensure quality control for the wild honey was put up and is currently being expanded to increase capacity. An added facility is the



1 A non-governmental organization working for the recognition of local communities, including the IPs, of their right to NTFP

dehumidification chamber to reduce further the moisture content of the product. The staffs of NATRIPAL who are 99% IPs, were trained on the aspect of simple laboratory techniques to monitor the quality of the product especially the moisture content. To reduce their dependence on middlemen and to get the most economic benefits from the gathered honey, the NATRIPAL served as the marketing/selling arm of the honey, with the staff given training and doing the packaging, marketing, and business management. The honey gathered by IPs and sold through NATRIPAL is guaranteed and may be said to be certified pure and organic. Aside from this, its buyers also know that the proceeds of the sales go directly to the IPs and they are therefore able to help improve the livelihood of these marginalized groups.

The Impact of the Linkage between Traditional Knowledge and Mainstream Technologies

The product: Wild honey

The use of honey as a medicinal drink, health supplement, and sweetener (substitute for sugar) has been recognized not only by the IPs but also by non-IPs. There is a considerable local and global market for honey, making it among the most sought after non-timber forest products. The application of available mainstream technologies for the wild honey enterprise resulted in (1) improved quality of wild honey which now have lower moisture content and no fermentation through the establishment and application of quality standards for the product, (2) better and innovative product packaging, and (3) penetration of the specialty market for indigenous products. These lead to higher premium on the honey marketed by the IPs through NATRIPAL since customers are assured that the honey being sold is unadulterated, organic, and of high quality. In turn, there is greater income for honey gatherers, with an average increase from PhP6,067 per month to PhP20,990 per month, due to higher sales and lesser mark-up for the middleman coming from the IP group. This has thus encouraged other IP members to venture in the collection of wild honey for commercial purposes.

Biodiversity

The biodiversity impact as a result of enhancement process includes:

- Stronger resolve of the need to protect the forest ecosystem among the IPs thereby preserving biodiversity.
- Protection of the honeybee colony and their habitat to ensure sustainable wild production of the resource.

Culture

The impacts to their culture and to the IPs as a people include:

- Strengthened community spirit by treating the business as a community initiative. The IP members are required to secure endorsement from their respective organization for the wild honey to be brought to NATRIPAL. Most of the IP organizations require a 10% share of the proceeds of the sale for the organization. The share is then used by the organization for their activities and projects.
- Increase in the value of the resource through higher market prices which translate into greater disposable income.

Opportunities and Challenges

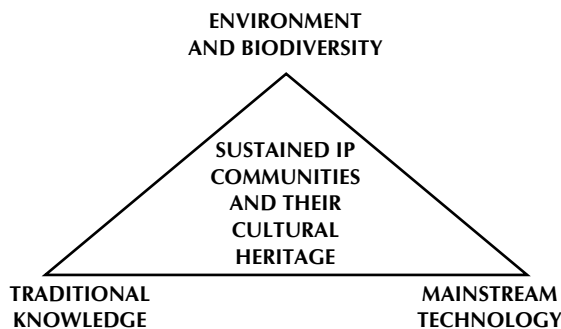
While there has often been a clash between IP culture and mainstream technologies, the wild honey enterprise has shown that both could be harnessed in synergy leading to protection and enhancement of forest resources, biodiversity, and IP culture. This offers an alternative option on how the larger society of the Palawan BR can view sustainable development for the province. The Palawan BR is at the crossroad of sustainable development path as it faces the challenge of what development option to pursue. A critical issue at hand is the development of the mining industry in the Palawan BR which may endanger the critical forest ecosystem of the province. As the wild honey enterprise has shown, there is potential for the traditional knowledge and practices enhanced by mainstream technology to meet this development challenge.

Meanwhile, among the IP communities of the Palawan BR is the challenge of how the increase in disposable income can be harnessed to provide for their most basic

needs and thereby ensuring their cultural survival as an IP community.

Conclusion

The interplay of traditional knowledge, mainstream technology and the protection of the environment and biodiversity to attain the preservation of the IP communities and their cultural heritage can be summarized in the following diagram:



The fusion of indigenous knowledge with that of mainstream technology to improve traditional IP products such as in this case, wild honey, for the mainstream market is a potential strategy to protect the environment and natural resources. This in turn can lead towards preserving the indigenous culture to attain the survival of the IPs. However, there is the need to give assistance and guidance to the IP communities in terms of translating this increase in income to improve their quality of life.

References

Published

Bennagen P. L. *Capacity building for sustainability for indigenous cultural communities, A handbook*: 2004

Cadelina R. V. *In time of want and plenty, the Batak experience*. Siliman University, Dumaguete City, Philippines:

Eder J. E. and Fernandez J. O. *Palawan at the Crossroads, Development and the Environment on a Philippine Frontier*. Ateneo de Manila University Press: 1996

National Statistics Office, Republic of the Philippines. *1995 Census of Population, Report No. 2-72 D: Socio-economic and demographic characteristics*: 1997

Unpublished Local Reports

Arquiza Y. D. *Food, shelter, clothing and cash: The economic importance of non-timber forest products in the Philippines*: 2007

Dumagat F. *Socio-economic, ethnographic, and tourism studies among the Batak at Saint Paul Subterranean River National Park and Adjacent areas*. Palawan Tropical Forestry Protection Programme, Palawan Council for Sustainable Development, Puerto Princesa City: 1998

Hobbess M. *Pala'wan managing their forest: The case of the Pala'wan of Saray on Southern Palawan Island, Philippines* (MA Thesis): 2000

Japan International Cooperation Agency (JICA) and Department of Tourism (DOT)-Philippines. *The Study on Environmentally Sustainable Tourism Development Plan for Northern Palawan in the Republic of the Philippines, Progress Report*: 1996

Mcdermon M. H. *Boundaries and Pathways, Indigenous Identity, Ancestral Domain, and Forest Use in Palawan, the Philippines* (PhD dissertation). University of California, Berkeley: 2000

Non-Timber Forest Products-Exchange Programme (NTP-EP). *Message from the forest, developing guidelines for sustainable harvesting of three Philippine NTFPs: Rattan, Honey, Almaciga* (Video documentary)

Pontillas M. S., Aquino M. A., Gironella E. P., and Cascara L. O. *Ethno-botanical study of indigenous Philippine forest plants among the Pala'wans of Quezon, Palawan*. Palawan State University: 2000

Sibal M. C. (ed). *A glimpse of the Tagbanua ingenuity*. Palawan State University. *Palawan's Heritage Research Monograph No. 1*: 1998

Annex A:

Brief Description of the Indigenous Peoples of the Palawan BR

The Bataks

The Batak meaning “mountain people,” inhabit the rugged part of central northeastern Palawan BR. They belong to the few less acculturated ethno-linguistic groups of Palawan and are described as the remainder of one of the most ancient Philippine culture. They are described by ethnologists as belonging to the Negrito type (Miller, 1905) as “Veddid” by Estel (1952) and by Beyer (1917) as an almost pure “Papuan” type.

They are traditionally nomadic, and do not cultivate the soil except to plant a few plants which yield edible roots. In recent times, they have learned the shifting cultivation of dry rice and their settlements are characterized by haphazard growth and tending of dry rice, coconut palms, fruit trees and root crops.

Their main economy is comprised of hunting and gathering food targeting small games. Trading with neighboring groups is common among the Bataks. Forest products such as rattan, copal tree gums and wild honey are traded with desired items such as cloth, metal implements, salt and rice.

The Tagbanuas

The word Tagbanua is derived from “tag-banua” which refers to the aborigines who retreated inland (Llamson, 1978). They are original inhabitants of the coastal areas who settled towards inland because of pressure imposed by later settlers.

They are described as shifting cultivators of the central and northern Palawan Island whose economy is principally based on upland (dry) rice production. Intercropping technology done in limited scale is common among the

Tagbanuas. This involves the planting of cassava, sweet potatoes and taro in limited quantity.

The annual cycle of their economic, social and religious activities are greatly influenced by climatological factors, e.g. rainfall. During the driest period they gather forest products such as wild honey, resinous gums and likewise venture in fishing and hunting.

Today, the Tagbanuas in the eastern coast are indistinguishable from their Christian neighbors because of acculturation.

The Pala’wan

The Pala’wan is one of the original ethnic groups of the Palawan BR. They are concentrated in the southern main island of the province but geographically scattered and developed into sub-groups living a nomadic life. Originally living along the coastal areas, the pressure imposed by migrants forced communities to advance into the hinterlands. Others choose to co-exist with the migrants, commonly through inter-marriages, adapting the way of life of the new comers.

The most common occupation among the Pala’wan is agricultural production. However, many still practice traditional hunting and gathering especially those communities living near and within forested areas. The products are then brought to the nearest established market sites during market days for trade.

Incomes from their economic activities are generally used to buy basic necessities such as salt, sugar, clothing, cheap canned goods and tobacco.

To Protect the Living Space of Cultural Diversity: “Tu Feng” Project of Inheriting Country Culture of Yunnan

Mr. Zhe Chen

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Pumi of Lanping County

Lanping, an ordinary place in map often overlooked by people, nurtures peacefully two ethnic groups with age-old culture.

Facts:

- Relatively remote in location; one can still feel the essence of the culture even though it is undergoing destruction.
- The basic elements that tied tribe, clan and family together are based on time-honored culture and history.
- A closed system yet invulnerable; it contains diverse custom and tradition that are complementary to mainstream culture.

“We would drive away devils by the metal knife; we would shield you with our life.
We bless you for promising us forever green mountain and timelessly flow of river water.”

—Pumi Song



Ceremonies to honor mountain and tree deities



A village said “No” to road

Village of Yushichang, an age-old Pumi mountain village locates in northeast of Lanping Bai and Pumi Autonomous County, Nujiang Prefecture, Yunnan. A natural village affiliating to Qinghua village, Hexi township, is sited on the mountain slope 2,880m above sea level with the backdrop of Laojun mountain, the peak of Yunling massif. The population of the village is 368, which consist of 80 families. There are 589 mu cultivated land and 83,753 mu forest as collective property of villagers. Most of their forest is primary forest.



Pumi’s forest

Pumi regards tree as sacred and reverent as their ancestor. They guard their natural environment the same way as they do to the local gods. Folk songs about tree are inexhaustible.



Worship to mountain deities, a ceremony attended by entire village of Yushichang on December 8, 2004

The forest around Yushichang village contains a great deal of biodiversity, including over 100 species of trees, such as taxus, spruce, fir, hemlock fir, pine, larix and *Torreya grandis*.

Fear for forest vanishing, no road has been built to the village so far, even though villagers constantly argue about it. Yang Jinhui, a village cultural officer said: "We Pumi are nomads. We can't live without forest and pastureland. Supposedly we give up on our natural resources, it would only be us who have lived here for generations to suffer."

Forest management

Pumi lives in the forest, which they regard as a friend. People's lives depend on forest where ancestors and deities live.

From generation to generation Pumi takes care of and safeguard the forest. They collect only dry and broken tree branches for firewood; they calculate cautiously when have to log the tree for house building.

They take great care and responsibility to manage the forest of family property, such as chopping the weed and preventing it from forest fire.

Harmony of Culture and Environment

In Pumi culture, man and his forest are one. People use ceremonies, folk songs, Cuocuo dance and folk vocabularies to honor the forest around their village.

They can hardly imagine a world without trees. They can sing a song to a tree for three days and three nights non-stop. The song would be lost if the tree is gone.

To ensure the tradition will be carried on is a serious matter for a culture that living with forest.

The value of ethnic cultures

The wide expansion of urban environment alienates these guardians of traditional homeland. They are paying great price to retain the integrity of their homeland and race.

The spiritual belief and wisdom for life that a primitive culture possess have long been lost in our modern urban culture.

The value system of minorities in China inspires us with abundant local knowledge drawn from their life experience of living in harmony with natural environment.

"Tu Feng" Project

"Tu Feng" project, an action-oriented experimental program, aims at preserving the living traditions of local culture. It is also a problem-solving process. We first ask what to do and how to pursue before making decision.

The project is based on working experience accumulated in the past 10 years.

In 2004, "Pumi traditional culture inheriting and learning group" of Lanping was selected one of the major pilot programs of China's ethnic and folk culture protection project.

The Ford Foundation funded "Lanping folk cultural village inheriting and learning" program. Today, a mechanism of teaching and learning the roots culture in village is taking shape. The first phase of project is completed.

Concepts of Action

- Folk culture is a living tradition, which exists in the everyday life of villagers, whose work keeps the tradition alive.
- To protect an ethnic culture from vanishing we must first preserve the habitat in which the people of the given culture reside.
- It is based on these ideas that we have been working on "Tu Feng project-Lanping village program" in Pumi village of Lanping County, Nujiang Prefecture, Yunnan since 2002.

"Inheriting the living tradition"

Within an ethnic group, to inherit the living tradition means a person of younger generation learns, therefore inherits his/her own cultural tradition directly from the parents generation.

Key factors:

- Passing the tradition to the younger generation within the family/clan/tribe instead of having outsider record it.
- Learning the tradition by participating the process instead of just observing or document it on paper.
- Preserving the unique cultural environment that such tradition lives.

ABC Theory

Like the tree, a culture is a living mechanism consisting of A, the roots; B, branches and C, leaves and flowers.

- Roots culture-A is the cornerstone of the given culture, a gene pool that supports and sustains the whole system.
- Branches-B is the continuation of roots-A. Branches carry out all quality and value of the roots.
- Leaves and flowers-C, exhibiting and communicating to outside world, changes constantly. It represents the complication, sophistication and conflict created when encountering the outside world.

Our view and solution

In ethnic region, the destruction of environment is often triggered by the dissolution of cultural value. This fact is largely overlooked.

“It looks easy, but hard to pursue. Because it’s a hot topic, everyone has his own idea, and believes he is the only one right...we won’t reach any agreement.

Everyone thinks his kid is the best...

“It should rely on market operation, survive the fittest...

“Generally speaking, it’s not a cultural sovereignty issue of the State...”

Our solution is: The story must continue.

Forest, grassland, music and songs, cattle and birds, cottages and watermills...all would live as long as the storytelling continues. And it should be told by younger generation and the generations to come.

Start from Young Group

Neither are these professional artists nor art students learning from without their own culture; they are not paid performers at any tourist spot, but a group of local youth from village.



“To nurture the young group and build teaching and learning mechanism at grassroots level; to preserve the roots culture through village-based operation; to cultivate team leaders chosen from the young generation who grow up with the tree of culture. Like the tree these people would eventually form a forest, which should be strong enough to resist assimilation and sustain their own cultural identity.”

The expression on their face reflects the richness of their cultural heritage.

Indigenous Knowledge Systems and Techniques in Natural Resource Management

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Summary

Many times, we miss the forest for the trees. Trees are one component and one value of the forests and that mayor may not serve the community as a whole. Yet the value of a healthy watershed is immeasurable as it provides water year-round and protects against flooding and drought. "Non-timber forest products" also provide benefits well beyond their commercial values. Forest foods provide essential proteins, nutrients, and minerals to rural community families that they cannot find elsewhere. Traditional medicine practice is an art that is passed on from generation to generation. The loss of the forest could spell the loss of this art. This forest supermarket and pharmacy (bio-diversity) is sustainable when used according to indigenous knowledge and techniques for community livelihoods and not for commercial or market purposes. Community forestry is one effective means of community-based, participatory, and sustainable utilization of natural resources.

Conservation ethics refer to a change of thinking and attitudes, based on our spiritual and human values and principles that guide our practices and policies. This ethic therefore reflects a conviction of individuals and collective responsibility.

By exploring indigenous knowledge systems and techniques, spiritual and cultural values and principles will become apparent and defined, and guide us in developing our ideas and future efforts in a sustainable manner.

Introduction

Myanmar still enjoys a forest cover of more than half of its total land area and is regarded as one of the highest in the South-East Asian region. Myanmar is recognized as a land of diverse culture, traditions and natural resources. As such, forest resources play a dominant role in the socio-economic life of the people. About 76% of the total population of 54.3 million are rural population with agriculture as the main livelihood and heavily dependent upon forest resources. Most of the rural people live in and around the forests for so long that they have acquired indigenous technological knowledge for the rational use of forest resources, thus helping in biodiversity conservation.

Forest Cover

Sr. No.	Category	2000 (,000 ha)	% of Total Land	2005 (,000 ha)	% of Total Land
1.	Closed Forest	25,841.0	38.2	27,704.5	36.5
2	Open/ Degraded Forest	9,426.7	13.9	9,426.9	13.7
3	Other Wooded Land	11,435.3	16.9	11,950.0	17.7
4	Other (Including Water Bodies)	20,954.7	31.0	21,741.3	32.1
Total		67,657.7	100.0	67,657.7	100.0

Source: Forest Department (2004) : FRA 2005

Village Level Community Groups and their responsibilities

The inhabitants of a village, generally organized themselves into two major community groups - the administrative groups and the welfare groups. The headman of the village and his council members are appointed by the government authorities for conducting official and legal matters. The welfare group is headed by the most respected village elder, who will assume as social leader or spokesman representing the group of elders. Village monks are also traditionally influential on the villagers and act as patrons of the welfare group.

Under this welfare group, a youth group comprising of both genders is customarily formed with corresponding gender leaders. This youth group is the main work force for each village and is involved in all activities of the village. The youth group members will participate in activities such as infrastructure development, security, education and health development, civic duties such as charity deeds and funeral services, etc.

Pooling of labour for agriculture, house building and repairs, group noviciation ceremonies, weddings, community forestry establishment, road construction and repairs and funeral services, etc. are the main activities of these youth groups. Traditionally the major positions of the youth group efforts go to the management of available resources. Customary and traditional indigenous knowledge for resource management is handed down by the village elders generation after generation.

Management of Natural Resources at village level

Rural people have access to and voluntary responsible for the management of natural resources. The resources are:

- (a) Land (Soil)
- (b) Water
- (c) Forests
- (d) Forest products
 - (i) Minor forest produce (Post, Pole, fuel wood, etc.)
 - (ii) NWFPs

Land (Soil)

Land is a limited resource which has to be shared by the growing populations, Most rural dweller live in the

forests with shifting cultivation as their main subsistence livelihood. Previously, population density being very low, the farmers can leave the cultivated land for long fallow period of 10 to 15 years. By that system of shifting cultivation, the farmers can get the advantage of revitalized soil in their second rotation. Due to population pressure, individual land holdings get smaller and fallow period inevitably also get shorter. The area therefore cannot regain the original fertility resulting in reduced crop production. For the sake of food security, the poor people have to extend the cultivation into the remaining natural forests causing more forests depletion. Eventually the shifting cultivators have to practice permanent agriculture on small land holdings.

Many ethnic groups of the Shan State living in moderately hilly to hilly regions practice hill cultivation methods that are not scientific or suitable for the locality. Most farmers plough their fields across the contour encouraging serious soil erosion. As the soil is loose and the gradient of slopes steep, all kinds of soil erosion, sheet, rill and gully erosions carry away large quantities of valuable top soil rendering the fields unproductive within a few years. Farmers have to improve the soil by reducing the soil erosion and also by supplementing the soil nutrition by means of various indigenous technological knowledge (ITK).

Soil Erosion Control by ITK

- Gully plugging with physical barrier construction using readily available materials such as poles, posts and branches.
- Planting deep rooted grasses, shrubs and bamboos
- Contour hedge planting with live trees, shrubs and herbs.
- Contour terrace cultivation.
- Increasing tree cover along the gullies or streams.
- Applying SALT technology for crops.
- Mixed cropping with perennial and annual crops.

Soil nutrition improvement

Unhealthy crops and declining crop yields are indicators of soil deterioration. Such soils can be improved by applying ITK such as:

- application of farmyard manure;
- application of organic compost from livestock breeding;

- green manure application using leguminous plants, algae, moss, ferns, water hyacinth and other aquatic weeds.

Applications of these technologies enhance crop yields, induce organic farming technology and initiate organic food production. If this technology can be extended systematically, the green food so produced can become a tourist attraction item of high income potential.

Water

Water is essential for agricultural production as well as for healthy living. This fact is especially true for rural areas where availability of clean water the whole year around is uncertain. Many rural dwellers come across conditions where water is abundant during the rainy season but scarce in the open season. Even the available water during the rainy season is not always clean enough for hygienic use and human consumption, due mainly to silt run off, inefficient protection or total lack of protection from contaminating by foreign materials.

The rural people therefore are very concerned about the available water resources. Traditionally the rural people protect the water sources and the watersheds of these sources. In almost all such watersheds, one will find a luxuriant growth of whatever forest type occurring in that area, the extent of which can be from a few hectares to a square kilometer or more. These forests are always untouched by the local people, who believe that forest is guarded by a super natural being, or a Nat (see photo 1).

The water source can be a spring-fed perennial stream or a spring-fed water pond. This water source is regarded as community property equitably shared by all consumers,



Photo 1. Nat guarded watershed forest

human and animal alike. Because of insufficient hygienic knowledge, the pond or lake water sources are not always properly protected and therefore the water quality is substandard.

Local people have their own traditional water harvesting techniques to collect clean water for domestic use. Huge Circular ground tanks are constructed with masonry. The ground tanks can be of storage capacity from 2000 gallons to 10000 gallons according to the spending power of the family. These people are mostly well-to-do people who have houses with corrugated iron sheet roofs. Rain water is collected and piped into the tank. Some families get sufficient water for the whole year (see photo 2).



Photo 2. Private rainwater harvesting system

Forests

In Myanmar, forests including forest plantations fall into the following categories:

Forest Area of Myanmar by Legal Status

Sr. No.	Forest Area by Legal Status	Area km ²	% of Total Land
1.	Reserved forest including Protected Public Forests	258,060	23.36
2.	Protected Areas Systems (PAS)	53,300	7.79
3.	Other forests	205,100	30.32
Total		416,460	61.65

Source : Myanmar Forestry Statistics 2006

People living in or around the forests are given some rights and privileges at the time of reservation of forests, concerning the utilization of forests products for their subsistence livelihoods. Although legally all lands

including forests are owned by the State, local people traditionally assume they have the customary rights of use of the forests around their villages. Taungya or Hill Cultivation technique is originally practiced by the people living in the forests for their subsistence. At first, there is no private ownership to the forest areas. Taungya Cultivation is practiced at random. But when population increases, to avoid argument on the land, people started to adopt a system whereby a stretch of forests first occupied by the person should have the right cultivate the land. This system is called the right of possession of land by the stroke of the machete, meaning the land first cleared by the persons' own hands has the right of ownership.

Forest Products

Minor forests produce (post, poles, fuelwood, etc.)

Rights and privileges of local people on the extraction of minor forest produce is clearly prescribed at the time of forest reservation. Extraction for domestic use from all forests in excess of the accepted amounts have to pay royalty. In practice the local people have access to the minor forest produce such as posts, poles, fuelwood, etc. almost free of charge as long as there are forests around.

Non-wood Forest Products (NWFP)

NWFP, play a very important role in the livelihood of the rural peoples in the form of shelter, food, medicine and

also for income. Myanmar forests provide many kinds of NWFPs of which about 20 kinds are of commercial importance. Traditionally the rural people can have free access to the NWFP and for domestic use and home consumption. Up to now, standardized and sustainable methods of harvesting for various NWFPs are not yet developed. Storage, processing and marketing techniques are also very rudimentary.

Sustainable management of NWFPs call for more research in these fields and extensive training of the knowledge have to be given to the local people starting from the basic education level.

Importance of Traditional, Cultural, Religious and Spiritual Influences on Resource Management

Traditional and cultural ITK in Resource Management

Many different kinds of ITK concerning soil and water resources management are noted in the hilly or undulating terrains of the Shan State and various other upland areas in the whole of Myanmar. These ITK are traditionally and culturally handed down from generation to generation with various impacts to the resources management.

The following are some examples with indication of possible end results:

Sr. No.	ITK activity	Purpose	End results
1.	Shan Dam Wooden Piles, Brush wood check dam with tree/grass planting	Gully plugging of serious erosion areas	<ul style="list-style-type: none"> Erosion stabilized Successful (See photo 3)
2.	Terrace Farming. Earth bunds constructed along the contour at some interval and the area between the terraces leveled	<ul style="list-style-type: none"> For cultivation of Wetland paddy and beans Beans after paddy harvest 	<ul style="list-style-type: none"> Soil and water properly conserved Successful (See photo 4)
3.	Soil Baking. Ploughed soil in a field is scraped into small mounds. Vegetative matter and cow manure is buried in the hole made at the top of the mound, which is set fire and covered with soil to smolder.	To prevent the potato or tuber crops from insect and fungus attack	<ul style="list-style-type: none"> Nutrients lost Protection is not certain Encourage erosion This practice should be discouraged

Sr. No.	ITK activity	Purpose	End results
4.	Fish bone Drainage. A shallow drainage ditch dug across the contour at the centre of the field with slanting side drains joining the main drain.	To prevent excessive moisture accumulation in potato or tomato fields.	<ul style="list-style-type: none"> • Bad practice • Encouraging serious soil erosion leading to gully erosions
5.	Community conserved forests. Small areas of natural forest adjoining the cultivation, orchards or homestead are traditionally protected by the respective farmers. Protections can even include wildlife occurring in those areas. Examples abound in many States and Divisions in Myanmar including Ayeyarwaddy Division	Traditional love of natural forests ecosystems and also for sustainable utilization of the forest produce including NWFPs	Very good practice, which should be encouraged by applying community Forestry Systems (See photo 5)
6.	Community WoodLots and plantations. Many ethnic communities set aside some areas of land near the villages for planting of multipurpose trees or bamboos for sustainable supply of small timber and bamboo for agriculture, fuelwood and other domestic uses. Although the trees are planted as a woodlot, individual ownership is traditionally practiced and the trees are inheritable.	To obtain sustainable supply of small timbers, fuel wood and bamboos for domestic uses.	<ul style="list-style-type: none"> • Very good practice • Helps in environmental conservation. (See photo 6)
7.	Hedge planting with forest trees, toddy, bamboo and fruit trees.	Income generation, sustainable supply of wood, bamboo and fruit trees.	<ul style="list-style-type: none"> • Helps in greening the landscape. • Efficient use of Wind break effect. farmland. (See photo 7)
8.	Live Hedge planting with hardy, thorny and bushy shrubs such as Agave spp. jatropha, cactus, carrisa, Acacia spp., etc.	For protection of agriculture crops at low cost and for perpetuity.	<ul style="list-style-type: none"> • Efficient protection, low maintenance cost, soil erosion control. (See photo 8)



Photo 3. Gully plugging



Photo 4. Contour hedge planting



Photo 5. Community conserved forests



Photo 6. Community Woodlots



Photo 7. Hedge planting Toddy



Photo 8. Hedge planting – Acacia trees

Religious and Spiritual Influences on Resource Management

In Myanmar, the majority of the people are Buddhists. Buddhist civil society including the laypeople, academics and monks participate voluntarily in performing environmentally friendly acts to conserve the natural resources. This activity is in line with the norms of Buddhist philosophy and in this respect the monks can play a vital role in spreading these norms. In Myanmar, examples of monks protecting the natural resources around their monasteries can be seen in all States and Divisions. Furthermore, monks can also help persuade the villagers to refrain from environmental destruction and can also use their influence to set up protected areas. The Forest Department and the Dry Zone Greening Department of the Ministry of Forestry take advantage of this fact for the establishment of protected areas to enhance environmental conservation. Although the Buddhist civil society activities on this subject cannot be called a systematic scientific approach, it has already taken important steps toward environmental protection and has enormous potential to enlarge its scope of involvement (see photo 9).



Photo 9. Forest protected by monks

The spiritual belief of the local people also play an important role in the conservation of natural resources, especially trees, groves of natural forests and water sources. Many examples of large trees (such as Banyan, Tamarind, Teak, etc.) left standing in totally bare lands are attributable to the local peoples' belief in Spiritual beings guarding those trees. The same phenomenon can also be seen in many parts of Myanmar where a conspicuously different type of forest (e.g Shwe Kyun Daw, i.e. Golden Teak Forest of Thegon; Zee-Oh Thit Hla forest - Beautiful sal forest of Zee-Oh village) or a luxuriant primary forest

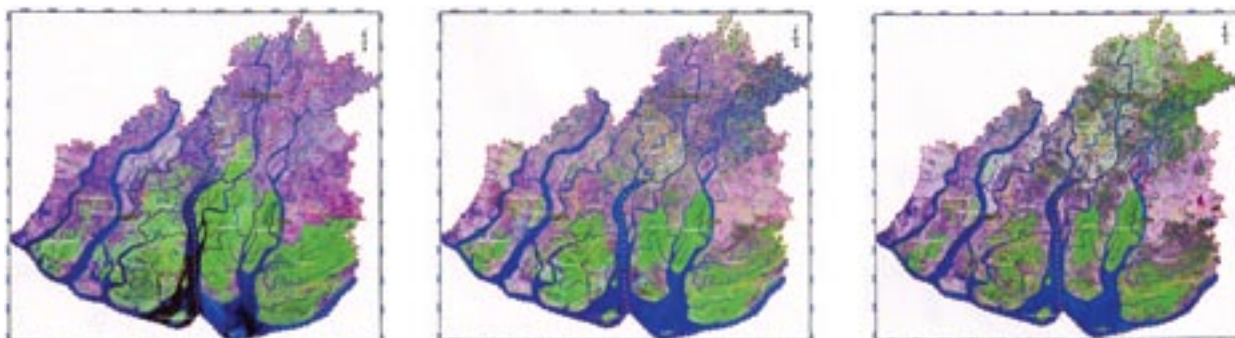
is growing against the backdrop of degraded or disturbed forests. One will also notice that almost all of such storage forests have Nat Shrines, indicating the presence of super natural beings guarding those forests (see photo 10)



Photo 10. Forest conservation by religious belief (Shwe Kyun Daw)

Some of these forests have legends depicting the restriction to the activities permitted and prohibited by the guardian Nats. Some restrictions involves cutting of trees and some even restrict collection of branches and leaves for use in areas outside the particular forest. One of such forests near Peyintaung is believed to cause trouble to the villagers of Peyintaung who cut the trees but villagers from other villagers can cut the trees without any harm to them.

Such strange spiritual beliefs also exist in the Ayeyarwady Delta region. The Meinmahla Island of Bogalay Township is believed to be guarded by U Shin Gyi Nat and the local people refrain from cutting the trees or clearing the forest. On account of that spiritual belief, the Forest Department can effectively maintain the forests of that island as evidenced by the three different times sequence satellite images shown below.



1990 satellite photo

2001 satellite photo

2005 satellite photo



Economic Activities and their Influence on Natural Resource Management

Economic Activities at the village level which has influence on natural resource management can be listed as follows:

- Shifting Cultivation (Taung Ya)
- Traditional Sloping Land agriculture
- Agro-forestry
- Forest gardening
- Hydroponics or floating island agriculture
- Ecotourism
- Miscellaneous

Shifting Cultivation

Ethnic minorities living in the hilly regions practice this method of agriculture. The method needs only hand tools for cutting down the natural forest. Burning of the felled trees is made in the hottest month (April) of the year to get a thorough burn. Fire is used as a tool to clear the land and to suppress weed growth and crop diseases. This agriculture practice is very destructive to the environment and biodiversity. Crop production is just enough for subsistence.

A family needs about 25 hectares of forest to cut 5 hectares plot per year on rotation of 5 years for their subsistence. This method of agriculture is one of the most destructive activities to natural resource management as fire consumes all forms of life in that area. (See photo 11)



Photo 11. Shifting cultivation

Traditional sloping land agriculture

Many of the upland farmers are not aware of the bad effects of soil erosion to its full extent, because they are still ploughing their slope land fields across the contour (downhill orientation) to get quick drainage effect. The result is that with each heavy shower, large loads of valuable fertile top soil is carried away with the run off, reducing the general fertility of the soil. Crop production falls and the farmer have to use fertilizers to maintain crop yield. Organic compost fertilizers do not damage the soil structure but chemical fertilizers, when used inappropriately, cause permanent damage to the soil in the long run. Soil erosion and seepage of hazardous chemicals causes lots of harm to down stream farmers in the form of farmland deterioration due to sand deposition and water pollution (see photo 12 & 13).



Photo 12. Traditional slope-land agriculture (perennial)



Photo 13. Traditional slope-land agriculture (Annual)

Agro-forestry

Traditionally, agro-forestry is practiced by the rural farmers since way back from their ancestors' time, probably in a slightly different setting, compared to the present day designs. Most commonly practiced system is planting of trees along the hedges of the agriculture crop fields. The tree crops generally are species suitable for house posts, agricultural tools and fuelwood. Many farmers in the Central Myanmar plant toddy palm trees along the hedges for income generation from toddy sugars, leaves for roofing and fiber from leaf stalks for making various household containers. The fruits and male flowers of toddy palms are used as cattle fodder (see photo 14).



Photo 14. Agro-forestry

Trees such as mango, tamarind, jack fruit, etc. are also planted as hedge trees for income generation. *Zigphyus jujuba*, a common native plum is also planted wide spaced in the field for income. Choice of species can be different from locality to locality according to the needs of the marketable produce from the planted trees, e.g. crab apple and cassia for fuelwood, Eucalypt, bamboo for domestic use and walnut, avocado for income, etc.

The trees planted as such are for sustainable production of fuelwood, domestic use and income. The harvesting of fuelwood is by pollarding method, for some species annually and for others at a few years intervals. Farmers who have available land plant such trees in numbers enough for sustainable production of fuelwood. Those who does not have land plant communal tree groves in bare land near villages establishing private ownership of individual trees by individual villagers.

Forestry portion of agro-forestry system as commonly practiced in Myanmar can be regarded as eco-friendly activity which should be encouraged.

Forest Gardening

Community Forestry Instructions issued by the Forest Department in 1995 allows the establishment of agro-forestry plantations in the community forest areas. The original idea of agro-forestry is planting of agriculture crops along with the forest trees. In actual practice orchard crops such as fruit trees, medicinal plants, fast growing multipurpose trees (Bamboos, palms, rattan, etc.) are also planted as agro-forestry plots. Such plantations are intensively managed for maximum sustainable production and therefore can be regarded as forest gardening, planting forest trees along the hedges.

The following are some examples of forest gardening activities.

- Fruit orchards
- Bamboo plantations
- Nipa palm groves of Ayeyarwady Division
- Thanaka (*Limonia acidissima*) plantation
- Tea and Coffee plantations
- Mango plantations, etc.
- Private protected *Rhizophora* plantation

In the establishment of community forests, private ownership of individual plots within the community forest enhances greater involvement of the people thus ensuring more success. The Forest Department of Ministry of Forestry has also issued a notification permitting public involvement in Private Forestry for all species except teak. Community Forestry Instructions (CFI) should be reviewed by the authorities concerned to allow for certain modifications and to enhance the legal backing to the ownership and tenure of the community forests. If this proposal could be implemented, public interest will be aroused for the biodiversity conservation to a great extent (see photo 15).



Photo 15. Forest Gardening

Floating Island Agriculture (Hydroponics)

Floating Island Agriculture is a traditional way of agriculture practiced by the local inhabitants of Inlay Lake called "Inthas". This type of agriculture is unique to Inle, the second largest natural lake in Myanmar. These floating islands are formed from the dead parts of aquatic and marsh plants bound together by bog moss and algae, into masses of fen peat which float on the surface of the lake. (Sein Thet et. al 1999). These floating peat masses are cut into 6 feet wide strips of varying lengths. The black lake sludge is dug from suitable places of the lake bed and spread over the floating islands. The floating islands thus constructed are towed to suitable positions so as not to hinder navigation of motor boat traffic and they are anchored to the lake bed by bamboo poles.

These floating islands are used as growing medium for major cash crops such as tomato and flowers. Because of favourable water regime, all kinds of cash crops can be grown the whole year around generating good income for the "Inthas". Because of this fact, there is a tendency of proliferation of floating islands and the authorities have to restrict to the extension of such islands.

The effect of floating island agriculture goes both ways—good and bad. The good effect is the attractive income generation can ease of the demand for resources from the forests reducing environmental degradation. On the other hand, the bad effect comes from the utilization of chemical fertilizer and pesticides (see photo no. 16).

Ecotourism

The ethnic and cultural diversity of selected areas such as Inlay Wetland Bird Sanctuary, Alaungdaw Kathapa National Park, Natmataung National Park and



Photo 16. Floating Island

Hkakaborazi National Park can be tourist attraction areas of high potential for the tourist industry. The income generated from tourism can be of great help to restore the biodiversity and resource management.

Others

Other economic activities can include weaving industry, Blacksmith, Gold and Silver Smith and production of replicas of artifacts that can be sold to the visitors coming to the area. The people involved in these activities earn their living without dependence on the natural resources, thus helping in some way to the biodiversity conservation.



Conclusion

Myanmar is a country rich in ethnic diversity with over 130 ethnic tribes living together spread over the whole country. Along with ethnic diversity flourishes cultural diversity and indigenous technological knowledge (ITK) which are well adapted to the environmental conditions they live in. The existing ITK are generally handed down from generation to generation through village elders and village community groups. There can also be new ITK acquired through experiences over time. It is also noted that the ITK are mostly in favour of biodiversity

conservation and sustainable development, of which some technologies in the agriculture sector need to be refined through awareness campaign and practical field trainings.

It is also noted that religious and spiritual influences have considerable effect on the biodiversity conservation in all States and Division of Myanmar. It might be attributable to the teachings of Buddha which emphasizes the respect for life and contains many environmentally friendly principles. There is a long tradition of positive merit inducements for environmental protection. Buddha's proclamation "Planters of groves and fruit trees.... for ever doth the merit grow" is permanently etched in the hearts of Buddhists and act as a driving force for biodiversity conservation. Buddhist monks invariably have the tendency to protect the forest around their monasteries and give refuge to birds and animals in those forests. The idea of sustainable development has yet to be introduced in such protection forests.

By exploring the indigenous technology knowledge systems and the newly evolving conservation techniques, coupled with understanding of spiritual and cultural values and principles, problems relating to biodiversity conservation will become apparent and defined for us to develop our future efforts towards sustainable development.

References

Myanmar Forestry Statistics, 2006, Forest Department

A Glimpse of Indigenous Technologies and Practices for Integrated Watershed Management in Myanmar
Myanmar Forestry Journal

Community Forestry Instruction, 1995, Forest Department

Inle: A large Myanmar Lake in transition by Myint Su and Alan D. Jassby

Country Report on management and Conservation of World Heritage Sites, Draft Report (unpublished) by U Ohn, General Secretary, Forest Resource Environment Development and Conservation Association, FREDa, Myanmar.

Records of the Indian Museum, A journal of Indian Zoology, Vol. XIV, 1981.

The Green Buddha, by Dominic Nardi, Southeast Review of Asian Studies Vol. XXVIII (2006).

Relationship between Cultural Diversity and Biodiversity in Maolan Nature Reserve

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Abstract

Maolan Reserve is the most well-preserved and largest Karst Forest with relatively stable ecosystem in subtropical zone. The Buyi, the Shui, the Yao, the Han and other minority peoples live in the reserve. In the long-term interaction with nature, they had a close relationship with nature both in production and life. Because of distinct living environment and culture background, they have formed various traditional cultures, and these cultures have a close relationship with biodiversity conservation. For example, some laws of nature formed in cutting and gathering as well as instinctive worship to nature help foster the resource protection, whereas hunting and reclaiming wasteland destroy resource in turn. This paper discusses the problem of how to protect and develop cultural diversity, while meet the demand of biodiversity conservation at the same time. It further puts forward some good methods to meet the need and reduce resource consumption, including the transference from products to commodities, ecotourism, scientific growing and planting skills and so on, in order to make reasonable use of favorable ecological environment and selectively develop traditional cultures of minority peoples.

Key words: Maolan Reserve, cultural diversity, biodiversity conservation

On a macroscopic level, the relationship between cultural diversity and biodiversity reflects the relationship between man and nature. Although man and nature interact and interrelate, it is undeniable that man is a dominant and active factor. The geographical isolation formed by ranges, rivers and other complicated geographic environment helps promote the differentiation of biological genera, and it also leads to various cultures and differentiation of various peoples. Different types and numbers of biological resource distribute in different natural geographical zone, and this is the environmental condition and substantial basis for the growth of different cultures. Under distinct biodiversity conditions, the approaches and methods by which human adapt to the environment and make use of resource would vary, and owing to different adaptation processes, such distinction would also appear on cultural aspect accordingly. In order to protect the Karst forest

ecological environment in south Guizhou as well as to improve local economy and people's living standard, it is essential to study the relationship between cultural diversity and biodiversity, and to analyze the positive and negative impact on biodiversity by traditional culture, and to further explore the strategy to protect biodiversity and cultural diversity.

Background of Maolan Reserve

Maolan Nature Reserve is located in Libo County in southern part of Guizhou province, and its southeast is adjacent to Huanjiang County of Guangxi Zhuang autonomous region. It has a width of 22.8 kilometers from east to west, and a length of 21.8 kilometers from south to north, including 14 villages of 6 towns, i.e. Lihua, Dongtang, Wengang, Yongkang, Laocun, and Jialiang.

There are 8770 villagers in the region and most live in buffer zone and experimental area, but 204 people still live in core area. Minority people accounts for 90% of the total population, such as the Buyi, the Shui, the Yao etc, and they live in groups from generation to generation in the reserve. Living in the same forest, different people obstruct and intercourse at the same time, and thus lead to the coexistence of individuality and commonness of ethnic cultures. For instance, they have distinct languages, clothes, festivals and habits, but they also have similar production methods and the same belief which embodies the primeval idea of multi-god, a variety of colorful and splendid ethnic arts and the search for freedom of marriage. All of these compose a particular character of cultural diversity in Maolan Nature Reserve.

The Buyi people are a main local minority group in Libo County. According to related historical records and some evidence in language, geography, and particular character of culture etc, Buyi people dated back to a special branch named *Luoyue* of an ancient *Yue* group. Before Qin and Han Dynasty, *Luoyue* distributed widely, including north Guangxi and south Guizhou where Buyi people currently lives. After Han Dynasty, the name of *Luoyue* gradually disappeared in historical records, replaced by a unified name for minority people like *Li*, *Liao*. However, after Yuan Dynasty, *Zhongjia* appeared in historical records. Although *Luoyue* community had different names in different periods in history, almost all the features of Buyi people have a close clan relationship with ancient *Yue* people. The Buyi people had various names and characters before the PRC (People's Republic of China) founded, so by proposals of delegates from different regions in 1953, the State Council rectified and published a unified name - the Buyi.

The Shui people are also a main local minority group in Libo County. By textual research in historical events, language, culture etc, the Shui people also developed from *Luoyue* branch of ancient *Baiyue* group in south China. According to folk songs and myths, their ancestors originally lived in the riverside of the Yong River, but they left Yong River basin caused by wars and went up along Long River, which is currently known as Hechi and Nandan County in Guangxi, and finally settle down in Libo County and Sandu Shui autonomous region. Names of Shui people used to be *Sui*, *Liao*, *Miao* etc in the history, and it is confirmed as *Shui* in 1956.

The Yao people are one of the earliest residents in Libo County. There are three branches in this area, which originated from the same ancestor. Early before Yin and Zhou Dynasty, they broke through brambles and thorns, lived and flourished in this land. The Yao people have three different names – Yaolu branch, i.e. the Qing Yao call themselves as Nuhou; Yaoshan branch, i.e. the Baiku Yao call themselves as Dongmeng; the branch in the reserve, i.e. the Changshan Yao call themselves as Dongmeng. In different language, three names have the same literal meaning, that is people wearing our particular clothes. After the PRC founded, and with the group identification work carried out, three branches have a unified name – the Yao.

The Han people are an exotic group in Libo County, and only several hundred years ago Han people were immigrated to the reserve from Hunan province and other places, mainly distributed in Dongtang Village. They have lived in the same place with minority groups for a long time and had interaction on cultural aspects, but they still have a distinct Han tradition. Owing to the fact that few Han people live in the reserve and it is only a short-term exotic group, the cultural development is not elaborated here.

The Relationship between Cultural Diversity and Biodiversity

Culture is a social ecological adaptation to environment by human beings, so the cultural factors will be inevitably imprinted with natural environment. However, different peoples have different cultural background, different level of productivity, and different types of resource ownership, so they would depend on nature differently and the influence by environment on culture would also be different. Every ethnic group lives in a particular environment, and various environments make various methods of production and life, and thus form a variety of habits and customs, and cultural diversity with a distinct environmental character. Some methods have an obvious primitivism which has a great influence on biodiversity, but due to the long-term isolation and insulated resource circulation, the impact is still within the threshold of self-repair of natural environment. Some methods have already formed a simple nature value subjectively or objectively, which makes reasonable use of resource and has a habit

of biodiversity conservation. With the development of economy and culture, the influence of exotic culture and the pressure of social demand increasingly destroy the natural environment and pose a severe threat to biodiversity.

The Relationship between Production Method and Biodiversity

Production method best represents the developing process of a group, and it is the basis for the survival of a group.

Cultivation

Because of the well-preserved water and soil as well as favorable climate in Maolan Karst Forest, people in the reserve mainly carry out paddy-field farming with less soil and more fields. They mostly grow rice, and also grow some corns, soy beans, sweet potatoes and other crops. Owing to the slow process to form soil in Karst habit, the soil is scarce and with intervals on the slope, so the cropland primarily distribute in relatively flat bottom of depression. Such farming method uses the natural environment of depression - reliable source of water and fertile soil, and thus cut the production cost. The doline and trough valley ecosystem, which have similar biological community, were not influenced, and this ensure the completeness of the whole ecosystem. Nevertheless, except for the Yao people, the Shui and the Buyi people still have a custom of slash-and-burn cultivation, that is cut a piece of land on the slope and burn it, then grow rice, cabbages, pepper, indigo etc. The reason is that land fertility may increase temporarily by burning, and people can get a high output by a low input. Although this method is carried out with intervals in several pieces of land, it severely destroys vegetation, and results in soil erosion and rocky desertification. Once the land fertility is degraded completely, people have to find new land to burn, whereas this may sometimes cause mountain fire in a large area, which greatly endanger biodiversity. Therefore, it has been forbidden since the reserve was set up.

The agricultural tools used by Local people are strongly influenced by Karst habit. Due to the discontinuity of soil, the plough cannot complete the cultivation of stone corners. Local people invented a special tool named fanqiao (literally means turn over and pry), which is not only effort-saving and effective to stone corners, but also

a best tool for wasteland reclamation. This is because the weed on the ground surface will be turned over under the soil as green manure, and it increases fertility and penetrativity and helps the growth of crops. Plough, harrow and other tools are also necessary agricultural tools by local people. By experience accumulated for years, local people find that the handles of *Fanqiao* and plough made by *Handeliodendro bodinieri* are light, agile and durable, so *Handeliodendro bodinieri* is essential for most families to make tools. The seed of *Handeliodendro bodinieri* contains oil and wax, is a staple food source for *Sciuridae* sp. and ants, but it have a low germination rate naturally and grow very slowly, so people seldom cut *Handeliodendro bodinieri* for firewood so that it could grow large enough for agricultural tools. This idea still commonly exists in Maolan Reserve whereas it is forbidden in other places as *Handeliodendro bodinieri* is listed among the national first-class protection plants.

Gatherings

Gathering is a common hobby for all the communities in the reserve, and it is also a crucial part in their daily life which closely related with all the aspects of their clothes and food, shelters and transportation. One of the most important gatherings is to pick wild vegetables, for example, wild vegetables ate by Buyi people have as much as 87 species, and forest fruits are 66 species.^[1] The Yao people use *Dendrocalamus tsiangii* as firewood, lighting and main building material, and they are also use *Dendrocalamus tsiangii* to knit bamboo baskets, bamboo mats, bamboo box and other daily commodities, as well as handicrafts for decoration. The ancient paper-making techniques by Buyi people also use *Dendrocalamus tsiangii* as staple material, but fences used in production are mainly made of *Chimonobambusa* sp. and *Phyllostachys* sp. Some people have a habit of gathering insects to make dishes and complement protein, such as *Oxya chinensis*, *Hierodula petellifera*, *Cipangopaludina chinensis*. Gathing medicine is also an important part in local people's life. According to different customs, different medicines should be picked in different seasons and people would always pick the big ones and leave the small ones. Due to a small population density in the reserve, as well as their gatherings are mainly renewable resource, gathering is a good way to meet the demand of local people, without destroying biodiversity if these herbal medicines are not sold outside. Nonetheless, as

a result of outside demand and over-gathering, some species are becoming very rare in the reserve, such as *Dendrobium officinale*, *Pogonatherum crinitum* etc. Taking advantage of favorable environment, people now begin to grow these species and this slows the extinction of these species.

Hunting

Hunting was one of the most important financial sources for local people before the establishment of the reserve. Being a hunting group for generations, the Yao people have a particular tradition of hunting methods and tools, as well as unique ethics and beliefs. Almost all the adults of male Yao people own a hunting gun (power gun made by themselves) but the main hunting tools are iron pincers, bamboo pincers, loops, net traps and drugs etc. Yao people believe that python are holy animals which can bring winds and abundant rainfalls; monkeys are man's ancestors; magpies are holy birds that indicate happy events would happen, so these animals cannot be hunted. They also believe that crows, egrets, owls are ominous birds, once hunted, they would bring ghosts and evil spirits to revenge, so they cannot be hunted either. Except these animals, people may hunt all the other animals, ranging from birds in the sky and beasts on the land to snakes, frogs, fish, insects, and even bats in caves. Most of them are hunted for food, and Yao people enjoy hunting rats as food, and they also hunt thrush, *Bambusicola* sp. and other birds for entertainment. On the contrary, Buyi people mainly hunt animals with certain economic value, like chickens, beasts, snakes, *Rana tigrina*, *Paa exilispinosa*, and they especially like hunting *Rhizomys pruinosus*. The Buyi people seldom hunt small birds and beasts, and some ominous animals like crows and owls.^[2] The Shui people mostly hunt bigger animals, favor fishing, and have a habit of hitting snakes once seeing them. All of these hunting activities influence biodiversity conservation, and interrupt the biological chain, and result in the extinction of some species.

Cutting

Cutting is an activities carried out by all the communities living forests, and the main purpose is to obtain timber, firewood, raw material and reclamation. Cutting in itself threatens biodiversity, but objectively some taboos of cutting methods and in the cutting processes, may protect biodiversity. When building houses, the Buyi

and Shui people usually choose trees that are commonly seen or artificially planted. They seldom cut rarely-seen or valuable trees in the region, because some religions believes that these trees may be monsters, so cutting them is ominous. Besides, the sites for cutting need to be chosen carefully, for instance, trees grow in the riverside, around villages or near cliffs all forbid cutting, and this avoid soil erosion and potential earthquakes. In addition, one cannot start cutting trees more than one meter above the ground, and one cannot cut half of the trees then stop cutting. All the trees need a special rotproof process before they are used to build house. These ideas reduce the waste of trees and thrift in itself is a protection of resources. Yao people do not cut in large scales, because it is required that the shape of the forest should seem to be no changes after cutting. Although the main objective is to maintain the normal growth of bamboos and breeding of wild animals, it protects biodiversity objectively. The Buyi and Shui people also have the habit of cutting small areas without breaking off the renewable conditions of forest, and this provides possibility for the restoration of vegetation. All the peoples enjoy cutting bamboos as fuel, because bamboos are easy to germinate and have a small negative impact on vegetation. The greatest danger is to sell timbers or charcoal outside, as long as this link is blocked, biodiversity would be protected.

Raising and Breeding

Raising is the chief source of income and raw materials for making dishes of local minority groups. People mostly raise chickens, ducks, pigs, and cattle etc, in recent years, goat breeding was introduced. Except that pigs are raised in a pen, other animals are scattered and raised in the wild. All the feedstuff for pigs are picked in the wild, such as *Begonia peltatifolia*, *Hemiboea flaccida* etc. For a long time, pigs were fed with cooked food, and the cooking process required a large amount of firewood. However, most plants for pig feed are annual and perennial herbaceous plants, and people only pick the parts above the ground, so those plants and resources are not at risk. Besides, most firewood for boiling pig feed are naturally withered and rotten wood, so it does not threaten much to biodiversity. Raising chickens need to catch some small animals like insects, but these insects have a strong fertility and most are pests, and these activities are confined in a small area, so it also does not pose much threat. However, in a survey on reasons of hunting, we

discovered that 45.7% of hunting activities is to protect crops, fowls and livestock ^[2] but in Maolan Reserve these animals which pose threat to fowls and livestock are all protected animals, and this will endanger biodiversity. Some Shui and Buyi people have an idea that *without burning land, the soil fertility is low and cattle are weak*, which results in vegetation degradation in many places. These problems were gradually solved by measures like changing cooked feedstuff to raw feedstuff, from scattered raising to pen raising, and from picking wild plants to growing demanded plants, and all these measure have a positive effect.

Lifestyles

Production methods are the basis of life, and lifestyles are the purpose of production, and culture is the extension of these two factors.

Houses

Houses will always adapt to a particular ecological environment where they are built. This is a reasonable elaboration and exertion of combination of man and nature, and it shows a best adaptive state that human seek to achieve between dwellings and natural environment, and it is a record people create for a better life under the pressure of nature. So distinct traditional buildings and architectures are constructed by different peoples.

The Buyi, the Shui, the Yao people in the reserve usually use stone and wood to build stilts of Ganlan style because of hot and wet climate, and with lots of rainfalls and beasts. Their villages usually exist near flat dam, valley, mountains, and rivers, surrounded by old prognostic trees and lush forest. A village usually holds dozens and hundreds of households, and living together helps prevent the attack of wild beast and invasion of other groups. A wooden house often has three stories, and the wall is covered with boards- the first floor is to raise livestock in pens and store firewood, so it is mainly made of stones; the second floor is for people to live in, so the wooden house show the natural color of wood, and most of them are covered with black tiles, some cover with hays. Compared with the Shui and Buyi people, who mostly use board in the second and third floor, walls of the Yao people often use bamboo fences. The edge of eaves looks like a flying bird, and the whole house are simple, primitive and elegant. On the construction level,

it is connected all by tenons without any nails and rivets. Houses of *Ganlan* style usually adopt a structure of eaves covered by black tiles, and with streamline on two sides of the roof, made up of beams, pillars, dougong (a system of brackets in Chinese buildings, wooden square blocks inserted between the top of a column and a crossbeam). Buildings in some places such as Ban village are greatly influenced by Han culture, and the main body is wall made by earth, but they still built in a shape of stilts. Raising livestock on the ground floor, one the one hand, it is convenient to manage; on the other hand, it help prevent the attacks of wild beasts and stealing.

Although construction processes require a large amount of timbers, people are very economical, combined with stones, earth and other these building materials. It is not only fireproof and timber-saving, but also durable for a long time, reducing losses of timbers.

Most production and life tools in houses are made of natural products in the wild, for instance, the building materials are stones, wood, and bamboos; the wardrobes, desks, chairs, the weaving machines, the beds and mats are all made of wood, even wooden mouse-killing tools. It clearly shows local people's dependence on forests.

Food

Main courses of peoples living in the reserve are more or less the same – rice with vegetables and meat. Some people enjoy eating pupas, grasshoppers, silkworms, longhorn beetles, mantis and so on, and they often eat pupas of wild bees, honey bees and longhorn beetles, or pupas in pine trees and kudzu vine etc. Vegetables are grown in the reserve in recent years, and in the past people gathered wild plants as vegetables, including brakes, *Chinese toons*, *Erechtites hieraciifolia*, agarics, mushrooms, bamboo shoot and so on.

In the past, the Yao people usually have porridges or rice with corns, millet, sweet potatoes, cassava, taros, legume etc. Sometimes they only eat boiled potatoes, or *ciba* (a special cake, grind the cooked glutinous rice and then pounded into paste) made by powder of grains and potatoes. This mostly results from the low production of rice. People stew or boil rice with wok on iron tripod or earth stove, and they also roast or bake food, such as roasted sweet potatoes and other potatoes, roasted bamboo shoots, baked corns and *ciba* etc. In addition,

the Yao people have a habit of eating cold food, and when making food, they take convenience into account—whether the food is easy to carry and store or not, so their favorite food are *Zongzi* (dumplings made of glutinous rice wrapped in bamboo or reed leaves) and *Zhutong Rice* (rice boiled in a bamboo utensil). During the break of work, Yao people sit together on the ground, sharing all the dishes, but they only eat the main courses brought by themselves. Commonly-eaten vegetables contains various kinds of beans, green grocer, radish, peppers, as well as preserved or pickled bamboo shoots, mushrooms, agarics, brakes, *Chinese toons*, *citron*. People often have meat salted and dried, stir-fried or boiled with some salt and less seasonings. Yao people enjoy bland vegetables, and almost boil them only with water and a little salt. Some may dip into a liquid mixed by salt and peppers, in order to keep the original taste of vegetables, whereas they enjoy meat with a heavy taste, no matter fresh meat or salted meat, they will first bake to yellow and then boil them. Yao people are good at catching migrant birds, toads and bats etc., and making into unique and savory dishes. For example, small birds was not deboned and chopped into small parts, then stir-fried with shallots, ginger and peppers; it tastes tender and crisp. As to pupas, by quick-fried in the oil until the color turn golden, it smells savory and tastes crisp, and certainly is a great dish to go with wine. Most Yao people forbid eating cats or snakes. They enjoy wines made by fermented glutinous rice, whenever they go out, they would put the wine in *Zhutong* (a tube-shaped container made by bamboo) and drink with water.

Buyi people are good at drinking a low degree, self-made rice wine and corn wine. They mainly eat pork, beef and dog's meat, and when festivals or celebrations come, they enjoy glutinous rice, glutinous rice and glutinous wine. Pickled Chinese cabbage is a necessary in each meal. Dog's meat is a favorite of Buyi people, and it is a best treat and dish for guests and festivals. The Shui people are similar to Buyi people in diet, but they prefer fish, esp. growing fish in their own paddy field, and Shui people must have fish over festivals of Shui people. It does not threaten biodiversity to gather wild plants and catch insects, but some hunting methods of Yao people pose a great danger to certain species. It is an important way to develop the raising industry of fowls and livestock in order to increase the amount of meat.

Clothing

The Buyi, the Shui, the Yao peoples in the reserve all keep a traditional pristine clothing style, as well a variety of clothing culture and arts. Different peoples have different clothes, and even the same branch may vary in dressing styles due to geographic differentiation. Therefore, a variety of simple but mysterious ethnic costumes form a gorgeous and colorful ethnic clothes culture.

Females of Buyi people wear round-neck short blouses and long trousers; the collars, cuffs, rim of coat and trousers are all decorated with purple. They have blue coif, embroidered shoes, and silver chains and embroidered waistcloth. Their costumes are mainly green adorned with a special silver head ornament called *Zha wan*, which is made by dozens of silver chains into a semi-circle with a variety of pendants like shape of sun, flowers, fish, shrimps, birds, goose and so on. They also wear silver earrings, bracelets and finger rings, shining and dazzling. All the clothes except costumes are made of self-weaved batik and Buyi cotton, and the patterns and designs contains sun, ripples, fish and shrimps, flowers and birds, ox and goats and ancient characters or seals etc. Men's clothes vary according to ages and styles. The senior mostly wear blue-green gown and long trousers, or a kind of Chinese-style jacket with buttons in the front. They have green coif or small hats, green cloth belt, cloth socks and wide shoes, whereas the young usually wear the Chinese-style jacket. Due to the early and close interaction with Han people, clothes of Buyi people are severely assimilated by Han clothes, only remaining some ornaments with ethnic styles.

Young women of the Shui people enjoy tops made by *Shui jia bu* (literally means cloth made by the Shui) with bright color like azure, blue, green etc. Weaved by females of Shui people, *Shui jia bu* have fine texture, durable trait, and many colors to choose like green, blue, indigo, so it has been famous for than hundred years ago. Shui people created an original painting and dyeing skill by bean milk, which is said to have a history of more than 700 years and favored by many people. Women's clothes are mainly made of *Shui jia bu* - the tops are semi-gown or gown as long as knees and without neck, and the trousers are dark-blue. They have colorful brocade as belt, green coif on head, embroidered shoes with pointed front part. Adult women have long hair coiled and adorned by wooden or silver combs. When festivals and celebrations

come, they will wear silver necklaces, bracelets, and head pins. Males of Shui people also wear green coifs, Chinese-style jackets and long trousers, and some wear gowns.

There are three different clothing styles of Yao people's in Libo County, and in the reserve there are Changshan Yao people. Males of Changshan Yao have long hair and coil up in a shape like cone. They wear green gowns and coifs, and there is a square pattern in the middle and two sides of the coif separately. When wrapped up, one square pattern is in the forehead, the other is behind. Females wear green coifs and silver hair pins, and they have a special design in the left front of the garment which has no buttons. And they wear *beipai* outside, which is embroidered with large square patterns, and five to nine flat necklaces in front. Besides, they wear batik pleated skirt and long thick stockings with embroidered laces. Males like black, so they wear black coif, with a long hem of jacket and long trousers. Tops of females are without neck and decorated with laces; they have embroidered *Beipai* on back and pleated skirts which is about 40cm long. They also have a special design on skirt, which is cover with a long and narrow cloth in front, a short and wide cloth behind. Wrapping this for several times makes a bumped bottom, and this is considered as beauty by them. This shows that local people give priority to procreation, while health and physical strength is a symbol of strong fertility, and thus people favor big breast and bumped bottom. People wear black stocking on leg in order to keep away from thorns. The fabrics of clothes are mainly self-grown and self-weaved, and people spin, weave, dye, and embroider all by themselves.

Clothing of ethnic peoples are often related with nature, and their ornaments and patterns all come from nature, and dye materials like *Indigofera tinctoria* and *Dioscorea* sp. also obtain from the wild. Besides, their dressing style is closely linked with natural environment, which is convenient for their activities in Karst landforms.

Entertainment

Songs and dances origin from life, but it is a product of spiritual activities, which exist in working, falling into love, drinking and eating, marriages and funerals, and festivals and ceremonies. Local songs are divided into ancient songs, wine songs, love songs and sacrifice songs etc. Wine songs mainly sing in occasions like marriage banquets and binge drinking. During the banquet or after

it, the seniors often use the tunes of wing songs to sing a song with national history, legends, stories and pay a tribute to national heroes, and this makes the ancient songs. Love songs are sung by young men and women to express their affections, with a strong rhythm and pleasant melody, and the lyrics use some rhetoric like metaphor and indication. Sacrifice songs, a.k.a speaking with ghost, is sung by *Guishi* (literally means ghost's master) in some superstitious sacrifice activities. Although this kind of songs is full of superstition, the content always involves some deeper level of ethnic awareness and traditional ideas. Most songs start with a description of natural scene, and then compare with a certain event, including some rules of nature.

Dances are the art form of working scenes, which indicate the developing process of a nation. *Lusheng* dance of the Shui people do not have a number limit. The person who plays the *Lusheng* wears colorful silk dress with feathers of pheasant's tail, and the music starts with small *Lusheng* and is later accompanied by middle and large *Lusheng*. Young women dress up with silver ornament, dancing with the leading dancer.

Buyi mop dance is an activity in funerals to console the dead. Mid-aged men and women gather together and sit in order on two sides of a big wooden trough, and in the two rows two people sit opposite each other, holding a bamboo mop with a length of 30cm. A adept man is the conductor, hitting the big trough and making a sound like *dong dong dong*; other dancers then follow this tempo, wave the mops from slow to fast, and then from fast to slow and again in circles. The sound of beating the trough and the sound of waving the mops combine perfectly, with a good rhythm. This kind of dance is always performed until midnight.

Buyi timbal dance is accompanied with beating timbal, and it is also for funerals. When an old Buyi people pass away, people will beat timbal for condolence. It is performed in the house, starting with timbal and accompanied by large drum. Numbers of people joining the performance should be even, and four people at least, more could be dozens of people. The movement of this dance is similar to the Yao people's hunting dance. Each performer holds a 2-meter-long pole, standing in two rows, or a single circle or double circles with a smaller inside. Dancers hit the ground with pole or beat each other's poles, sometimes left, sometimes right, and the

movement is intense and fierce, with a quick tempo.

Yao people's hunting dance is performed by eight to twelve men, each holding a 2-meter-long stick, hitting with each other, and imitating behaviors of different animals. This combines dance and stick play, with strong movement and intense atmosphere, very breathtaking. Monkey and drum dance is also for wizard to perform in funerals, and the performer is solely a male. The dancer is half squat and dances to the wooden drum, beating the drum with two hammers, and at the same time hitting the hammer with each other. Ups and downs, left and right, fast and slow, he dances gracefully and vigorously, where others imitate the behaviors of monkeys, climbing and hopping, over mountains and across water, very interesting and particular.

Ethnic musical instruments are a kind of entertainment discovered in nature and invented by local people. *Lusheng* is a kind of bamboo pipe wind instrument used by the Miao, the Shui, the Buyi, the Yao and other ethnic peoples. It is made up of six bamboo tubes, each tube have a hole and a bronze reed. Small lusheng is only eight to nine *cun* (Chinese unit of length, 1meter = 30 *cun*), where as large lusheng can as long as seven to eight *chi* (Chinese unit of length, 1meter = 3 *chi*). *Timbal* is a kind of bronze musical instrument used by the Miao, the Buyi, the Shui, the Yao and other ethnic peoples, usually for festivals and funerals, and different occasions with varied beating methods. In festivals and celebrations, *timbal* needs the accompaniment of big drum, as well as a wooden barrel in order to increase the sound effect and create resonance. On the contrary, *timbal* does not need the accompaniment in funerals, so that the sound is low and deep, creating a grieved and somber atmosphere. Companion *Xiao* (a vertical bamboo flute) is made up of two *Xiao*-one with high pitch, and the other is low. It is commonly used by the Buyi people with a soft and pleasant tone, sounds like a duet. Single string *hu* is similar to *erhu* (a.k.a. *urheen*), and used by young people of the Yao to show their love and affection at night. Besides, *piaolilie* is a kind of bamboo percussion instrument used by Yaoshan the Yao people, and many are performed together like a sound of drum.

Songs, dances and musical instruments all fully demonstrate the mystery of nature, and show the rule of discovery by people livings in nature.

Funerals

The Buyi and the Shui people have a tradition of inhumation, and only young people who are not dead naturally are cremated. The coffins are made of *Podocarpus macrophyllus*, *Zenia insignis*, *Keteleeria calcarea*, *Pinus kwangtungensis* and *Calocedrus macrolepis*, and other timbers. In the past, the Yao people use *cave bury* (a.k.a cliff bury), but the Changshan Yao people have changed to inhumation, and the conventions are totally different from the Buyi people nearby. No matter what ethnic group it is, the mountains with tombs are always lush with forests. All the trees and flowers are strictly protected, and nobody is allowed to destroy, and thus forms the culture of holy mountains. The paradox is that one the one hand inhumation consume a large quantity of timbers, one the other hand, the culture of tomb mountains provide a haven of many rare species.

Medicine

The Yao people are good at picking herbal medicine which is used to cure illness and strong body. These species includes *Radermachera sinica*, *Alocasia macrorrhiza*, *Arisaema lbatum*, *Ganoderma sinense*, *Pyrrhosia lingua*, *Aristolochia tuberosa*, *Alpinia chinensis*, *Epimedium sagittatum*, *Spiranthes sinensis*, *Dendrobim sp.*, *Bletilla striata*, *Bulbophyllum inconspicuum* etc. Long living in the forest, the Yao people invented a peculiar folk prescription for detoxification, which needs *Taraxacum mongolicrrm*, *Gardenia jasminoides*, *Mussaenda pubescens*, *Galam aparine*, *Kalimeris indica*, *Commelina communis*, *Verbena officina*, *Duckesnea indica*, *Potentilla freyniana*, *Polygala japonica* etc. They also made a special liquid for bath, so few Yao people have a skin sickness, and this magic bathing liquid includes mint, *Xanthium sibiricus*, *Pilygonum hydropiper*, *Potentilla kleiniana*, *Clerodendrum japonicum*, *Mahonia bealei* and so on. However, Yao people do not like to prepare medicine in advance or keep or sell them. The Yao people enjoy brewing tea by cinnamons and gingers, for they find this kind tea is good for refreshing and relaxing. Moreover, some Yao people prefer oil tea, and they not only drink everyday but also treat guests. The Buyi and the Shui people also have their peculiar tradition in medicine. For example, the Buyi medicine believes that any kinds of plants and animals can be used as medicine, even vegetables and fruits. And the Shui people combine

medicine with sorcery, using some rare plants and animals as raw materials.

The Yao people follow certain rules to pick medicine, and they are very practical and seldom keep medicine. However, the Buyi and the Shui people have a habit of store medicine, and in recent years, they have started to pick and sell medicine for extra income. The Yao people usually pick the big ones, leave the small ones, whereas the Buyi and the Shui people always pick them all. And thus some commonly-seen plants like *Dendrobium officinale* were rarely seen now mainly because they are picked to sell.

Belief

Belief is the prime accumulation of ideas and values in ethnic culture.

Religion

The Buyi, the Shui, the Yao people all have a religious belief of nature, and they believe everything has a spirit, and worship the God of Thunder, Village, Mountain, Tree and Water etc, for they may bless people and keep the safety of man and livestock. Therefore, every village builds the Temple of Land, and performs sacrifice every year to pray for the peace, prosperity and harvest. They hold that the God of Thunder can bring winds, clouds, and abundant rainfalls which lead to a plentiful harvest, so they have a special ritual to sacrifice the God of Thunder. After the sound of thunder, the whole village aggregate in front of the Temple of Land, kill pigs and chicken and burn paper moneys. Many villages set up a small temple to offer the trees and stones, which are considered with a deity. These peoples have many sacrifice celebration, like the sacrifice to mountains, to trees, to bridges, and the third day of March or the sixth day of June of Buyi people, as well as *Mao* (fourth of a unique Chinese duodecimal cycle) festival of the Shui and the Yao people. They also believe there exist some devils, which commit all sorts of wickedness, so they blame these devils for all the abnormal phenomena, disasters caused by nature or men, wide-spread plagues, pains, sicknesses and the loss of property etc. And they invited wizards and witches to augur and talk with these devils in order to eliminate disasters and adversity. When a child is ill, they will invite *Guishi* (literally means ghosts' master) to get back the lost

spirit; when a woman is not fertile, they will invite witch to bring a child. ^[3]

Except for the superstition of gods and ghosts and the worship of ancestors, they also believe in *bazi* (literally means eight characters) as fortune-telling. They hold that everything is made up of five things, i.e. gold, wood, water, fire and earth, and the birth of man comprise eight characters of year, month, date, hour both in heaven and earth. Thus, they will try to make up a certain thing once someone lacks. For example, if someone lacks wood, they will sacrifice the trees for a blessing; if someone lacks gold, they will sacrifice the stones for health and long life. In addition, they have some taboos in daily like, like avoiding others' pigs and ox to enter the door, abstaining snakes in houses and disliking pregnant women go to someone else's houses.

Shui Shu (characters of the Shui people) contains weather, seasons, birds, beasts, and many other things, and these characters are recorded in local history of Duyun City and Sandu County. With ancient symbol styles, *Shui Shu* is similar to oracle bone inscription and inscriptions on bronze, and it also looks like *Da Zhuan* (Guzhou a.k.a a big seal character, an ancient style of Chinese calligraphy, adopted in the Spring and Autumn period and Warring States Period, before the Qin Dynasty) and *Xiao Zhuan* (Hsiao chuan a.k.a small seal character, an ancient style of Chinese calligraphy, adopted in the Qin Dynasty for the purpose of standardizing the script). Some think it comes from *I Ching (the Book of Changes)* and *Luo Shu*, others think it originate from hieroglyph of the Han people. Early scripts were written by hand, using bamboo sticks with ink, but later they are written with *Maobi* (Chinese brush pen). Some of these character look like pictures and symbols, others look like the overturned, leaned, or reversed form of *Kai Shu* (regular script, a popular style of Chinese calligraphy until now). Besides, some Gui Shi also write secret characters, known as *Fan Shu* (reversed character) and *Mi Zi* (secret letters). The main purpose of *Shui Shu* is for augury and divided into two types- auspicious and ominous. Whenever there are illnesses and funerals, marriages or constructions, Gui Shi will be invited to choose a auspicious date according to *Shui Shu*. The catalog of *Shui Shu* includes books for read, books for read loud, books of times, books of directions and constellation etc.

Activities related with nature are also contained in these ethnic religions, for example, Shui Shu recorded that one will be punished by gods if hunting at a wrong time. These taboos and tradition are more effective than laws to them at most of the time.

Traditions and Customs

Festivals are contracted activities by long-time interaction between local people and nature. In addition to Spring Festival, Qingming Festival, Dragon Boat Festival, Mid-autumn Festival, local people in the reserve also have their own special festivals.

The Shui people usually hold the grandest ceremony during *Duan Festival*, and the date is counted by the Shui calendar in Shui Shu. The Shui calendar also divides a year into twelve months and four seasons, but the first month is September and the last month is August. This festival starts from the twelfth month to the second month in Shui calendar, that is late August to early October in Chinese lunar calendar. Different groups have this festivals in turn at day of *Hai* (the last branch of the twelve Earthly Branches, used in combination with the Heavenly Stems to designate years, months, days and hours). *Duan Festival* is also called *Gua Festival*, and the sequence for different groups to celebrate the festival cannot be reserved or mixed.

The Buyi people also have their own festivals, like *San Yue San* (the third day of March), *Liu Yue Liu* (the sixth day of June) and *Liao Nian*. *Liu Yue Liu* is the most important traditional festival, and they will worship ancestors, pray for harvest, sings and dances. On that day, every family will kill ox or pigs or dogs, make *Zongzi* (dumpling made of glutinous rice wrapped in bamboo or reed leaves) and worship their ancestors. *San Yue San* is a day to sacrifice the God of Stove and Mountain, all the villagers will join in the grand gathering, hilarious and splendid. One great distinction between *San Yue San* and *Liu Yue Liu* is that the former one does not allow any people outside the village. The Buyi people call the last day of the first month of a new year as *Liao Nian*, and they will eat the fried round *ciba* and worship ancestors, which marks the end of a new year celebration and it is the time for farming in spring.

Most festivals of Yao people are linked with myths, like *Si Yue Ba*, *Shua Ge Tang*, King of Pan, Spring Worshipping, Danu etc. Every *Si Yue Ba* (the eight day of April in Chinese lunar calendar), Yao people will boil Wumi rice, and girls will have a picnic with colorful eggs, *ciba* and candies. If boys peek furtively or steal a quick glance, they will be punished. *Shua Ge Tang* is celebrated around the sixteenth day of October in Chinese lunar calendar in order to worship ancestors and felicitate harvest. The length of this festival varies from three days to nine days. Every family will prepare rice wine and *ciba* to treat guest, and many young men and women will choose a marriage partner on this occasion. Once a man and a woman fall in love with each other, the parents of two parties will have a matchmaker to arrange marriages with presents like pork and wine. They will have a grand banquet on wedding, and it is a tradition to invite the seniors in the village and the bride and groom will have a special type of drinking called *Jiao bei jiu* (a rite of drinking from nuptial cups by the bridegroom and bride on their wedding day).

The yellow rice and colorful rice are often provides during all festivals. And the dyestuff all come from natural plants like *Callicarpa japonica*, *Liquidambar formosana* and so on; the seasonings are *Zanthoxylum esquirolii*, *Litsea pungens*, *Allium Macrostemom*, cinnamon, gingers etc.

The Positive and Negative Impact on Biodiversity by Cultural Diversity

From the analysis above, we find that in the basic relationship between man and nature, the adaptation to environment and exploration of resources are the cradles of cultures. Human beings adapt to the particular ecological environment, make sustainable use of resource by a particular culture and thus reach a dynamic balance. That is to say current environment is in fact the result of dynamic balance between local culture and nature, whereas the invasion of exotic culture and the pressure of population are trying to disturb the current balance.

Activities which have a positive effect on biodiversity contain: in farming, the arable land mainly distribute in the relatively flat bottom of depression land; in gathering, pick the big ones and keep the small ones; in hunting, some animals with divinity cannot be hunted; in cutting, certain taboos and rules protect biodiversity by determining types, methods and location of cutting; in growing, eat the upper part of annual plants, and use

withered trees as firewood; in building, be thrifty with the material, and by mixing with stones and earth, it is fireproof, economical and durable. Moreover, people enjoy eating pupas, grasshoppers, longhorn beetles, mantis and other pests; in funerals, the cave bury and tomb mountains; in religion, all the Buyi, the Shui, the Yao people worship nature, and believe that everything has a spirit, and the divine trees and stone and so on. All of these culture have a positive effect on biodiversity conservation.

Activities which have a negative effect on biodiversity contain: in farming, the Shui and Buyi people have a slash-and-burn tradition, which lead to soil erosion and rocky desertification, and they also have a fallacy that *without burning land, the soil fertility is low and cattle are weak* and this pose threat to biodiversity. In hunting, the Shui people have a habit of *hitting snakes once seeing them*; in gathering, some protected species are main objects, such as *Begonia peltatifolia*, *Hemiboea flaccida* etc. In addition, some animals, hurting fowls and livestock are protected animals; inhumation is popular in the Buyi and Shui people but coffins are made of fir, *Zenia insignis*, *Keteleeria calcarea*, *Pinus kwangtungensis*, *Calocedrus macrolepis* and other rare trees, and the Changshan Yao also change to inhumation. And the Buyi and Shui people will pick all the herbal medicine at a time and sell them outside. All of these activities have a negative effect on biodiversity conservation.

As we know, the ethnic culture and biodiversity flourish and vanish hand in hand. Generally speaking, the growth and development of ethnic culture rely on the classification, quality, diversity and richness of ecological environment. With the impact of exotic culture and the drive of economic interest, the harmonious existence between man and nature is going to disappear. For example, many species of bamboo are abundantly used in production and life; the dyestuff for the yellow rice and colorful rice are extracted from natural plants like *Callicarpa japonica*, *Liquidambar formosana* etc.; the seasonings also come from nature, including *Zanthoxylum esquirolii*, *Litsea pungens*, *Allium Macrostemom*, cinnamon and gingers etc. And the dyestuff for dyeing fabrics also comes from the wild like *Indigofera tinctoria*, *Dioscorea* sp. Nonetheless, people still show a close connection with nature, like clothes and dances of the Yao and the Shui people. These present a harmonious

existence of man and nature, and form a particular culture of Karst forest.

The Inheritance and Development of Cultural Diversity

Local cultures occurred a great realistic meaning, but with the passage of time and changes of environment, some traditions may gradually evolve into some out of time behaviors. We should recognize the positive aspect of ethnic cultures, although without intention subjectively, they objectively protect biodiversity. In fact, some tradition contains the idea of harmonious existence of man and nature. For example, forest is like mother's milk, and it is the sole way for survival of Yao people, so they exert to protect forest and make reasonable use of forest and related resource. It is best evidence why Changshan Yao people live in the mountains, and their villages are surrounded by big trees and lush forest. Another example is that the Buyi people believe all the animals and plants in forest have spirits, and like human, they only have one life, so they respect animals and plants, and never waste resource. Never wasting is an important aspect of biodiversity conservation in itself. Worship of the God of Mountain and the God of Tree and some other taboos on hunting also protect species objectively. Meanwhile, it is important to notice that with the development of social-economy and the explosion of population, the pressure on environment is increasingly aggrandized. If the awareness level still remain the same- profuse resource are at the disposal of human, if the primitive production method of direct use is still being adopted, the biodiversity will be damaged. Therefore, with the strong impact of exotic culture, it should be emphasized in the future on how to protect and inherit the positive culture, deserting obsolete traditions which contradict with reality.

Respect traditional culture in biodiversity conservation

It is proved that local people have a strong awareness to protect their own culture, but it cannot fully exert and develop due to other dominant cultures, and some ethnic cultures are in danger. It is difficult to protection biodiversity and cultural diversity by laws and regulations or publicity and education because local people highly depend on mountain resource in

production and life, and policy of public participation cannot implement effectively. Therefore, the sustainable strategy, which adjusts to local social, economic and cultural characteristic, is in great demand so that local communities will actively participate in the protection and development. And this requires the respect to local traditional culture.

When Maolan Reserve just established, local community did not understand the true meaning and management methods, willing to be divided into the reserve. However, their production and life were not improved after the establishment of the reserve, and their production activities were greatly restricted. On the one hand, people need to live and it was hard to change an established lifestyle, and there was no condition to change; on the other hand, administrative bureau of the reserve strictly conformed to the laws and regulations, without considering the difficult life of local people. As a result, there existed antagonism and conflict; what's worse, some local people were sent to prison because of hitting the administrative officers. Then local people changed from direct conflict to passive compromise and even hatred. Obviously the administrative officers were not welcomed in the village- they had no place to live, no food to eat, no water to drink, and nobody was willing to give a direction. It was more and more difficult to manage and the antagonism was increasingly aggravated. The reserve finally changed their managing methods- they made friends with local people, knew their hardship and adversity, met their demand, volunteered to help them, respected their customs and ideas, guided them to explore natural resource in a reasonable way, and allow them develop positive part of traditional culture. In this way, local people no long confront with the reserve, and are willing to participate in the conservation work.

Use traditional culture to promote biodiversity conservation

Local people seldom meet with exotic cultures, and some people esp. women and children even cannot understand *Pu tong hua* (standard and widely-used Chinese). It is very effective to compose some songs in their languages, and the lyrics come from the knowledge of natural protection, fire-preventing, national policies etc. The reason is that fires are mainly caused by the carelessness of women and

children, and it is mostly women who involve in cutting and gathering activities.

In local communities, the rules of village and people's contracts are no less than the national laws. It is also very effective to add environmental protection and reasonable use of natural resource in these rules and contracts. In addition, beliefs of local people are greatly related with nature, and it is essential to help them exert and develop these beliefs.

By encourage the positive cultural behaviors and beliefs, and exploring the local experience of utilizing and managing biological resource, it not only mobilizes all the ethnic people to participation in biodiversity conservation, but also preserves cultural diversity.

Therefore, we should try every possible way to use ethnic knowledge and culture in biodiversity conservation action plan, and use them in the decision-making process of protection and development. We should also fully develop the initiative of local people, and let them join in the conservation work. Only local communities obtain their merited benefit and play an important role in the protection of biological resource, the biodiversity conservation can actually be achieved. Consequently, it is an important strategy to employ local knowledge and cultural belief to strengthen the natural protection.

Selectively develop traditional culture

Local people have a deep understanding of their own culture, but in a society centering on the economic development, their traditional culture is far away from industrial civilization, so it does not win enough recognition by outside world. In order to develop economy, they neglect some merits in their traditional culture, ignoring that some good traditional culture have a great potential for economic development. Once they realize the importance of traditional culture in economic life, they will regain the identity and superiority of traditional culture. For instance, the reserve organized some community representatives to visit Leishan the Miao village, and they were extremely excited to compare cultural differences and conceive the potential and extraction of their own cultures.

After agricultural civilization and industrial civilization, ecological civilization will come to stage. There must be some negative effect of traditional culture from the

aspect of ecological civilization- for example, hunting activities lead to the extinction of many species, but most traditional culture can be guided to develop in a right direction, which not only achieve economic development but also achieve cultural inheritance - for instance, Maolan Reserve explore the artistic and esthetical value of traditional culture and promote the transference from products to commodities, and these play an critical role in economic development. Besides, some local products like colorful cloth, embroideries, bandhnu^[4,5] all have a great economic potential. Guiding them to enter market not only achieve cultural inheritance but also benefit local communities. Moreover, ecotourism can attract social attention, also help the inheritance of this culture, such as *Nuo xi*, dances, wine-making, traditional marriages and funerals etc. And scientific growing and planting skills and extra fund are needed to develop traditional medicine and wild vegetables in order to meet the demand of traditional gathering and medicine. In addition, people may plant certain species of tree, which can be used to build traditional buildings and keep ethnic architecture, and alternative energy should be built in villages in order to reduce the loss of resource and labor, and thus decrease the production pressure and promote ethnic cultures.

Reference

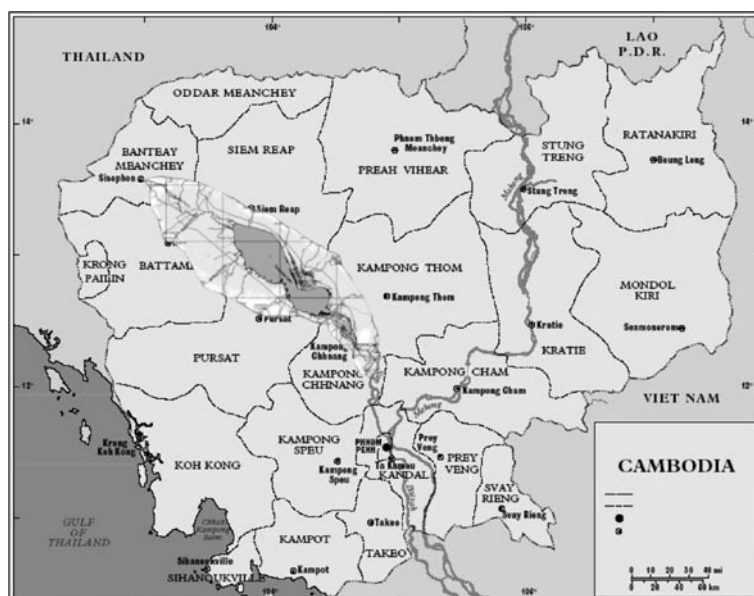
- [1] Chen Zhengren, Jiang Zhongcheng, Yu Dengli, Chen Huiming, Yu Ping, 2001, Study on National Botany of Traditional Edible Plants for Buyi Minority in Maolan. *Ecological Research on Karst Forest* (3)
- [2] Ran Jingcheng, Chen Huiming, Chen Zhengren, Yu Dengli and Yu Ping, 2001, The Present Situation of Poaching and Wildlife Conservation Measure in Maolan Nature Reserve. *Biodiversity science*, 9(4):482-486
- [3] Chen Zhengren, Yu Dengli, 2001, Study on Yao Minority Traditional Culture and Bio-diversity. *Ecological Research on Karst Forest* (3)
- [4] Ran Jingcheng, Zhu Jinyi, Tan Longjing, Zhang Yanquan, Den Bilin, 2003, Approach of Exploring Women's Capacity and Improving Women's Status in Rural Community. *Guizhou Agricultural Science*. 31(1):51-52
- [5] Ran Jingcheng, Zhu Jinyi, 2007, Application of Community Development to the Conservation of Karst Vegetation. *Tropical Forestry*. 35(T):52-56

Community Participation in the Management of the Tonle Sap Biosphere Reserve

Dr. Neou Bonheur
 Permanent Deputy Secretary,
 Tonle Sap Biosphere Reserve Secretariat

Country Profile at a Glance

- Land Area: 181,035 Km²
- Forest area: 52.3%
- Arable land: 3,700,000Ha
- Rice farm (CEA, 2007): 2.44 million ha
- Protected areas: 18.5%
- Potential oil and mineral resources
- Freshwater per capita (WB 2004): 38,136m³



- Population (MEF, 2006): 14.2 million, with annual growth rate: 2%
- Life expectancy (WB, 2005): 57
- Adult literacy rate (ADB, 2003): 68%
- Poverty headcount rate (CEA, 2007): 35.1
- GDP per capita (MEF, 2006): US\$506
- GDP growth rate (MEF, 2006): 10.4%
- FDI (WB 2005): US\$ Mill. 379.2
- ODA (WB 2005): US\$ Mill. 537.8
- Agriculture contributes 34.2 % of GDP, where rice makes 18.9% of GDP
- Fisheries contribute 7.9% of GDP
- Access to improved water source (WB 2004): 30% (26% in rural, 56% in urban areas)
- Garment, construction, agriculture and tourism are the major driving force for Cambodia economy

- TSBR aims to reconcile biodiversity conservation with sustainable development.
- TSBR establishes zoning:
 - Core Areas, ca. 42,257 ha of important wetlands;
 - Buffer Zone, ca. 541,482 ha of wetlands;
 - Transition Area, of some 899,600 ha.

The Tonle Sap Biosphere Reserve encompasses natural, economic and cultural values

Natural

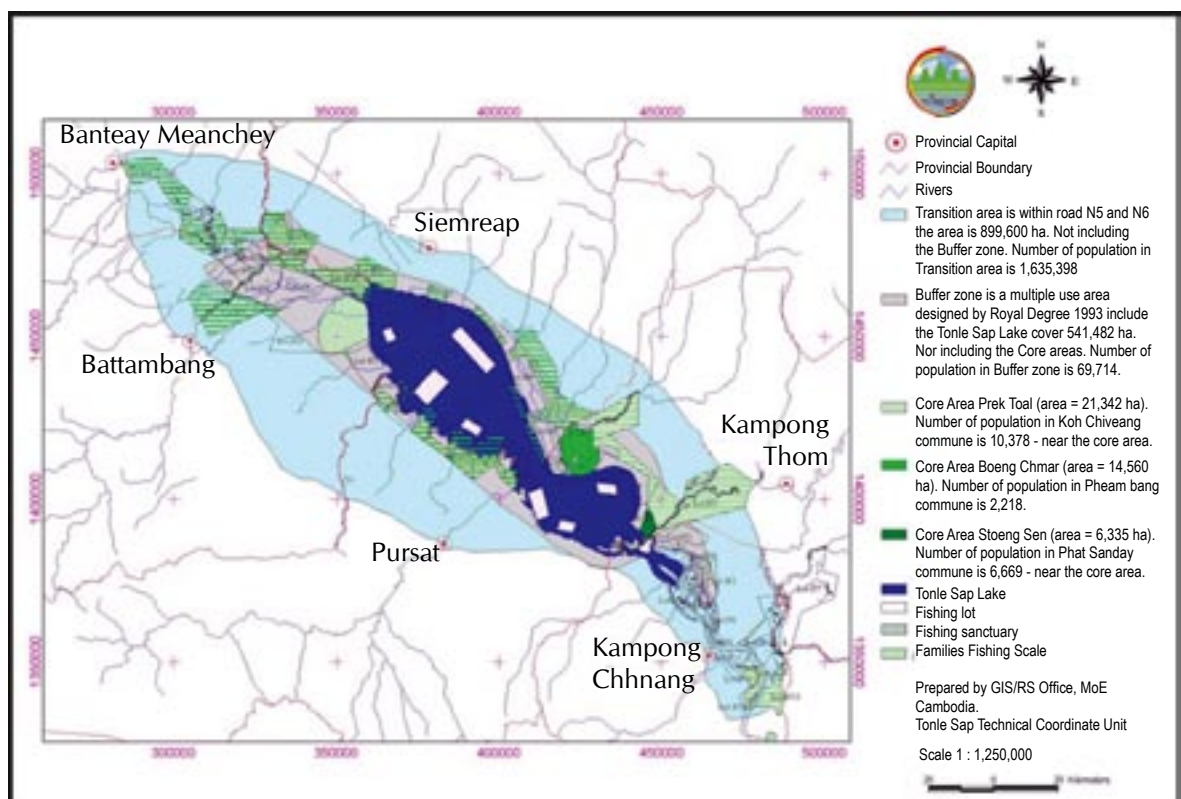
- Biodiversity Hotspot, containing large flooded forest, globally threatened bird and animal species.
- Unique Hydrological Regime.
- Important wetland in the Mekong River system.

Economic

- Directly supports more than a million people.
- Large volume of water for use.
- Productive freshwater fisheries.
- One of Asia's largest rice bowls.
- Attractive Tourism destination.
- Potential Oil and gas.

Tonle Sap Great Lake

- Designated as a Multiple Use Protected Area in 1993.
- Designated as a Biosphere Reserve in 1997 by UNESCO.
- Officially designated by Royal Decree on 10 April 2001.



Culture

- Floating Villages, traditional settlement;
- A number of ethnic groups with distinct religion and culture;
- Traditional forms of land use;
- Angkor, is a World Heritage site.

The Biosphere Reserve Concept addresses the need for conservation without neglecting the challenge of development

The Tonle Sap Biosphere Reserve is established by a royal decree to fulfill three complementary functions:

Conservation

To contribute to the conservation of landscapes, ecosystems, species and genetic variation;

Development

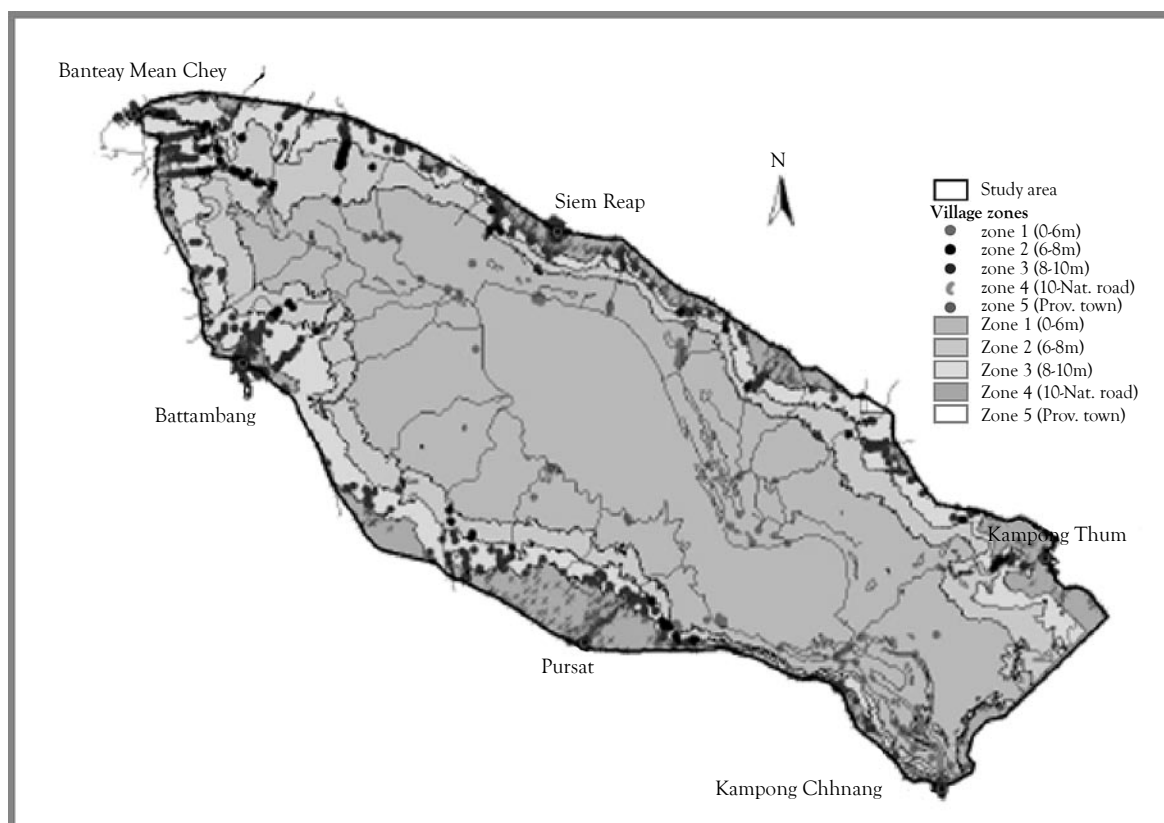
To foster economic and human development which is socio-culturally and ecologically sustainable;

Logistic Support

To provide support for research, monitoring, education and information exchange related to local, national and global issues of conservation and development.

Current Work

- Common Policy and Strategy to support implementation of the functions of the TSBR;
- TSBR Environmental Database (www.tsbr-ed.org);
- Biodiversity Conservation in three core areas of the TSBR;



	Definition	Villages	% of Total	Area (ha)	% of Total
Zone 1	0 – 6 m	88	7.6	853,098	57.3
Zone 2	6 – 8 m	82	7.1	240,694	16.2
Zone 3	8 – 10 m	313	27.0	229,207	15.4
Zone 4	10 m to National Roads	554	47.8	157,355	10.6
Zone 5	Urban areas	121	10.4	7,255	0.5
All Zones	Between National Roads 5 & 6	1158		1,487,609	

- Biodiversity Monitoring;
- Environmental Awareness and Education;
- Community Participation.

Settlements

- 1158 villages within roads 5 and 6;
- Zone 1 villages mainly fishers;
- Zone 2-4 villages mainly farmers.

Religion and Ethnic Origin

	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	All Zones
Religion						
• Buddhism	96.0%	98.7%	98.6%	98.1%	97.3%	97.9%
• Islam	2.3%	0.5%	1.1%	1.4%	1.7%	1.4%
• Christianity	0.8%	0.4%	0.2%	0.3%	0.7%	0.4%
Ethnicity						
• Khmer	82.9%	100.0%	99.8%	94.9%	100.0%	94.6%
• Chinese	-	-	0.2%	0.1%	-	0.1%
• Vietnamese	14.0%	-	-	0.9%	-	3.0%
• Cham	3.0%	-	-	3.9%	-	2.2%
Number of respondents in Fishing Household Survey	299	84	480	692	63	1,618
Share from the total population of the zone	0.35%	0.15%	0.17%	0.15%	0.02%	0.14%

Human Ecology Zones

- Zone 1: the fishing zone - fishing forms the main source of livelihood only in this Zone;
- Zones 2-4: the agriculture zones - rice cultivation is by far the most important source of livelihood. In this zone, decreasing availability of agricultural land causes problems.

Overall trends:

- extensive poverty ;
- significant dependence on natural resources;
- decrease in natural resource base and increase in population.

Socio-economic Conditions

- In the Tonle Sap area more than 36% living below poverty line (54,050 riel/capita/month). Poverty is resulted from population growth, inequitable access to land, forestry, fishery and water resources, environmental degradation, low capability, insecurity, land mines and vulnerability.
- Over 77% of labor forces is from agricultural sector
- Between 12-15% of farmers have no agricultural land, and about 14.4% of the rural household is landlessness.
- Health care: over third of household income is spent on health care due to lack of clean water and sanitation facilities. Infant mortality rate is 89 per 1000, low life expectancy.
- Education is low in the rural areas
- 94% of rural people rely on firewood as the main fuel for cooking, while 86% relies on kerosene as a source of light. Less than 1% of rural household have access to electricity. Per capita rice consumption ranges between 126-160Kg per year, while fish consumption is 25-60kg/year.

Gender

- Women is under represented in government and social organizations.
- High workload for women in household.
- Women comprise 65.9% of the economically active population, and 54% of skilled agriculture and fishery workers.
- Literacy rate for women is 61.1% compared to 82.9% for men, limited access to better jobs.
- Women are vulnerable to deficient health care, HIV, sex trade, and domestic violence.

Promoting Community Participation in several forms

- Organizing Community-Based Natural Resources Management.
- Commune Land Use Planning.
- Environmental Awareness and Outreach.

Organizing Community-Based Natural Resources Management

Major activities:

- List of CF members and CF Committee members.
- By law agreement.
- Boundaries and Map of CF.
- CF area agreement.
- CF Management Plans.
- Training.

Commune Land Use Planning

Purpose: to secure better land/resources allocation for different uses at the commune level

- 9 communes with a mosaic land cover are targeted to prepare land use;
- Procedures and best practice on land use classification are developed;
- Trainings are provided to stakeholders representing various interests and social groups.

Environmental Awareness and Outreach

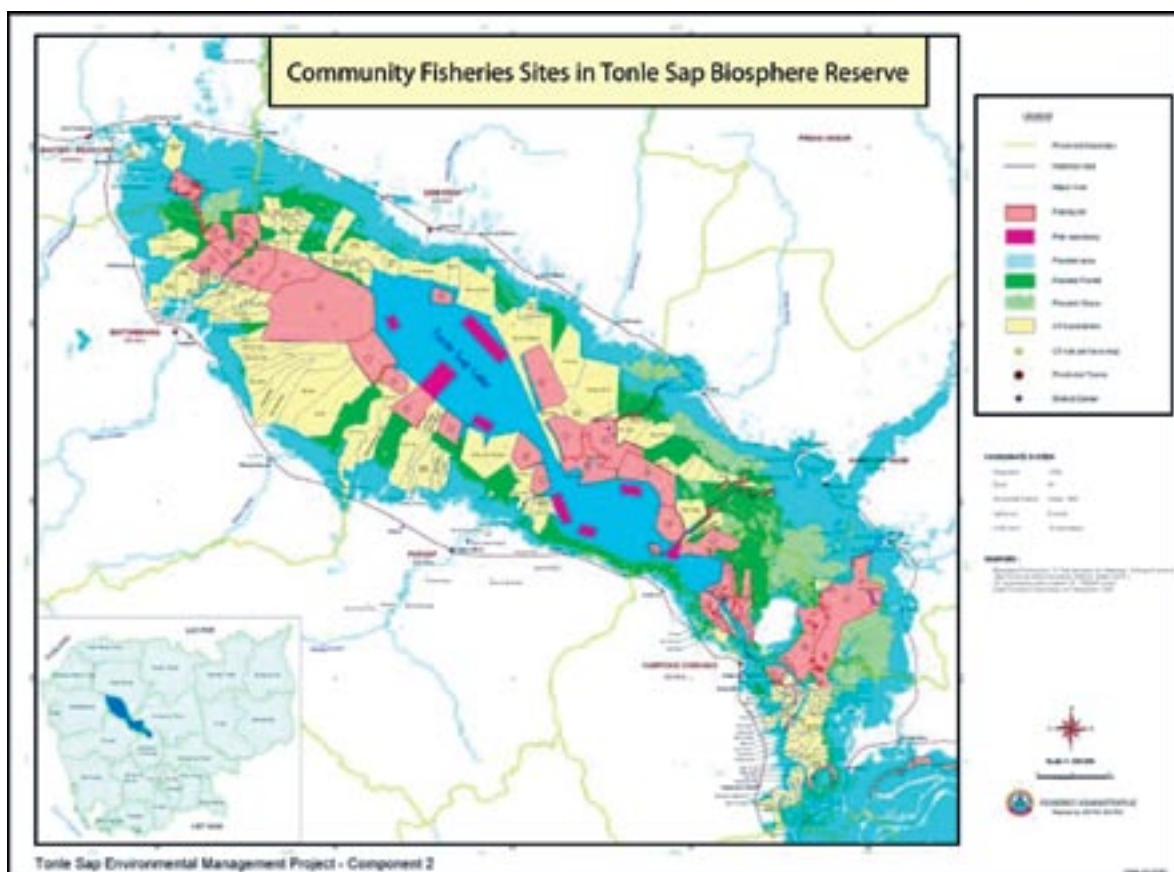
Purpose: to promote knowledge across different levels of society targeting local communities, school children, private groups and government officials.

Awareness Activities:

- Community Flipcharts, community theater.
- School eco-clubs, school flipcharts, curriculum development.
- Video spots.
- TV debate.
- Posters and Brochures.

Lessons

- Communities can play a crucial role in sustainable natural resources management and biodiversity conservation as they are the direct resources users;
- To achieve long-term success, the communities must have functional organizational structure supported by a clear rule and rights, capacity, and funding;



- Men still dominate women in many aspects of resources management and work;
- Still limited participation of ethnic minorities due to different culture, lack of trust, conflict of interest;
- Livelihoods improvement is the most important factor to secure long-term participation of communities in term participation of communities in natural resources management.

- Clear legal and institutional structure must be provided to insure effective community participation;
- Capacity should be enhanced to allow communities to work as a functional organization;
- Ethnic groups should not be excluded and their participation can be improved by means of awareness, trust building, and good communication;
- Livelihoods improvement should be weighted against their active participation in resources protection and management, alternative income generation and other social infrastructure can be added to maintain their commitment to resources stewardship.

Conclusion

- Sustainable Resources Management and Biodiversity Conservation can not be achieved without community participation;

The Nomadism and Biodiversity Conservation in the Arid Zone in China: A Case Study on Kazak and Beaver Conservation

Mr. Changqin Yu

Center of Ecology Research, Tsinghua University



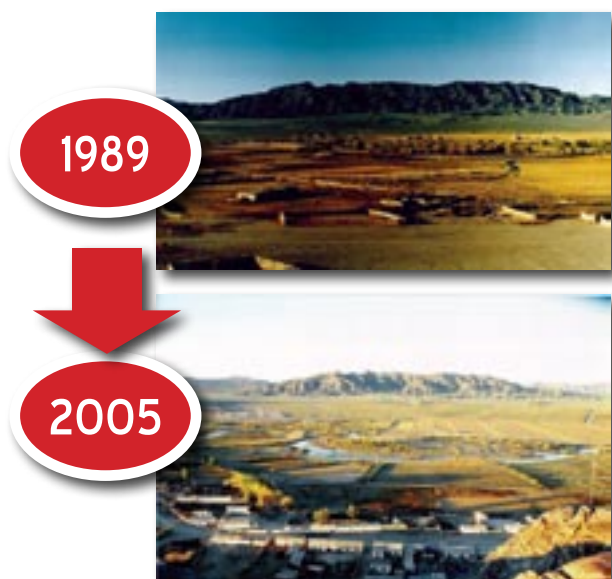
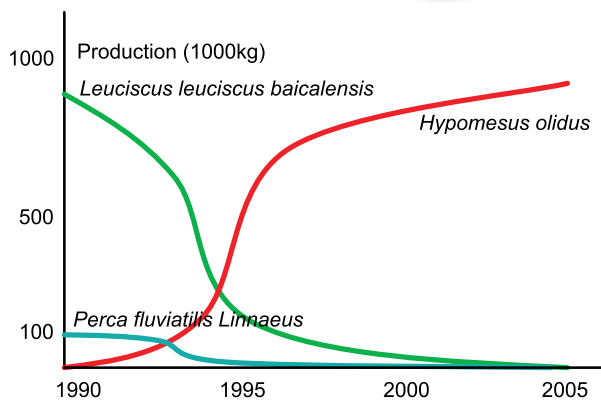
The Beaver, flagship species of Wulungu River



The Beaver and its habitat of Wulungu River



Exotic species and local species



Comparison between 1989 and 2005

Kazak and Nomadism Culture

- Acclimated to nature, respect nature;
- Sheep, cattle, camel, horse;
- Not eat wildlife;
- Where there is a wolf, there is healthy sheep herd;
- Cutting a single tree would leads to a single life.

Endangered Beavers, endangered Wulungu River

- Beaver population decreased from 700 in 1989 to current 400;
- River forest from 2/3 in 1989 to current 1/5;
- Local fish species become extinction;
- River become drying;
- River bank become desertification.

Nomadism: Uncultured or sustainable

- Is Nomadism extensive, uncultured and predatory? Or is it harmonious and sustainable?
- How to maintain the sustainability of Nomadism, and promote the social and economic development.



Desertification



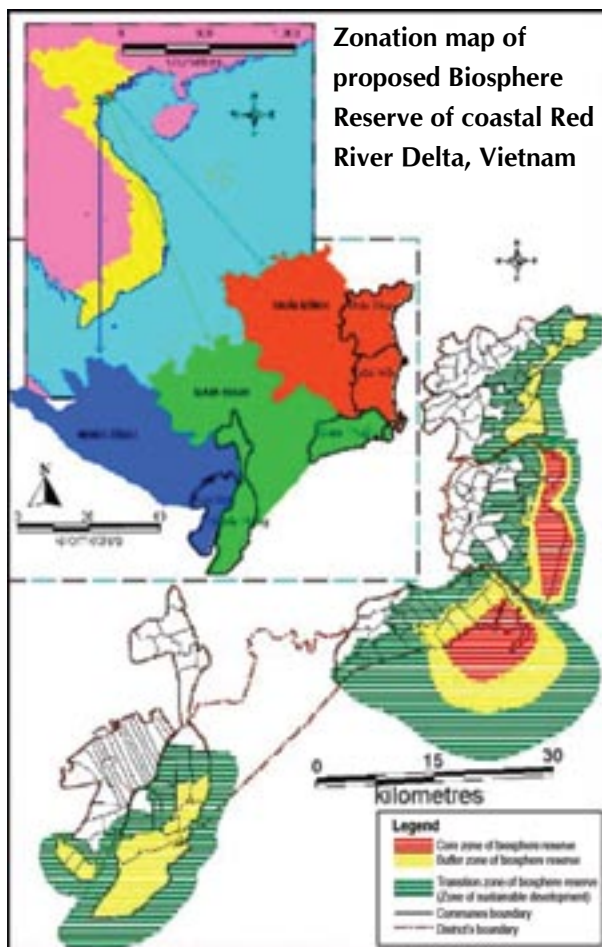
Dam and irrigation

The Relationship between Traditional Culture and Nature in the Biosphere Reserve of Red River Delta, Vietnam

Mr. Phan Nguyen Hong

Mangrove Ecosystem Research Centre (MERC), Hanoi National University of Education, Vietnam

The Red River Delta Biosphere Reserve



- The Red River Delta Biosphere Reserve consists of five coastal districts.
- The cultural foundation is based on wet rice cultivation and is governed by natural circumstances
- Agriculture practice requires a knowledge of the weather and climate of the year's four seasons.

Nature and Culture

- Observing natural phenomena:
 - Rice field;
 - Cloud;
 - Tide in coast;
 - Sunset.
- Phonological phenomena indicate weather change.

Belief Culture



Pagoda

Communal House



Temple

Worshipping and carved animals



Family lines



Family landscape

Houses usually built to face south to avoid heat and storms during summer and cold winds in winter. Every house has a pond for use in their daily life, which is surrounded by fruit trees. The garden always have vegetables and herbs and a number of areca palms.

Worshipping ancestors

Regarding the traditional culture, each family line has a separate house of worship. The popular faith in families is to worship one's ancestors. People believe that the spirits

of dead relatives often come back to earth to visit and protect the family.

Communal Festivals

Most of villages have festivals and rituals such as praying-for-rain rituals, rice planting rituals, boat races, rice cooking competitions, etc.



Communal Regulations

- Discussion;
- Slogan;
- Education extension;
- Regulations of catching.

Challenges and lose-lose scenarios

- This beautiful age old culture has been eroded under the impact of economic and technological development such as concrete structures, houses replaced the old cultural ones, etc.
- The rich get richer vice versa the poor get poorer.

Conclusion

The diversified culture has a close and deeply relationship with nature and biodiversity.

Guidelines for recognising and promoting local cultural values for biodiversity conservation and sustainable development this area is indeed an urgent attention and cooperation.

Conservation of the Biodiversity and Cultural Diversity in Xishuangbanna Biosphere Reserve

Mr. Songhai Yang

Director, Xishuangbanna Biosphere Reserve, China



Brief introduction of Xishuang Banna Biosphere Reserve

- 242,500 hectares, accounting for 12.68% of the total area of the prefecture;
- Set as Nature Reserve in 1958;
- Upgraded to National Nature Reserve in 1986;
- Reserve Administration was established in 1988;
- Accepted as Biosphere Reserve in 1993.

Biodiversity in Xishuang Banna

- Eight vegetation types including tropical forest, tropical monsoon forest and so on.
- 5 plant species are first-grade nationally protected, 27 species are 2nd-grade nationally protected, and 153 species are special plants, such as *Parashorea chinensis* Wang Hsie and *Vatica xishuang bannaensis*.
- 109 animal species are wild animals of national priority protection, 19 species are first-grade nationally protected, 90 species are 2nd-grade nationally protected, including *Elephas maximus*, *Tragulus javanicus*, and *Panthera tigris corbetti* (endangered species).

Heterogeneity of Ethnic Cultures at Xishuang Banna

- Population at Xishuang Banna Prefecture comprised mainly of Dai ethnic group; in addition, there are Han, Hani, Lagu, Bulang, Yi, Jinuo, Yao, Wa, Hui, Bai, Jingpo and Zhuang, totaling 13 ethnic groups.
- Religion—Hinayana Buddhism (Dai).
- Languages—Dai Language, Palm-Leaf Scripture.



Palm-Leaf Scripture of the Dai Ethnic Group

Ethnic Forest Culture

Dai people have a proverb: "There is no water without forest, no field without water, no grain without field, and no people without grain."

Dragon Mountain of All Ethnicities - A Traditional "Nature Reserve"

- Dragon Mountain—the Holy Mountain of Dai, Bulang and other ethnic groups.
- Dragon Mountain and Dragon Forest are home to "Gods and Goddesses", all plants and animals here are "holy" and receive strict protection.

- Dragon Mountain is part of the natural holy environment.
- The entire prefecture keeps over 400 Dragon mountain sites, totaling 30,000-50,000 hectares.
- Forest vegetation protected with strong influence of culture belief share similar features, structures and functions as primeval forests.
- Dragon Mountain and Dragon Forest are key ecological parts of Xishuang Banna; they can be step stones to biological corridor.



Worshipping elephant



Dai's elephant dance

Worshipping Nature Helps Protect Species

The minorities that live in the mountains often deify plants, mountains, and waters surrounding them and then worship them. Many rare species and wild animals remain until today thanks to such folk beliefs.

The Local People view Ashoka Trees as Holy Tree, and *Ficus altissima* as the Goddess tree.



The goddess tree-
Ficus altissima



Dai's Totem

Peacock

Peacock symbolizes truthfulness, kindness, beauty, auspiciousness and nobility; it is regarded as envoy of the Buddha to send happiness to mankind.

The Aini's View Buffalos as "Holy Cows"

Buffalos are viewed as sent by God to help people produce, so they are regarded as "Holy Cows" and respected by the Aini's.

Dai's Worshipping of Elephants

White elephant—symbolizes propitious winds and rains, harvests, peace and tranquility. Ways of worshiping:

- Elephant sculptures;
- Elephant silk embroidery, elephant wall painting, elephant crafts;
- Elephant music and elephant dance.

Traditional Way of Utilizing Resources

- Shifting Cultivation—the various minority ethnic groups utilize land in a shifting way, they do not have fixed fields to cultivate. The land left behind grows herbs and plants, providing sufficient food for large plant-eating animals.
- Planting *Cassia siamea* for fire, thus protecting forest resources.

The philosophy of the minority groups is: "All species carry within themselves new lives, all species find their best environment for a living. Man, like all other species, needs to coexist with Nature." This is in line with what we emphasize today: "Man shall live in harmony with Nature."

Practice combining protection of heterogeneity of ethnic cultures and conservation of biodiversity

- The natural “holy” environment protected under the influence of traditional cultures and beliefs of the Dais, Bulangs, Hanis, and Jinuos have made great contributions to the conservation of biodiversity in China’s tropical areas.
- The various tropical forests in Xishuang Banna National Biosphere Reserve are sacred mountains and sacred forests themselves.
- Since the 1990s, Xishuang Banna Biosphere Reserve, along with domestic and overseas research and educational institutions, has organized a series of activities aimed to protect heterogeneity of ethnic cultures and conservation of biodiversity.
- Incorporate Ethnic Cultures into General Planning.
- Develop Community Co-Management Projects.
- Sign “Responsibility Sharing Agreements” with all villages.
- Trial Community Co-Management – sharing resources and returns.
- 3 minorities village selected: Manni (Dai), Xiahuijian (Aini) and Xinlongshan (Jinuo) are trial villages, each setting up a “Villager-Community Co-Management Committee” based on public votes.
- Make Use of Indigenous Knowledge.
- Develop “Xishuang Banna Forest Resources Utilization Project” in cooperation with GTZ.
- Protect Rare Species with Ethnic Indigenous Knowledge.
- Asiatic Elephant food base establishment and improvement of undergrowth vegetation.

Major Partners

- Canada-based International Development Research Center (IDRC);
- Global Environment Fund (GEF);
- Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ);
- Xishuang Banna Tropical Botanical Garden, Chinese Academy of Sciences;
- Yunnan University.

- Modern industrial development changes traditional agricultural production system .
- Conflicts between people and elephants increase
- Employ shifting cultivation method.
- Since 2001, undergrowth vegetation has been improved at Nantun and Nanping of Shangyong Reserve and Guanping and Shulinzhai of Mengyang Reserve; over 3,000 mu of food bases have been set up.
- Improve and increase food sources for Asiatic elephants.
- Keep Asiatic elephants within reserves to ease conflicts between human beings and elephants. Effect: attracting wild elephants and impacting on the number of visits of wild elephants to crop fields surrounding the reserves and on the loss of crops in a positive way. Social and ecological benefits have been achieved to a certain extent.
- Engage in “I grow with the little trees” activity
- Forestry policy and reduced resources have had an impact on the Aini’s conventional custom of “one person one tree.

Crop	Year	Cultivated Area (mu)	Damaged Area (mu)	Loss (kg)	Percentage of Loss	Reduced loss (kg)	Percentage of Reduced Loss	Reduced Economic Loss (yuan)
Corn	2005	3,491	2,648.750	264,875	75.9%	15,727	33.6%	22,017.8
	2006	3,987	1,686.800	249,048	42.3%			
Rice	2005	2,067	941.925	215,625	45.6%	71,737	19.6%	100,431.8
	2006	2,762	719.440	143,888	26.0%			
Total								122,449.6

- In 1997, the “I grow with the little trees” activity was initiated in Mannalan Village of Menglun Reserve, for which people planted Sweet Osmanthus
- The call to pay respect to minorities’ traditional cultures was positively reacted
- Over 10,000 trees were planted on 340 mu of land

Conclusion

The heterogeneity of minority cultures in Xishuang Banna has a profound influence on conserving the eco-system in the area. It constitutes precious resources and forces for the protection of nature; it also lays the foundation and provides support and reference for the effort of conserving biodiversity in minority-concentrated areas. After years of practice, we conclude that cultures and nature are related to each other but also restrain each other and that traditions have both positive and negative impacts on conservation of nature. The key strategy is to further explore and develop the potential of minority ethnic cultures for the effort of protecting nature and conserving biodiversity.

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**Ecotone
thematic session**

Biosphere Reserves and Firefly Ecotourism Development in Thailand

Mr. Sonjai Havanond

Director, Mangrove and Wetland Management Division, Department of Marine and Coastal Resources, Thailand

Four Biosphere reserves of Thailand namely, Sakaerat Biosphere Reserve (1976), Kogma-Maesa Biosphere Reserve (1977), Huay Tak Teak Biosphere Reserve (1977), Ranong Biosphere Reserve, 1997 were nominated by UNESCO, World Biosphere Reserve Network Center. All are playing important role in biodiversity conservation, cultures heritage and nature learning centers of Thailand and the world. Sakaerat Biosphere Reserve is located at Poo Luang , Tambol Udom Sap, Wang Nam Khew District, Nakornrachasima Province. The particular importance of this area is appropriate for environment and ecosystem research. It covers with Dry Evergreen Forest and Dry Dipterocarp Forest. Whereas other two sites are setting at the north of Thailand namely, Kogma-Maesa Biosphere Reserve and Huay Tak Teak Biosphere Reserve. Kogma-Maesa Biosphere Reserve comprises of two parts, one is Kogma watershed and the other is Maesa watershed. The Kogma Biosphere is located in the Suthep - Pui National Park, Chiang Mai while the Maesa Biosphere is located in Mae Rim District, Chiang Mai Province. Being a watershed of the Ping River at least 125 million cubic meters a year, being a biological diversity resources both flora and fauna. Moreover being a world famous tourism spot and being a place for natural study and research were the fantastic important of this site. Whereas Huay Tak Teak Biosphere Reserve Demonstration Forest, Amphur Ngao, Lampang province is the only place having both nature teak and teak plantation in Thailand. It is also one of the teak seed orchards of the world. The last is Ranong Biosphere Reserve, located in Ranong province, southern Thailand, on the west coast of the Thai Peninsula. This area is well known as mangrove ecosystem functioning. Its natural resources are of great importance to the local people, many of whom are totally dependent on the forests and marine areas for their livelihoods. They are also of great importance for protecting the coast and providing a habitat for Thailand's marine fauna.

Introduction

Fireflies belong to the family Lampyridae and are members of the largest order in the insect kingdom, Coleoptera. There are four major groups of fireflies, the *Pteroptyx*, *Luciola*, *Colophotia* and *Lychnuris*. In Thailand, only 14 described firefly species representing 6 genera are recorded (Thancharoen *et al.*, 2007). According to rare literature is available on specific firefly species and its interactions within its habitat then the lack of recorded reports and scientific documents on the number of species and their preferred habitat has hampered numerous past and on-going conservation efforts to protect these fireflies and preserve their habitats from man-made

catastrophes. *Pteroptyx valida* and *Pteroptyx malacca* was identified based on records from Thailand, especially *P. malacca* and *P. valida* have been observed in displays near Bangkok. The synchronous displays for which the *Pteroptyx* species are responsible have been identified occurring in trees or shrubs along tidal rivers in mangrove-nypa swamps. The congregation of fireflies in *Sonneratia caseolaris* trees have also been described by several firefly observers that *Pteroptyx* is the most widely distributed genus in the eastern and the south of Thailand (Lloyd, 1999). *Pteroptyx* was more abundance along mangrove along the Tha Chin and Mae Khlong River, river mouth of Samut Sakhon and Samut Songkhram respectively.

They were generally inaccessible at heights of 3-17 m above water. Whereas *Luciola* was found in particular aquatic freshwater habitat, this species has an extremely high risk of population decline because its habitat occurs in non-conservation areas or uninhabited areas that have high chances of being destroyed and changed to new ecosystem (Thancharoen et al., 2007). In Thailand, many places that observer can enjoy seeing the firefly at night. Especially, in the Rain season, there are a lot of firefly. The recent interest in fireflies' tourism is very famous among observers. However, only few promoting sites are well known in firefly ecotourism. One is at Ampawa community, Samut Songkhram Province. A number of tourist travels along the river in the night time to observe firefly in *Sonneratia caseolaris* community.

Suggestion for establish and develop firefly ecotourism in Thailand, particular in Biosphere Reserves that habitats were diverse with natural resources and animal species. In addition, establish and develop firefly ecotourism will enhance knowledge of firefly ecology and income increasing of local community.

Sakaerat Biosphere Reserve

Location

It is located at Poo Luang District, Amphur Pak Thong Chai, Wang Nam Khew District and Udom Sap District, Amphur Wang Nam Khew, Nakornrachshima province, Thailand.

Organization

Thailand Institute of Scientific and Technological Research (TISTR)

Area

About 78 km² (48,750 rais).

Topography and Climate

It is located in the mountain area 280 - 762 meters above average sea level, 26 °C average temperature and 1,260 mm average rainfall. It is appropriate for researching on environment and ecosystem. It covered with dry evergreen forest and dry dipterocarp forest.

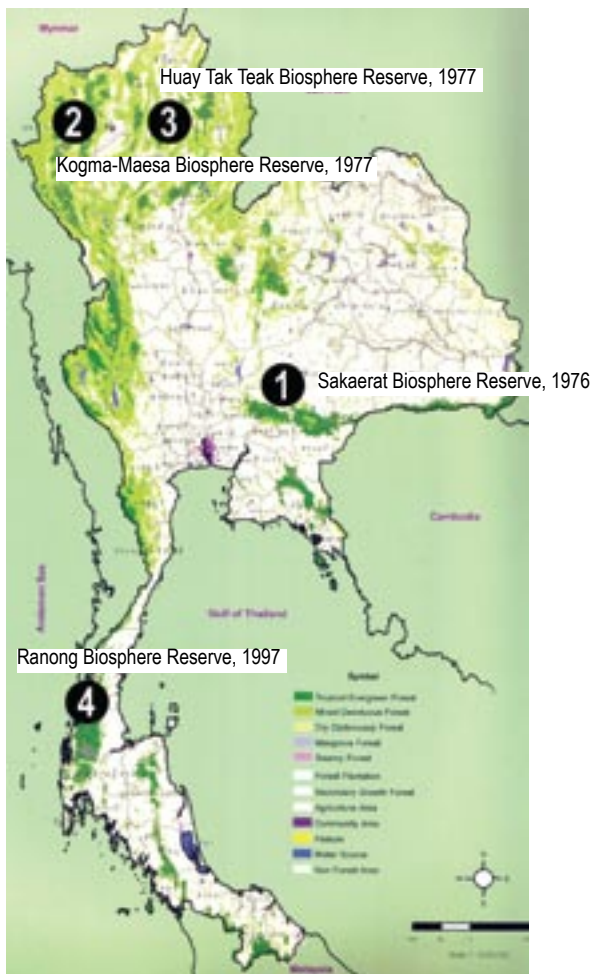
Biodiversity





Flora







It is comprised of dry evergreen forest and dry dipterocarp forest about 70% of area. Significant species are *Hopea ferrea*, *Hopea odorata*.

Fauna

There are about 380 species of animal diversities: classified as 70 mammals, 200 birds, 25 amphibia, and 82 reptiles.



	Flora diversity	Fauna diversity
Dry dipterocarp forest	 <i>Doritis pulcherima</i>	 <i>Lepus peguensis</i>
	 <i>Drosera burmannii</i>	 <i>Athene brama</i>

	Flora diversity	Fauna diversity
Dry evergreen forest	 <i>Alstonia scsolaris</i>	 <i>Elephas masimus</i>
	 <i>Thismia mirabilis</i>	 <i>Bos gaurus</i>
	 <i>Dipterocarpus alatus</i>	
	 <i>Dillenia aurea</i>	

Kogma-Maesa Biosphere Reserve

Location

Comprising of two parts, one is Kogma watershed and the other is Maesa watershed. The Kogma Biosphere is located in the Suthep - Pui National Park, Chiang Mai while the Maesa Biosphere is located in Amphur Mae Rim, Chiang Mai.

Organization

Faculty of Forestry, University of Kasetsart monitoring the Kogma Biosphere and Royal Forest Department monitoring the Maesa Biosphere.

Area

- About 0.65 km² in Kogma Biosphere
- 420 square km² in Maesa Biosphere.

Topography and Climate

Kogma is in mountain area 1,260-1,540 meters above average sea level. Average temperature 20 °C and average rainfall 1,995.3 mm.

Maesa is in mountain area 320 - 1,685 m above average sea level and has average temperature 20.9 °C and average rainfall 1,668.2 mm.

Significance

- Being a watershed of the Ping River at least 125 million cubic meters a year.
- Being a biological diversity resources, both flora and fauna.
- Being a world famous tourism spot.
- Being a place for nature research and study.





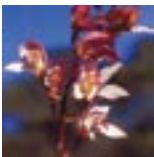
Biodiversity


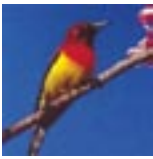



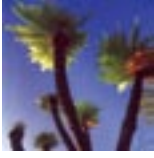





Flora

Most area are mixed deciduous forest, dry dipterocarp forest, hill evergreen forest and pine forest. There are at least 261 of tree species, orchid and fern about 1,959 species. About 50 species are endangered.

Fauna

There are about 1,265 species of faunal diversity. About 22 of 326 bird species are endangered and 7 birds are endemic.

	Flora diversity	Fauna diversity
Coniferous forest	 <i>Spathoglottis affinis</i>	 <i>Sitta frontalis</i>
	 <i>Dendrobium unicum</i>	 <i>Montacilla cinera</i>
	 <i>Murdannia gigantea</i>	

	Flora diversity	Fauna diversity
Hill evergreen forest	 <i>Rhododendron arboreum</i>	 <i>Aethopyga gouldiae</i>
	 <i>Paphiopedilum villosum</i>	 <i>Aethopyga nipalensis</i>
		 <i>Cladognathus giraffe</i>
Savanna forest	 <i>Cycas pectinata</i>	 <i>Panthera tigris</i>
	 <i>Flacourtia indica</i>	 <i>Canis aureus</i>
	 <i>Phoenix loureiri</i>	
	 <i>Bauhinia bracteata</i>	

Huay Tak Teak Biosphere Reserve

Location

Ngao Demonstration Forest, Amphur Ngao, Lampang province.

Organization

Royal Forest Department

Area

About 47 km²

Topography and Climate

400 meters above average sea level, 25.6 °C average temperature and 1,200 mm average rainfall yearly





Significance

The only place having planted and natural teak in Thailand. It is also one of the few teak seed orchards of the world.

Biodiversity

Flora

The oldest and most significant teak plantation in Thailand. Besides, there are mixed deciduous forest and dry dipterocarp forest.

	Flora diversity	Fauna diversity
Mixed deciduous forest	 <i>Grammatophyllum speciosum</i>	 <i>Viverricula indica</i>
	 <i>Ficus racemosa</i>	 <i>Viverricula zibetha</i>

Ranong Biosphere Reserve

Location

Located in Ranong province, southern Thailand, on the west coast of the Thai Peninsula.

Organization

Department of Marine and Coastal Resources

Area

About 303 km² (189,431 rais).

Topography and Climate

Soft muddy soid area with 26.96 °C, average temperature and 4,082 millimeters average rainfall yearly.

Significance

Its natural resources are of great importance to the local people, many of whom are totally dependent on the forests and marine areas for their livelihoods.

They are also of great importance for protecting the coast and providing a habitat for Thailand’s wildlife.




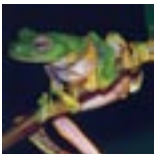
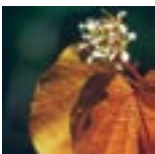

Biodiversity












Flora

Significant floral divesity. Most are Rhizophoraceae. There are more than 25 tree genera and 17 families 35 genera of natural mangrove.

Fauna

There are 98 species of fish, 124 species of phytoplankton, 28 species of crustacea, 77 species of infauna and surface fauna, 30 insect species, 20 bacterial genera and 59 fungal species.

	Flora diversity	Fauna diversity
Tropical rain forest	 <i>Vanilla siamensis</i>	 <i>Tragulus javenicus</i>
	 <i>Rafflesia kerrii</i>	 <i>Rhacophorus nigropalmatus</i>
	 <i>Eauhinia aureifolia</i>	 <i>Batrachostomus javensis</i>

	Flora diversity	Fauna diversity
Swamp forest	 <i>Hedychium longicornutum</i>	 <i>Nycticebus coucang</i>
	 <i>Thrixspermum amplexicaule</i>	 <i>Felis planiceps</i>
	 <i>Nymphoides indicum</i>	 <i>Cyornis turcosus</i>
Beach forest	 <i>Erythrina variegata</i>	 <i>Leiolepis belliana</i>
	 <i>Abrus precatorius</i>	
	 <i>Scaevola taccada</i>	
	 <i>Gloriosa superba</i>	



Mangrove forest in Ranong Biosphere Reserve



Mud skipper



Rhizophora community at Ban Haad Sai Khao in Core Area



King fisher



Mangrove Nature Trail in Buffer zone



Sand piper



Giant *Xylocarpus molluccensis*, nearby Nature Trail at La-un, Ranong Province



Horse Shoe Crab



Jelly fish



Mud Lobster (*Thalassina anomala*)



Sesamid crabs (Sesamid crab productivity 700 kg/day or 218 ton/year - Macintosh,2002)

Uca crabs



Mud crab productivity 109 ton/year (Papavasit et al., 1990)



Management zone in Ranong Biosphere Reserve

- Core Area
- Buffer Zone
- Transition Zone
- Sea



Community living mangrove around Ranong Biosphere Reserve



Aquaculture-fish cage floating

Research activities in Core area



litter production = 1,536 kg/rai/yr
 or 9,600 kg/ha/yr
 nutrient return = 51.2 kg/rai/yr or
 320kg/ha/yr

Collection of Soil sample using
 Geoslicer. Data gathered:
 Sstructural characteristics,biomas
 s,soils,etc.



Learning Centre

First award from
 Tourism Authority
 of Thailand in Year
 2004



Mangrove rehabilitation

Khlong Khone Mangrove

Location: 130° 16' - 21' N, 990 ° 54' - 59' E

Area: 60 km² (37,500 rai)

Ecosystem Characteristic: Mangrove & Mudflat

Dominant plant species: *Avicennia alba* and *Sonneratia caseolaris* with other; *Excoecaria agallocha*, *Bruguiera* spp., *Rhizophora apiculata*, *Rhizophora mucronata*, *Tespisia populnea*, *Xylocarpus* spp., *Nypa fruticans*, *Acrostichum aureum*, *Sueda maritima*, *Derris trifoliata* and *Sesuvium portulacastrum*.

Importance

- Royal Project: Mangrove Conservation;
- Mangrove Plantation for Charcoal production at Samut Songkhram Province;
- Socio-economic Aquaculture area. Well known area in *Penaeus monodon* farm culture;
- Fisheries
 - Shrimp paste productivity (*Acetes* spp.);
 - Cockle productivity;
 - Mussel and oyster farm.
- Ecotourism
 - boat tourism;
 - homestay;
 - fire fly habitat tour.



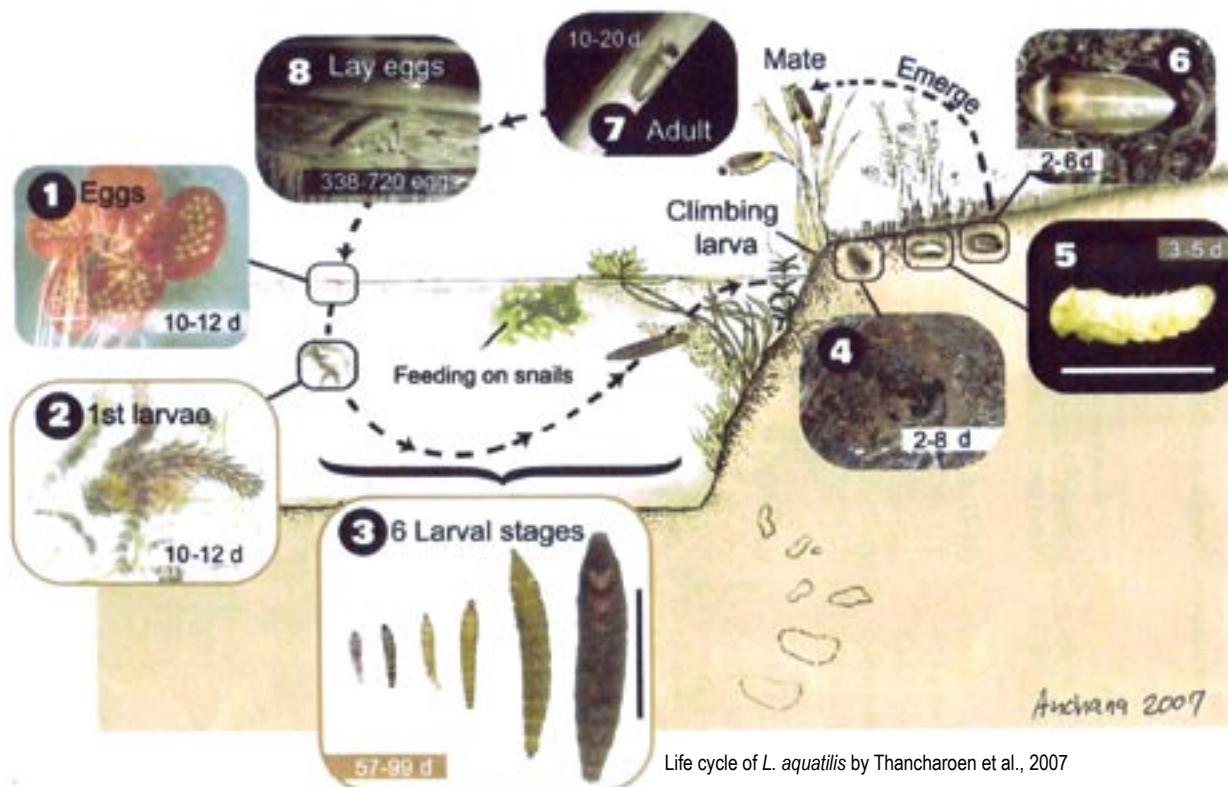
Firefly in Thailand

(*Pteroptyx* spp.) in mangrove habitat

- Habitat estuary and Mangrove.
- Adult live in *Sonneratia* spp., and *Avicennia* spp.
- Abundance in September but rare in April.

Distribution of firefly in the center and eastern part of Thailand

Habitat	#spp
The centre- Lopuri, Ayuthaya, Bangkok, Uthaitani, Samutsakorn, Samutsong khram and Nontaburi Provinces	38
The eastern –Chantaburi and Trat	5



Hill tribes in Thailand

In Thailand there are up to 20 different hill tribes whose total population is about 550,000. Dominant hill tribes include Yao, Karen (Kariang), Akha (I-Kaw), Lahu (Musoie Hmong (Mae) and Lisu (Lisaw). They usually grow rice, corn and other agricultural products. Though in the past some tribal groups such as Yao, Lahu Hmong and Lisu used to grow opium, now with the encouragement of the royal project, they turn to earn a livelihood through the cultivation of temperate fruit crops like apples, strawberries and other cash crops such as kidney beans, coffee, vegetables and flowers. The hill tribes are also encouraged to stop destroying forest through slash and burn cultivation.

At present, new hill tribal generation come down to get job and study in the city. Therefore can speak English as well. They like to live in a better life than isolated world.

Yoa village is the passage way to doi Mae Salong. Yoa family sale souvenir items, purses, hats, tribal outfits etc.

Yoa in Mae Fah Luang Project, Chiangmai province grow apples, strawberries and the other cash crops such as kidney beans, coffee, vegetable and flower.



Morgan: Sea Gypsies

Several centuries ago the ancestors of the Morgan people migrated to the Andaman sea around the Myeik Archipelago in Burma all the way to Surin Islands in Thailand. They spent much of their lives in large hand-carved wooden boats called "Ka Bang" roaming freely from one island to another and living off the riches of the sea. Because of their nomadic way of life they have been dubbed "the Gypsies of the sea."

Then there was the invisible but powerful line that divided into two countries the long stretch of 800 islands where Morgan people inhabited. And more importantly the



demarcation of Surin Islands as a national marine park in 1981 had a profound impact on the way of life of Morgan people in Thailand.

Traditionally avid swimmers able to dive deep to collect clams and sea cucumbers, Morgan people are now forbidden from harvesting sea animals with the exception of subsistence fishing and from freely crossing the border to visit their relatives and friends. With access to the Morgan cultural centers in Burma cut off and their way of life restricted, changes to the 190 Morgan people on Surin Islands are inevitable.

As long-distance sea travelling became less frequent, the boats-cum-houses "Ka Bang" virtually disappeared, and Morgans now live in permanent houses. The beautiful sea and the designation of the islands as a national park have brought an increasing number of tourists to the area. As a result, the lives of Morgan people, park officials and tourists are now intertwined in an interesting way. Many Morgans are now seen mingled among park visitors, doing construction work for the park, driving tourist boats, collecting garbage, and cleaning rooms. While the park visitors bring Morgans income, there are also problems that come with increased contact with outsiders, such as alcohol, smoking, and begging.

In April when visitors crowd the islands, the park officials facilitate and provide food items for Morgan people to hold a traditional ceremony involving food worship, dance and songs to ancestors. The ancestors are symbolized by four carved and painted wooden "Lor Bong" pillars planted in the sea. According to a Morgan, the ceremony is to protect their people, officials and tourists from evils and illnesses.

Reference:

- Kutinn, A. 2004. Status Trends and threat to Protected Areas. In Proceedings of Biodiversity: Food, Water and Health, 19-20 May 2004. Bangkok, P 65-69.
- Lloyd J.E. 1999. On Research and entomology education III: Firefly branchyptery and wing "Polymorphism" at Pitkin march and watery retreats near summer camps (Coleoptera: Lympyridae; Pyropyga). Florida Entomologist; 82 (2): 165-179.
- Office of Environmental Policy and Planning. 2540. Biodiversity Conservation in Biosphere Reserves. Bangkok. 11-12 Febuary 1997. 102Pp
- Rajini B. 1999. Thai Forestry Coupled with Protected Area System. In Proceedings of Regional seminar for East and Southern Asia Countries: Ecotone VIII, Ranong and Phuket Province, ASouthern Thailand, 23-28 May 1999. P 25-36.
- Thancharoen, A., Ballantyne L. A., Branham M. A. & Jeng M. L. 2007. Description of *Luciola aquatilis* sp. nov., a new aqyatic firefly (Coleoptera: Lampyridae) from Thailand. *Zootaza* 1611: 55-62

Distribution of Lotus (*Nelumbo nucifera*) Using Satellite Images and Water Quality Criteria in Tasik Chini, Pahang, Malaysia.

Dr. Mushrifah Idris, Mrs. Nor Rohaizah Jamil and Mr. Ahmad Azmirul Azhar

MAB Malaysia, Tasik Chini Research Centre, Faculty of Science and Technology, University Kebangsaan Malaysia



National Physical Plan

- Central Forest Spine (CFS)
- Established to form the backbone of the Environmentally Sensitive Area (ESA)

ESA

Land use and natural resources to be developed sustainably

- South East Pahang, Chini and Bera Wetlands
- Part of protected area under ESA Rank 1
 - Tasik Chini and its surrounding wetland, Pahang.

Lake type

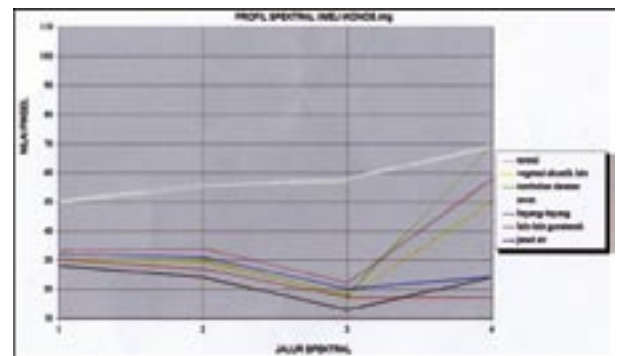
- Natural lake (second largest natural lake in Peninsular Malaysia).
- Location south-east of Pahang.
 - 3°15'40" N
 - 102°45'40" E

- 12 open water bodies (locally known as “LAUT”)
- Surface Area 202 ha of open water
 - 700ha freshwater swamp.
- Catchment Area 5,000ha
- Min depth 0.5m
- Max depth 6m



To Determine:

- Effect of seasonal variation on the distribution of lotus.
 - Advice for tourism seasons
- Effect of changes in the water quality during the seasonal variation on the lotus distribution
 - To establish routes and sites for boating activities



Interpretation image that creates the colour of the Lotus distribution

Colour on the interpretation imej	Objects
Red	Lotus (<i>Nelumbo nucifera</i>)
Light Green	Other aquatic vegetation
Blue	Water
Pink	Others landuse

State of Pahang Physical Plan

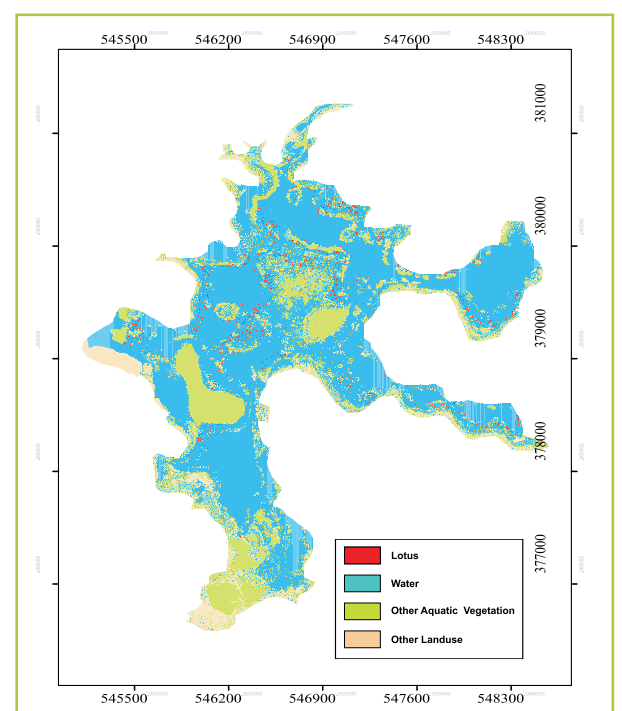
- To develop Tasik Chini as an ecotourism area.
- One of the main attraction is biodiversity especially, the lotus growing in the lake.
- Scenic area
- Fishing



Lotus is an aquatic flowering plant that has been historically associated to Tasik Chini and is an attraction to tourist visiting the lake.

However, the decline in its abundance in Tasik Chini has caused concern to local tourism.

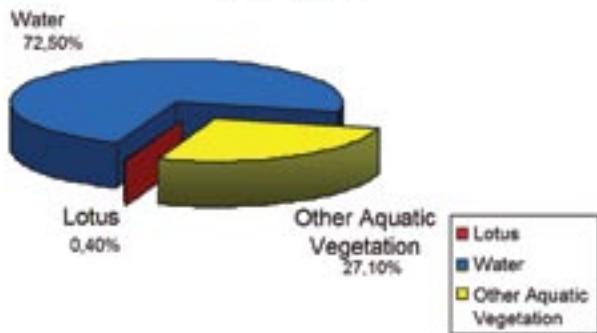
Dry Season



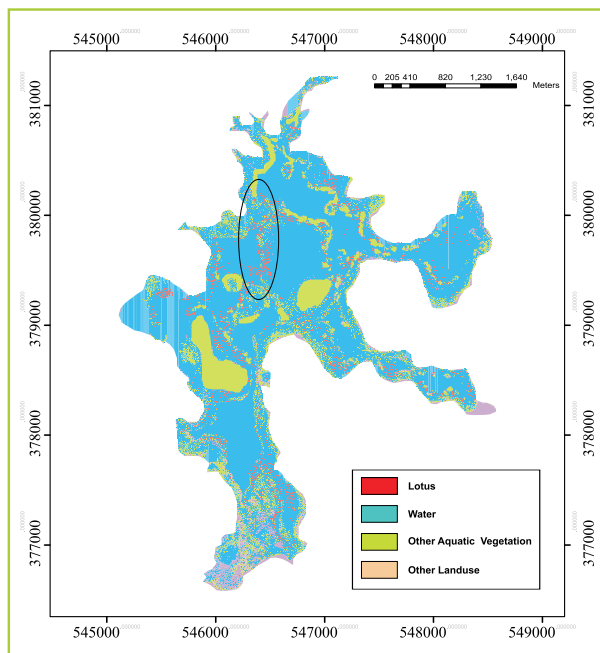
Percentages that cover the landuse based on the classification of IKONOS image (Dry season)

Landuse	Wide (km2)	(%)
Lotus	0.01931	0.40
Water	3.47576	72.5
Other aquatic vegetation	1.29408	27.1
Total	4.78915	100

Percentages of the distribution of Lotus Dry Season



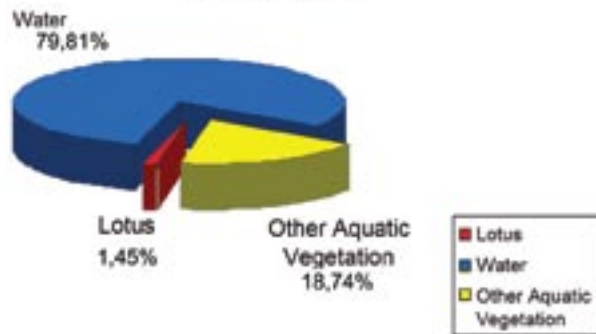
Normal Season



Percentages that cover the landuse based on the classification of IKONOS image (Normal season)

Landuse	Wide (km2)	(%)
Lotus	0.0709	1.45
Water	3.91845	79.81
Other aquatic vegetation	0.9203	18.74
Total	4.90965	100

Percentages of the distribution of Lotus Normal Season



Mean water quality parameter of lake

Parameter	Normal Season	Dry Season
	Mean	Mean
Temperatures (°C)	31.93	30.03
pH	6.47	6.62
Conductivity (µS/cm)	31.73	21.55
DO (mg/L)	4.01	6.25
BOD (mg/L)	1.88	1.62
COD (mg/L)	27.77	16.85

Mean heavy metal parameters of lake

Parameter	Normal Season	Dry Season
	Mean	Mean
Fe (mg/L)	0.378 ± 0.22	6.31 ± 4.21
Cu (mg/L)	0.048 ± 0.004	0.14 ± 0.09
Cd (mg/L)	0.8 × 10 ⁻³ ± 0.0040	0.82 ± 0.55
Pb (mg/L)	1.18 × 10 ⁻² ± 0.004	5.13 ± 3.42
Zn (mg/L)	0.080 ± 0.016	0.82 ± 0.55

Parameter	Normal Season	Dry Season
	Mean	Mean
Depth (m)*	± 1.09	± 1.06
Mean of the distribution rain (mm)**	9.99	2.22
Wide (km ²)	4.90965	4.78915
Lotus Distribution (%)	1.45	0.40

Conclusion

- Distribution of lotus is dominant during normal season than the dry season.
- Lotus sightseeing recommended during the normal season.

- Routes during the normal season is recommended around the west side of the lake.
- No correlation found between water quality and lotus distribution ($p > 0.05$)
- The water quality of the lake in both seasons is within Class I and II of the Malaysian Interim Water Quality Standard (INWQS), indicating that the water is not contaminated.
- The presence of other aquatic plants need to be identified.
- *Cabomba furcata* found dominant:
 - Allelopathy of invasive species.
 - full phytochemical screening.
 - decay of *Cabomba* could have prevented the lotus seed from germination.
- Contamination of water and sediment in terms of heavy metal, pesticides and eutrophication.
- Untreated sewage discharged lake resulted in noticeable level of sewage bacteria
- The use of lotus as a biological indicator for clean water.

Results from Research Programmes EMSB-u32* and EMSB** in Lake Tonle Sap, Cambodia

Dr. Shinji Tsukawaki and All Members of the Teams EMSB-u32 and EMSB
Kanazawa University, Japan

* EMSB-u32: UNESCO MAB-IHP Joint Programme Ecological and Hydrological Research and Training for Young Scientist in Tonle Sap Biosphere Reserve, Cambodia: Research and Training for Young Scientists

** EMSB: Evaluation of Mechanisms Sustaining the Biodiversity in Lake Tonle Sap, Cambodia



Abstract

Although Lake Tonle Sap, the largest freshwater lake in Southeast Asia (Figure 1), is well known as the heart of Cambodia referring to close association with the lives and culture of the Cambodian people and various / multifarious freshwater organisms, no comprehensive research on its biodiversity and related subjects had been made.

On the basis of the results of Tonle Sap 96 and Tonle Sap 21 Programmes which threw light on the geological development and environmental change of the lake and the lower reaches of the Mekong River during the last 7,500 years, two research programmes, the EMSB (Evaluation of Mechanisms Sustaining the Biodiversity of Lake Tonle Sap, Cambodia: 2003 - 2005) supported by Grant-in-Aid of JSPS and the EMSB-u32 (UNESCO MAB-IHP Joint Programme Ecological and Hydrological Research and Training for Young Scientist in Tonle Sap Biosphere Reserve, Cambodia: Research and Training for Young Scientists: 2004 - 2006) supported by Fund-in-Trust of UNESCO MAB-IHP, were carried out aiming to evaluate the mechanisms sustaining the present freshwater biodiversity of the lake.

In order to grasp various facets of the mechanisms sustaining the biodiversity of the lake, the EMSB Team is composed of four research groups; 1) invertebrate zoology and ichthyology, 2) plant ecology, 3) hydrology and meteorology, and 4) sedimentary geology, in cooperation with two groups; 5) atmospheric science and 6) river and soil engineering. On the other hand, the EMSB-u32 Team consisting only of young researchers and experts from both Cambodia and Japan was established as a supplementary team of the EMSB Team but the main body in near future.



Figure 1. Location of Lake Tonle Sap, Cambodia

Two field missions of the EMSB Team (November 2003 and May 2004), two missions of the EMSB-u32 Team (February to March 2005 and July to August 2005), two joint missions of both teams (November to December 2004 and May to June 2005) and some optional missions of the teams were carried out in both north and south Lake Tonle Sap in the seasons of the highest, lowest, rising, and falling water level corresponding to delicate and dynamic change of the lake in time and space.

In spite of a certain period of time is needed to compile and summarize all data obtained from all field missions of both teams, it is highly expected that the result will provide important basic information and knowledge

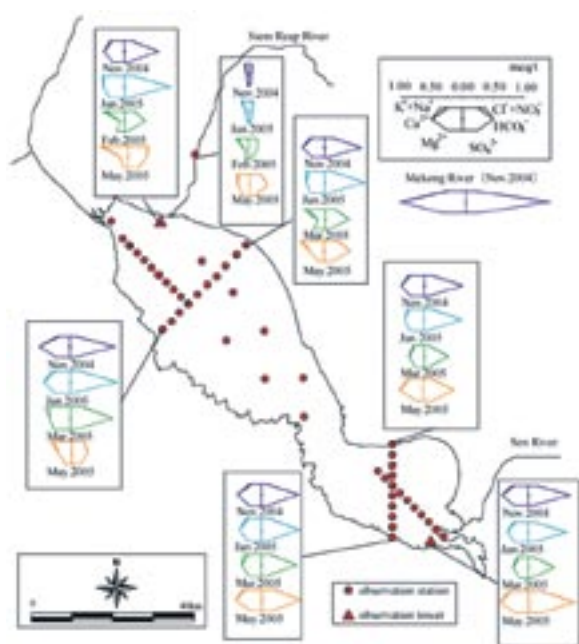


Figure 2. Seasonal changes of water quality in Lake Tonle Sap (after Oyagi et al., 2005)

to develop, preserve and maintain the biodiversity as well as the natural environment of the lake and its surrounding areas. Some results from hydrological and plant ecological researches are shown in Figures 2 and 3 as examples.

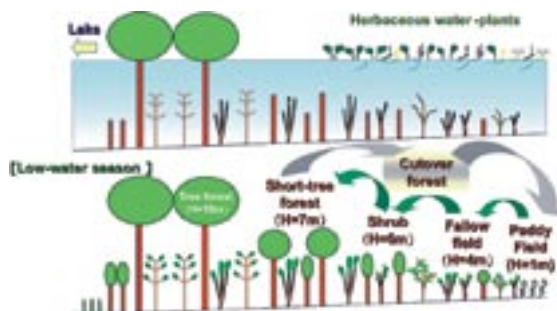


Figure 3. Seasonal changes of vegetation on the flood plains around Lake Tonle Sap (after Araki et al., 2005)

In addition, new research programmes, “Environment Research Development in Angkor, Cambodia (ERDAC Programme)” led by Shinji Tsukawaki and “Traditional Home Garden Research in Southeast and East Asia” led by Yoshihiko Hirabuki, both supported by JSPS have started since 2006 in and around the Angkor Monument Complex and Lake Tonle Sap, Cambodia on the basis of the results of the EMSB and EMSB-u32 Programmes.

Importance of Lake Tonle Sap in Cambodia

- The largest freshwater lake in Southeast Asia;
- 19th-ranking in the world lakes (highest water level);
- largest freshwater lake in the world situated in tropical lowlands;
- Marked seasonal changes in its water area and depth
- lowest water level: 3,000km² in area, less than 1 m in depth;
- highest water level: 18,000 km² in area, more than 8 m in depth;
- A great variety of organisms, fish in particular;
- Having real relevance for people’s life, society and culture of Cambodia since the pre-historic time;
- The most important heritage in Cambodia rather than the Angkor monument complex;
- A great variety of aquatic organisms;
- Water resources;
- Safe and comfortable life and watercourses, etc.;

- Common heritage of the whole human race;
- Biological resources such as DNA resources;
- Scientific interests, etc.

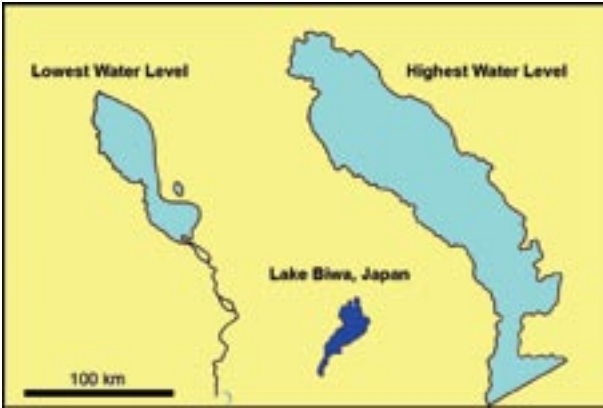
Everything of the lake must be described and recorded to sustain this important lake in future



lowest water level

highest water level

Seasonal Change of Water Area

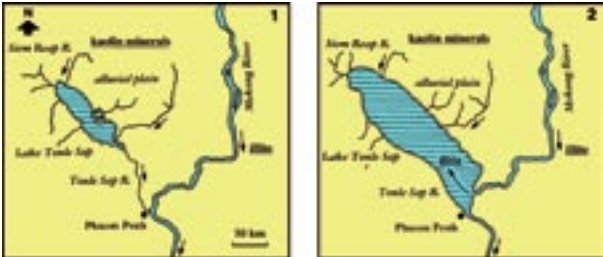


Understanding the Past Environment and its changes: “Tonle Sap 96 and 21 Programmes”

About Tonle Sap 96 & 21 Programmes

- “Geological and Environmental History of Lake Tonle Sap” as the background of the Present environment of the lake
- Tonle Sap 96 Programme (1996): Geological and environmental history of Lake Tonle Sap, Cambodia during the last 6,500 years
- Tonle Sap 21 Programme (2000-2002): Geological and environmental history of Lake Tonle Sap, Cambodia during the last 20,000 years

Mechanism of Change



ebbing season (November - April)

flooding season (May - October)



Sediment Sampling on the Lake

Change of Water Depth



lowest water level (centre of the lake)

highest water level (margin of the lake)

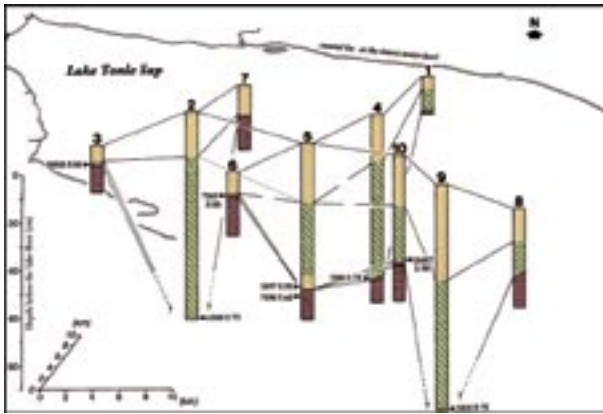
An Example of Cored Sediments



compact mud (sediment of palaeo-Tonle Sap)

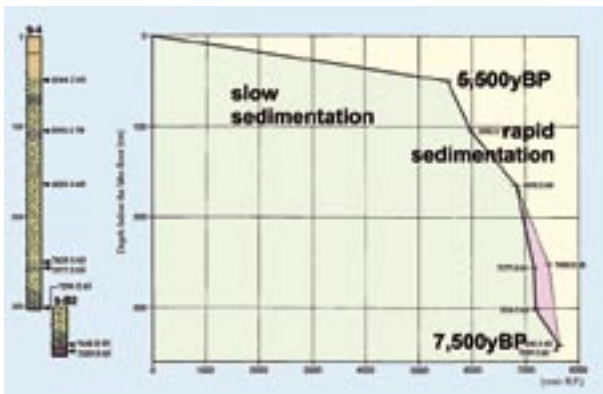
semi-consolidated clay (basement of lake)

Result of Core Samplings in North Lake



Lithological Correlation of TS21-1 Cores

Result of Radiocarbon Datings



Lake Tonle Sap in 7,500 y BP

Taking all these factors and results of previous studies into consideration, it is inferred that Lake "Palaeo-Tonle Sap" existed for a period from 7.6 to 5.5 Ka. Palaeo-Tonle

Sap was a much smaller lake or lakes, rather than at the present time situated in the central axis area of modern Lake Tonle Sap.



Lake Tonle Sap in 6,500 y BP

The palaeo-lake(s) was isolated from major fluvial systems such as the Mekong River in the Indochina Peninsula at that time and muddy

sediments derived mainly from alluvial plains around the lake were filling up the lake(s) rapidly.

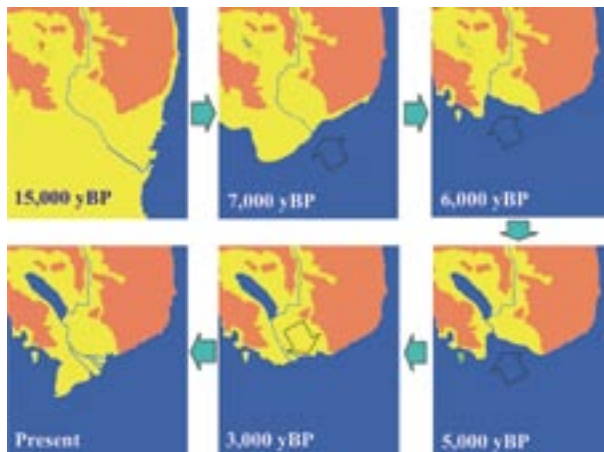


Lake Tonle Sap in 5,000 y BP

Because of the connexion of the lake with the Mekong River, caused probably by the rapid rise of sea-level after LGM and its high-stand at the Holocene Optimum, the

present environment of Lake Tonle Sap appeared at 5.5 Ka and the environment has existed continuously till the present day, and will exist in future.

Geological History of Lake Tonle Sap



Important Information from TS96 & 21

The Present natural environment of Lake Tonle Sap was created about 5,500 y BP due to the connexion with the Mekong River, and it has existed since that time without major change.

In spite of the lake shows dynamic seasonal change of water level and water area, it keeps the balance between sedimentation and erosion through a year. This means that the lake will exist in future if no major environmental change of both natural and artificial will occur in and/or around the lake.

Description and Record of the Present Environment EMSB and EMSB-u32 Programmes

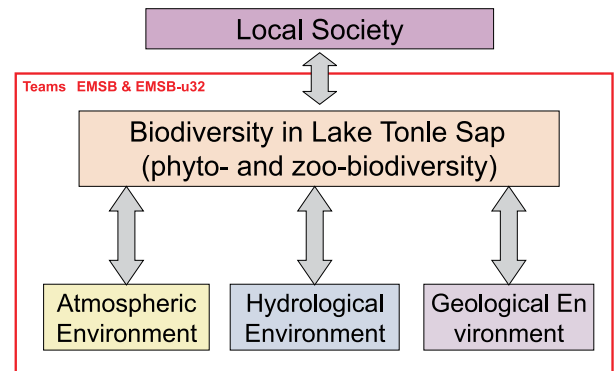
Background of EMSB Team

- Research Theme: Evaluation of Mechanisms Sustaining the Biodiversity in Lake Tonle Sap, Cambodia.
- Based on the results of “Tonle Sap 96 and 21 Programmes: Environmental Changes in Lake Tonle Sap in Cambodia during the Last 20,000 Years -”
- Three-Years (2003 - 2005) joint study between Cambodia and Japan.
- Consisting four research groups and scientific and collaborating members and support party from various research fields: Invertebrate and Vertebrate Zoology, Plant Ecology (Botany), Hydrology (Limnology) and Sedimentary Geology.
- Funded by Japan Society for the Promotion of Science: Grant-in-Aid for International Scientific Research (International Field Research).

Background of EMSB-u32 Team

- UNESCO Japanese Fund-in-Trust MAB-IHP Joint Programme “Ecological and Hydrological Research and Training for Young Scientist in Tonle Sap Biosphere Reserve, Cambodia: Research and Training for Young Scientists”. Nickname “EMSB-u32 (under 32 years old)”.
- Working under the supervision of “Tonle Sap EMSB Programmes: Evaluation of Mechanisms Sustaining the Biodiversity in Lake Tonle Sap, Cambodia”.
- Two-Year (2004 - 2005) joint research between Cambodia and Japan.
- Consisting eight regular members from both Cambodia and Japan with support parties from various research fields.
- Invertebrate Zoology (plankton) and Vertebrate Zoology (fish), Plant Ecology (Botany), Hydrology (Limnology) and Sedimentary Geology.

Composition of the Teams



Missions of EMSB Team

- First Mission (EMSB-1: November - December 2003): the northern part of the lake, off Siem Reap at the highest water level.
- Second Mission (EMSB-2: May - June 2004): the northern part of the lake, off Siem Reap at the lowest water level.
- Third Mission (EMSB-3: November - December, 2004): the northern part of the lake off Siem Reap and the southern part of the lake off Chhunok Tru at the highest water level.
- Fourth Mission (EMSB-4: May - June, 2005): the northern part of the lake off Siem Reap and the southern part of the lake off Chhunok Tru at the lowest water level

Missions of EMSB-u32 Team

- First Mission (EMSB u32-1 and EMSB-3: November - December, 2004): the northern part of the lake off Siem Reap and the southern part of the lake off Chhunok Tru at the highest water level
- Optional Mission (EMSB u32-1a: January, 2005): the northern part of the lake off Siem Reap and the southern part of the lake off Chhunok Tru at the falling water level
- Second Mission (EMSB u32-2: February - March, 2005): the northern part of the lake off Siem Reap and the southern part of the lake off Chhunok Tru at the falling water level
- Third Mission (EMSB u32-3 and EMSB-4: May - June, 2005): the northern part of the lake off Siem Reap and the southern part of the lake off Chhunok Tru at the lowest water level

- Fourth Mission (EMSB u32-4: July - August, 2005): the northern part of the lake off Siem Reap and the southern part of the lake off Chhunok Tru at the rising water level.



Activity of Zoology Group



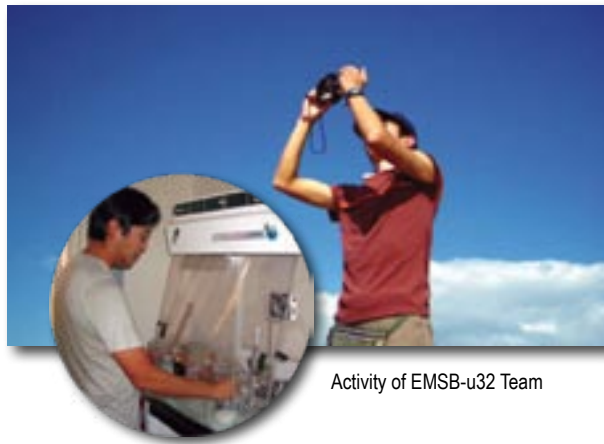
Activity of Plant Ecology Group



Activity of Hydrology Group



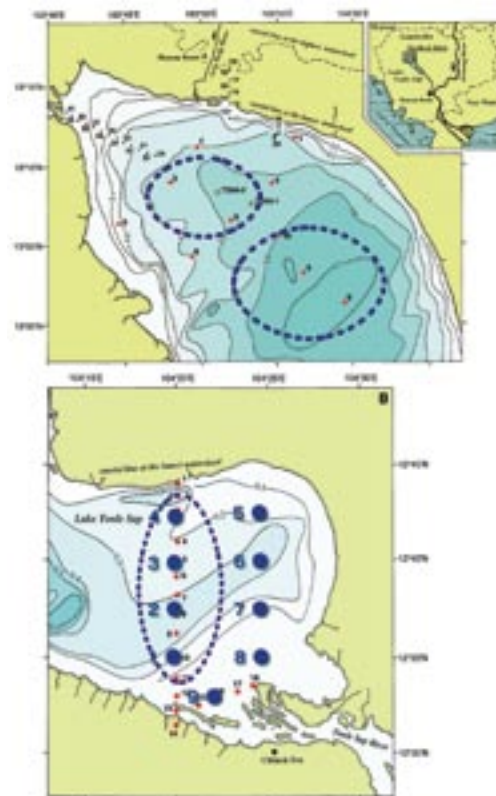
Activity of Sedimentology Group



Activity of EMSB-u32 Team

Result of Sedimentology Group

Three small lakes (Palaeo-Lake Tonle Sap) were situated before 5500 y BP.

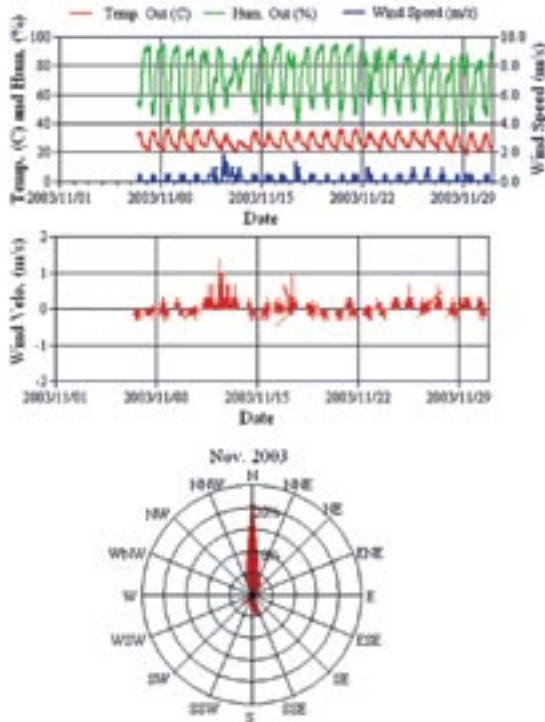


Sampling sites of TS21-1 survey

Result of Hydrology Group

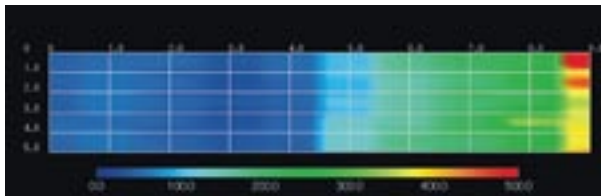
The difference of water quality under the low water level conditions is mainly recognised in the northern parts of the lake.

Changes in water quality in dry season is induced by the increase of discharge from inflowing tributaries attendant with lowering of lake water level.



Monthly weather data for November 2003 in Siem Reap

Cross section of the water quality in Lake Tonle Sap in dry and wet seasons from 2000 to 2007



an example in wet season in 2007

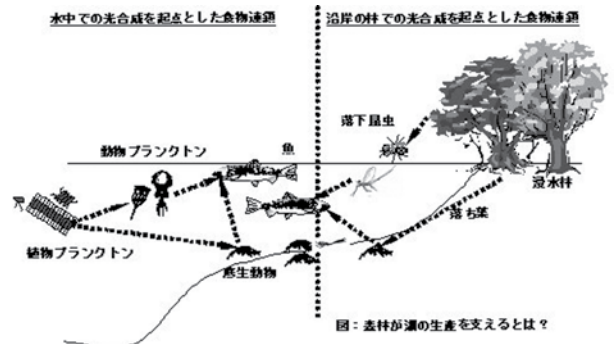
Result of Zoology Group (Invertebrate)

Occurrences of zoobentos in offshore Lake Tonle Sap

Season	North basin		South basin	
	Flooded	Dry	Flooded	Dry
Macrofauna				
Mollusca	+	+	+	+
Oligochaeta	++	++	++	++
Natantia	+	+	+	+
Amphipoda	+	+	+	+
Chaoboridae	+	+	+	+
Chironomidae	+	+	+	+
Total density m ²	104-415	326-1300	490-580	300-490
Meiofauna				
Nematoda	++	+	++	++
Ostracoda	+	++	+	+
Copepoda	+	+	+	+
Total density m ²	2000-7600	5200-10800	7600-16000	6000-13200
Wet weight (g m²)				
Oligochaeta	0.1-1.6	0.1-2.2	0.6-2.8	0.3-0.5
Chironomidae	0-0.1	0-0.1	0-0.1	0-0.1
Mollusca	0.1-66	13-320	244-365	134-137
others	0	0	0.3-0.6	0
Total wet wt (g) m ²	0.1-67	13-320	246-366	135-138

Result of Zoology Group (ecosystem)

Relationship between ecosystem and marginal forests in Lake Tonle Sap



Result of Zoology Group (Ichthyology)

Ichthyofauna surveys have recorded 140 species in 80 genera and 35 families on the basis of specimens collected. Prior to the current study about 500 species were believed to occur in the region. Based on reliable literature and museum specimens, the current number of species is in fact probably around 200.



A new genus "*Tonlesapia tsukawakii*"

Final results of the EMSB and EMSB-u32 Programmes will be published in 2008!

Preservation the Environment for the Future "ERDAC Programme"

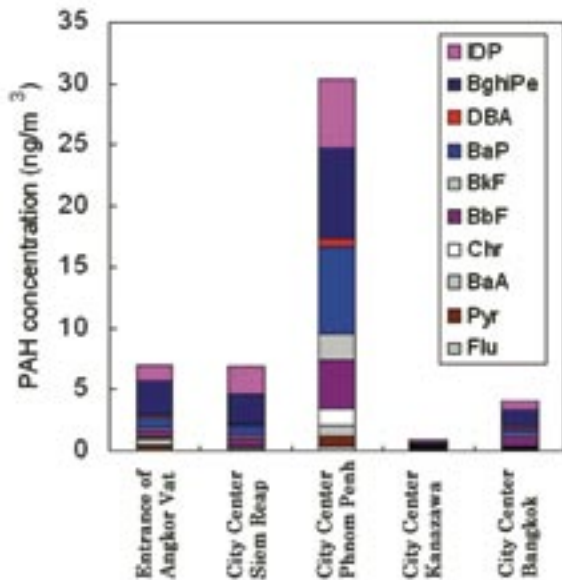
New Research Team ERDAC

"Environment Research Development in Angkor, Cambodia"

because we must develop researches of the natural environment of the Angkor Monument Area to sustain and preserve the monuments as same as to assure healthy and safe life of local people, and to maintain the great biodiversity in Cambodia.

Atmospheric Pollution in Angkor Vat

Air pollution at the entrance of Angkor Vat is almost same or higher than that of the city centre of Bangkok, Thailand and much higher than that of Kanazawa, one of famous sight-seeing city in Japan (after Furuuchi *et al.*, 2005).



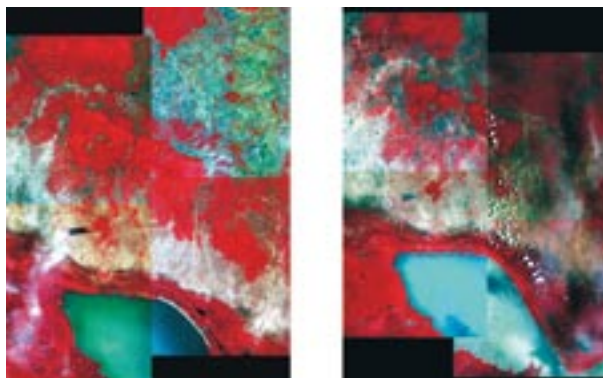
PAH (Poly Aromatic Hydrocarbon): a kind of carcinogenic substance

Environmental Pollution in Angkor

- Destruction of forests;
- Red water in the pond;
- Erosion of riverbanks;
- Air pollution by automobiles.

Environmental Destruction in Angkor

Rapid changes caused by development



1991

2005

Background of the Team ERDAC

- Researches in Lake Tonle Sap as the Heart of Natural Environment in Cambodia.
- Tonle Sap 96 and 21 Programmes: Geological and Environmental History of Lake Tonle Sap, Cambodia during the last 15,000 Years (1996, 2000 - 2002).
- Tonle Sap EMSB and EMSB-u32 Programmes: Evaluation of Mechanisms Sustaining the Biodiversity in Lake Tonle Sap, Cambodia (2003 - 2006).

All data and informations of the previous programmes are applicable to develop the environmental researches, monitoring, evaluation and eradication, in the Angkor Monument Area

An Example: Difference of Freshwater Fish Diversity between Lake Tonle Sap and Moats of Angkor Vat

Fishes in the moats were originated in the lake, and were collected at random in the markets in Siem Reap, then released in the moats about 10 yrs ago. 158 species in the lake (after Motomura *et al.*, 2005), only 8 species, all flesh-eating, in the moats (Motomura, unpublished).

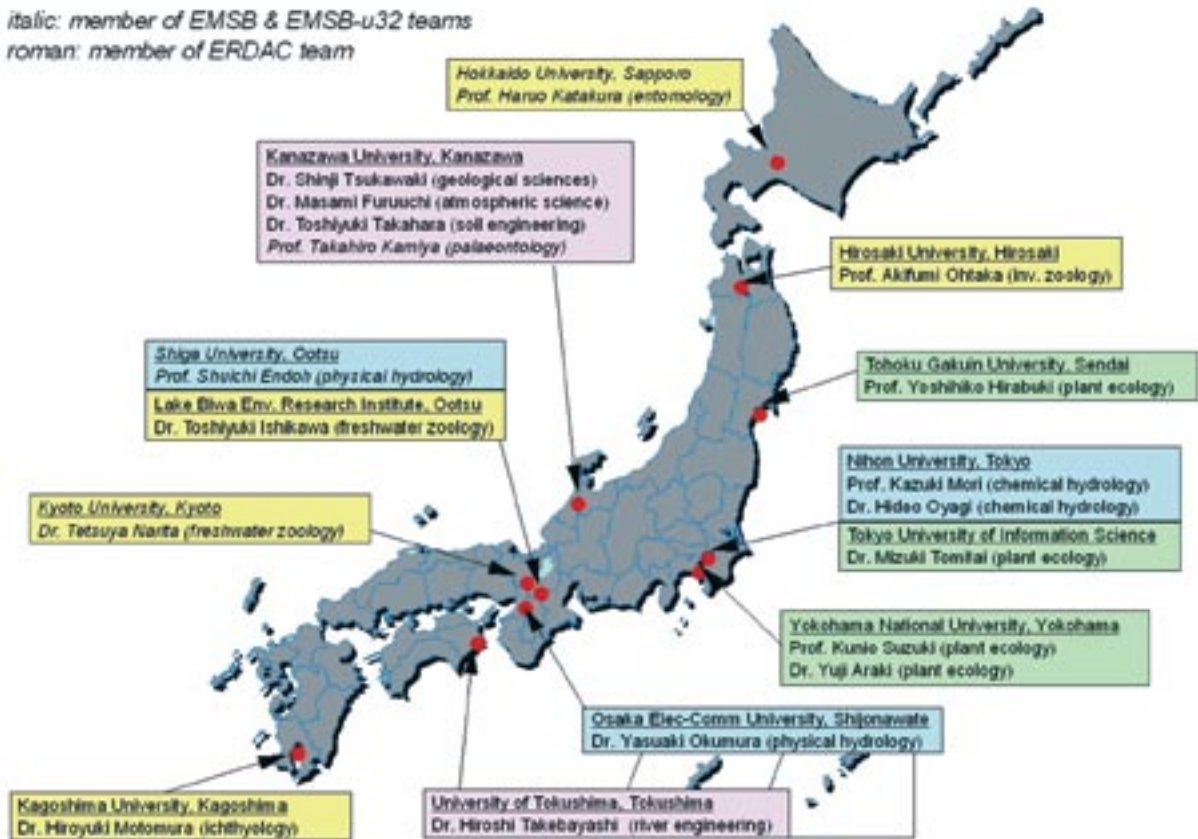
Composition of the Team ERDAC

1. Atmospheric Environment Group.
2. Forest Environment Group.
3. Water and River Environment Group:
 - 3-1. Water Environment Subgroup;
 - 3-2. Aquatic Biodiversity Subgroup;
 - 3-3. River and Soil Engineering Subgroup.

under tight cooperation with the departments of the APSARA Authority, Department of Water and Forestry in particular.

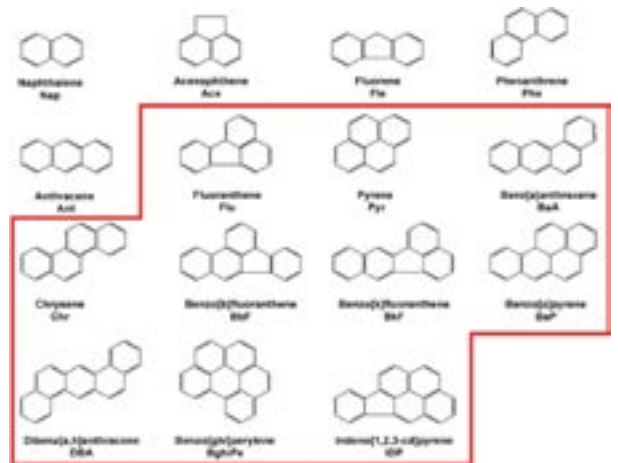
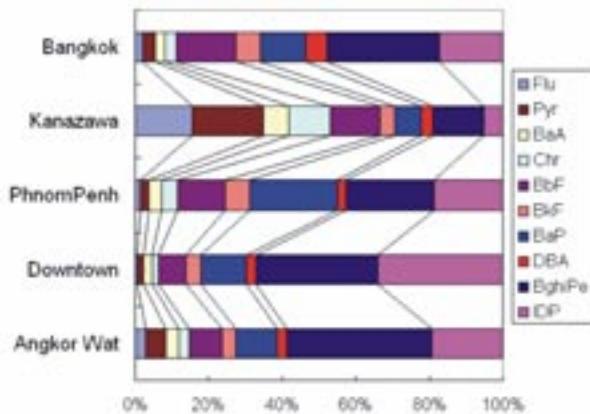
Members of Teams ERDAC & EMSB

italic: member of EMSB & EMSB-u32 teams
 roman: member of ERDAC team



Research Techniques and Procedures

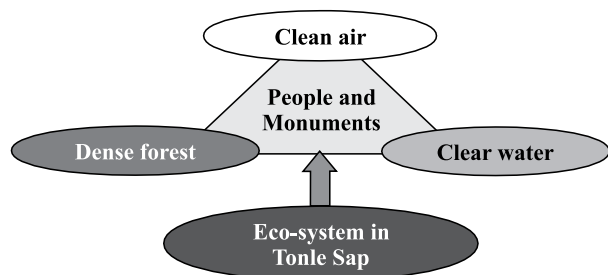
e.g. Atmospheric Environment



Identification of actual sources of pollutants by a year-round monitoring and laboratory analyses of the air pollution, and evaluation of the pollutants, then proposal plans for eradication or decrease of them.

Objective of the Team ERDAC

Assistance to realize harmony and sustainable development among them



Asian Home Garden Project

“Description of Asian Traditional Home Gardens to Record Wisdom and Wits for Future”

Research Areas of Home Gardens

- North East Japan (Y. Hirabuki)
- South West Japan (T. Miyagi)
- Cambodia (S. Tsukawaki)
- South Thailand (K. Suzuki)

I am looking forward to making a report for all you on the results of both ERDAC Programme and Home Garden Project!

The Agusan Marsh - Two Years after Pakse

Dr. Jurgenne H. Primavera

Senior Researcher, Aquaculture Department - Southeast Asian Fisheries Development Centre (AQD-SEAFDEC), Philippines

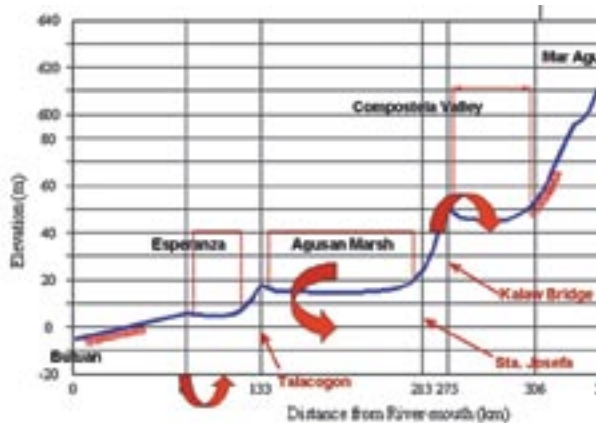
Agusan River Basin

- **Lower Basin:** Agusan River-Butuan Bay
Downstream of Agusan Wetland from Talocogon.
- **Middle Basin:** Agusan Marsh
Between Talocogon and Sta. Josefa including Agusan Marsh.
- **Upper Basin** (watersheds/catchment): Mountain ranges of Agusan Norte, Agusan Sur, Compostela Valley
Upstream of Sta. Josefa

Agusan River Basin	Area (ha)
Lower	444,599.2
Middle	467,689.0
Upper	291,745.8
Total	1,204,034.0



Agusan River Profile



Upper Agusan River Basin



Middle Agusan River Basin

The Agusan Marsh

- Coordinates of 8°00'-8°19'N and 125°52'-126°02'
- Agusan River Basin = 1.2 million ha.
- Agusan Marsh Wildlife Sanctuary (AMWS) = 111,540 ha.
- 4,286 mm/yr ave. rainfall: 59 lakes in the dry season, single waterbody in rainy season.
- acts like giant sponge, soaking up excess water from mountains during rainy season, creating a huge area for wetland wildlife and protecting downstream

towns, cities including Butuan, from catastrophic floods.

- Protection: 1994 NIPAS, 1996 Wildlife Sanctuary or AMWS (Pres. Proc. 913), 1999 Ramsar Convention.

Hydrology

- A. Marsh is floodplain of Agusan River, 3rd longest river in the country.
- 9 major river basins drain into Marsh.
- distinct annual flooding cycle with max. water level Oct-Feb up to 4 m above min., when whole floodplain is inundated min level in May with open water confined to floodplain and oxbow lakes, water table measures 10-30 cm below soil surface over large areas.

Habitats

- 1) **Riverbanks** – slightly dif. vegetation fr. lowland, least flooding in raised banks; cleared along major rivers for transport, exist only in isolated creeks.
- 2) **Flowing water** - high sediment loads, aggravated by deforestation, reduce diversity because of interfere with respiration of fishes etc.
- 3) **Open water** (oxbow lakes, floodplain lakes, ponds)
 - Clear water: colored by humic acid, high rate of organic decomposition, floating/submerged macrophytes that support high biomass/species diversity of invertebrates, fishes, fish-eating birds
 - Turbid water: silt load inhibits submerged macrophytes.
- 4) **Herbaceous swamp** – open, very extensive; mainly sedges, grasses, ferns related to inundation
 - almost undisturbed bec. difficult to penetrate, burned for access purposes.
- 5) **Scrub forest/swamp** – herbaceous swamp with stunted Barringtonia, Nauclea; used by birds for cover, roosting.
- 6) **Swamp forest** (4 subtypes)
 - *Terminalia copelandii* forest; fairly common in past but mostly cleared now.
 - Largest/only sago palm forest in Philippines; rarest forest type in Marsh.

- mixed swamp forest (*Barringtonia*, *Nauclea*); still pristine, except for 1960s selective logging; very rare in Philippines.
- pygmy/peat swamp forest, next rarest swamp.

7) **Inundated forest** – inundated but soil not permanently logged.

Surveys

- No serious scientific studies until 1990s.
- 1976 (see Mallari et al, 2001).
- Summer 1991, IPAS field survey teams (plants - J. Davies, P. Gonzales – butterflies, amphibians, lizards, snakes, mammals, J. Diaz - crocodiles, T. Michaelson – birds).
- 9-11 February 1999, Haribon Foundation & CPPAP staff – fauna (amphibians, birds, reptiles, mammals).
- 2-15 June 1999, Prof. G. Arreza & CPPAP staff – flora.
- Oloroso P.A., Roa-Quiaoit H.A.F., Chee J.N. and J.V. Egipto. 2000. Aquatic Inventory of Agusan Marsh. Marine Biological Research Center Department of Biology, Xavier University - Ateneo de Cagayan for NGOs for Integrated Protected Areas, Inc. Quezon City. Unpub. ms.
- Pontillas, U. Frederick A. - crocodiles.

Birds

- > 200 species known to spend part of year in Marsh, making it one of Asia's most important sites for both resident and migratory birds.
- rains October-March, thousands of birds, eg, Purple Heron *Ardea purpurea* migrate from Japan, China, Russia to escape chilly winter winds.
- valuable habitat for waterbirds, eg, ducks, herons, egrets which build nests as water level rises during rainy season (for mating, reproduction).
- refuge of rare Oriental Darter *Anhinga melanogaster*, Purple Swamp Hen *Porphyrio porphyrio*, and threatened Philippine Hawk Eagle *Spizaetus philippensis*, Spotted Imperial Pigeon *Ducula carola* and Rufous-lored Kingfisher *Todirhampus winchelli*.

Biodiversity

Haribon (1999 – 2 days)

- birds: 126 species/47 families (24% endemic)
- amphibians + reptiles: 53 spp. (51% endemic)
- mammals: 15 spp. (33% endemic)

- 17 – undergrowth plants;
- 28 – vines, lianas, epiphytes;
- 36- grasses, ground herbs;
- 65 – butterflies;
- ?? – insects/other invertebrates;
- 17 – fish;
- 21 –amphibians;
- 39 – reptiles (snakes, crocodiles);
- 14 – mammals (bats, squirrels, wild pigs);
- *small population (< 10 adults) of *Crocodylus porosus*, but no *C. mindorensis* (June-July 1999).

Published Studies

- DENR CARAGA-PAWB. Various AMWS documents (Executive Profile, Management Plan, surveys, etc.).
- Davies J., Magsalay P.M., Rigor R., Mapalo A. and H. Gonzales. 1990. A Directory of Philippine Wetlands. AWBPF/HF. Cebu, Philippines.
- Davies J. 1993. Agusan Marsh in the Philippines. Asian Wetland News 6 (2): 20-21.
- Eludo, M. 2002. Agusan Marsh Wildlife Sanctuary: tenurial instrument in Protected Area Management. In Haribon Foundation, DENR, FPE and Birdlife International. Building on Lessons from the Field, Proceedings of Conference on Protected Areas in the Philippines, Davao City, 12-16 Nov. 2001.
- Talde, C.M., Mamaril, A.C. Sr. and M.L.D. Palomares. 2004. The diet composition of some economically important fishes in the three floodplain lakes in Agusan Marsh wildlife sanctuary in the Philippines. Sri Lanka J. Aquat. Sci. 9: 45-56.
- Hubilla, M. and F. Kis. 2006. Janitor fish in the Agusan Marsh – a threat to freshwater biodiversity. The Mouseion 2 (2): 2- 3 Mallari, N.A.D., Tabaranza, B.T., Jr. and M.J. Crosby. 2002. Key Conservation Sites in the Philippines. Agusan Marsh Wildlife Sanctuary. Haribon Foundation and Birdlife International., pp. 351-353.

Peatlands of the Agusan Marsh

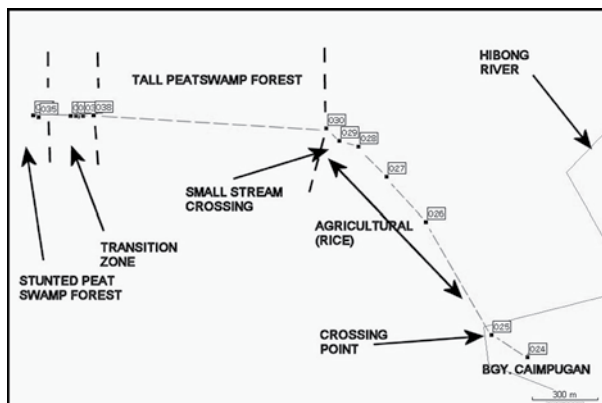
Caimpugan Wetland = Pygmy Forest = Peat Forest
 ("Wonderland")

by Dr. Jon Davies (Dec. 2005)

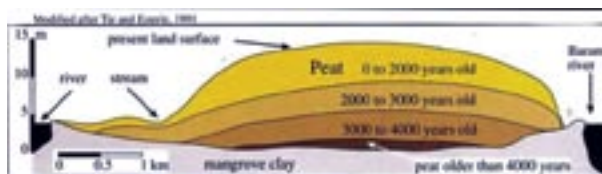


Walking in the peat forest in Caimpugan - feels like foam

- **Location** – West of Bgy Caimpugan, Northeast of AMarsh, West of Hibong River, East of Lake Casiwangan;
- Valued by Manobos for spiritual significance;



- 3 zones: canopy ht (m);
- Forest edge: 25-30 m;
- Transition: 7 m;
- Pygmy: 4 m.



- red-brown peat 2 m deep;
- nutrient-deficiency: stunted trees, *Nepenthes*, parasitic climber *Cassythia filiformis*;
- peat area > 1,000 ha surrounded by taller forest;

- 1st Philippine record: possible peat dome bet. Hibong River and Agusan River.

Recommendations

- review boundaries, zoning of protected area;
- include all peatlands in AMWS;
- document Manobo beliefs to safeguard cultural heritage;
- inventory/identify other peat areas;
- AMWS-PAWB studies, collaborate with universities;
- peat profile;
- inventory of flora;
- water quality, esp. pH, conductivity.

First Scientific Conference on the Agusan Marsh

Agusan Marsh Scientific Conference, Butuan City, 21-23 May 2007

- > 100 participants from academe, government, NGOs, people's organizations, private sector.
- Sponsors: UNESCO Jakarta, DENR Protected Areas and Wildlife Bureau, Philippine Council for Aquatic and Marine Resources Development, Conservation International, Haribon, local government, Butuanon/Agusanon expatriates.
- 14 plenary + 12 poster papers: History, Geology (Shifts in the Position of Agusan River along the Butuan Coastal Plain), Hydrology and Wetland Dynamics, Water Quality and Heavy Metal Contamination, Aquatic Biodiversity (Insects/other Invertebrates, Amphibians, Fishes), Avifauna, Cultural/Socioeconomics, Sago Palm, NGO/LGU Initiatives.
- Workshop on A. Marsh management – Impact of Dams on Hydrology and Ecology, Forest Protection, Biodiversity, Heavy Metals Pollution, Sustainability of the Marsh, and Science-based Information.



JANITOR FISH IN THE AGUSAN MARSH

A Threat to Freshwater Biodiversity

Marianne Hubilla, UPV-CFOS and Ferenc Kis, PENRO-Agusan del Sur

Biological invasion or the spread of an invasive species from its native place to other parts of the world, usually by human vectors, is an ecological problem the Philippines is facing today. There are two well-known cases of biological invasion in the country. These are the introduction of Nile tilapia and janitor fish in freshwater habitats.

South American vermiculated sailfin catfish

Pterygoplichthys disjunctivus



- invaded the Agusan Marsh (rivers, creeks of Talacogon, La Paz, Loreto, Bunawan, Rosario, San Francisco, Veruela and Sta. Josefa);
- also found in Laguna Lake and nearby rivers in Luzon, northern Philippines;
- total catches of fishermen: 1-50 individuals per fishing trip.



Sucaldito and Nuneza (2007)

Exotic Fish/other Species

Xavier University Survey, 2000:

- 17 fish species/9 families, including pigok *Therapon* sp., in floodplain lakes, forest swamp, herbaceous swamp;
- among top 5 species WERE 3 EXOTICS!! – African Catfish *Clarias gariepinus*, Nile Tilapia *Oreochromis niloticus*, and Common Carp *Cyprinus carpio*;
- invasive Golden Apple Snail *Pomacea canaliculata*.

SAGO PALM (*Metroxylon sagu*): a good substitute for NIPA?

Virgilio C. Dela Cruz, ERDS-DENR, Caraga

- sago shingles last 15-20 yrs as roofing, longer as wallings;
- service life of sago shingle 4-5x nipa shingle;
- 2 sago leaves = 1 shingle at P1.10 (double selling price of nipa);
- therefore shingles most important product derived from sago palm;
- coastal folks claim sago shingles more durable than galvanized iron.

Workshop On Agusan Marsh Management

Impact of Dams on Hydrology and Ecology, Forest Protection, Biodiversity, Heavy Metals Pollution, and Science-based Information.

PHP9.2 Billion (US\$210 M) Agusan River Basin Development Project



Project Area Location 2005-2006

Objectives: Agusan River Basin Development Master Plan

- Resource development of water supply/sanitation, irrigation/ drainage, hydropower, flood protection and drainage, fishery and forest/watershed development, considering upstream and downstream conflicts;
- Balanced use of resources vs need to protect resources;

- Reduction of water related diseases;
- Appropriate water price structure (social/economic commodity);
- Management of water quality and water use/allocation in integrated, environmentally sustainable way based on finite resource;
- Control/management of water pollution;
- Sustainable management, conservation, restoration and development of terrestrial areas in the Basin;
- Development interventions are planned, implemented, monitored and evaluated in environmentally sustainable manner;
- Asset reform of communities;
- Improve community access to various services;
- Employment and livelihood opportunities.

The Agusan River Basin is envisioned as a pillar of peace-loving, prosperous and empowered citizenry with equitable wealth anchored on a well managed and balanced ecosystem for a sustainable agri-industrial development and eco-tourism destination.

Aims

- Reduction of poverty in the Basin focusing on equitable and sustainable development;
- Enhancement of Basin resources developments based on the holistic approach and knowledge base (available knowledge, study on water budgets??);
- Development of Basin resources based on resource management of social, economic and environmental soundness and sustainability;
- Community involvement and participatory approach;
- Development of basin-wide implementing organization (= Agusan River Basin Development Authority).

ARBMP List of Projects by Key Theme and Cost, 2006

No.	Program	No. of Projects	Estimated Cost (P000)	% Share
1	Water Quality Management	2	93,223	1.0%
2	Flood Management	5	2,984,587	31.3%
3	Water Resources Development	25	2,615,920	27.4%
4	Watershed Management	152	3,445,457	36.1%
5	Agusan Marsh and Wildlife Sanctuary Management	2	47,979	0.5%
6	Indigenous Peoples Development	78	229,973	2.4%
7	River Basin Organization Development	7	117,200	1.2%
Total ARB Master Plan		271	9,534,339	100.0%

ARBMP List of Projects by Type, 2006

Type of Project	No. of Projects	Estimated Cost (P000)	% Share
Capacity Building	26	44,060	0.5%
Establishment/Strengthening of Data Sources and Establishment of Databanking Network	19	42,573	0.4%
Management Plan and Water Resources Studies	11	103,927	1.1%
Feasibility Studies	17	172,930	1.8%
Feasibility Studies With Indicative Total Project Costs When Implemented	6	460,900	4.8%
Implementable Projects With Completed Feasibility Studies	131	5,526,136	58.0%
Projects Dependent on Implementation of Initial Projects	61	3,183,813	33.4%
Total ARB Master Plan	271	9,534,339	100.0%

A POSITION PAPER OF CONCERNED SCIENTISTS FOR A SCIENCE-BASED RESEARCH AND DEVELOPMENT PROGRAM FOR THE AGUSAN MARSH

The recently- concluded First Scientific Conference on the Agusan Marsh highlighted the ecological and economic importance of the Agusan Marsh to Eastern Mindanao. Comprising 59 lakes, the Marsh encompasses the 111,000-hectare Agusan Marsh Wildlife Sanctuary and is part of the 1.2 million-hectare Agusan River Basin (ARB). With a yearly rainfall of over four meters, the Marsh acts as a giant sponge that soaks up excess water from streams arising in Agusan del Sur, Agusan del Norte and Compostela Valley, and protects downstream towns and cities from devastating floods.

Conference participants representing Marsh communities, LGUs, NGOs and other stakeholders expressed concern over initiatives to exploit Marsh resources for irrigation, agriculture and forestry. These date back to the late 1970s, e.g., Asian Development Bank (ADB) Loan No. 210 PHI-SF for irrigation projects in Veruela, Agusan del Sur. Of particular concern were the ecological, socioeconomic and cultural impacts of the various interventions including the construction of dams under the proposed PhP9.2 billion Agusan River Basin Development Master Plan. Also noted were inadequate enforcement of forest laws despite official protection conferred by NIPAS and Ramsar status, and heavy metal pollution from mining activities and associated public health issues.

We, members of the scientific community based mainly in Northern and Eastern Mindanao, stress that the proposed dams and other interventions **require science-based information** especially on the hydrology, sediment dynamics and ecology of the Agusan Marsh. Proactively, we have started to put together an Agusan Marsh R&D framework in response to the various concerns of Marsh stakeholders described above.

Therefore we call on the Asian Development Bank, and agencies of the national/regional/local government units, and other decision-makers to ensure that scientific research and the corresponding funding support are given due importance in order to generate the basic information (e.g., on water budgets) required before any interventions can be implemented or even planned.

Signed, the 19th day of June 2007, Butuan City:

Agusan Marsh Research and Development Framework

PCAMRD Zonal Meeting, Butuan City, 19 June 2007

Basic

a) Physical

- Reconstruction of Flood Events – Modelling;
- Tectonism and Hazards Water Budgets;
- Water Quality – Fishing areas, Drinking water, Pollutants, coring/history of heavy metals to establish baseline data; bioavailability and toxicity.

b) Biological

- Trees – Ethnobotany (LKS, IKS) /Medicinal-Traditional Uses;
- Aquatic Plants – Habitats eg. Peat Forest;
- Fauna – Insects/Vertebrates (Fish, Herps, Birds) Microorganisms.

Applied

- Sago Palm;
- Screening of Forest Species for Commercial Uses (timber, medicinal, etc.).

Other Topics

- Socio-demographics/economics: Economic valuation studies;
- documentation of resource uses of various habitats.

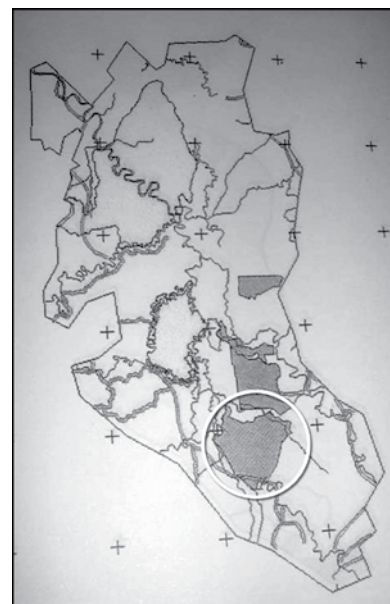
Threats to the Marsh

1. Development with no scientific data – e.g., dams.
2. Deforestation (= logging)
 - legal (IFMAs)
 - illegal – small-scale clearing (for crops) – large-scale (commercial)
3. Exotic/introduced species.
4. Heavy metal contamination.

Industrial Forest Management Agreement - IFMA

(Phil. Star, 20 April 1995)

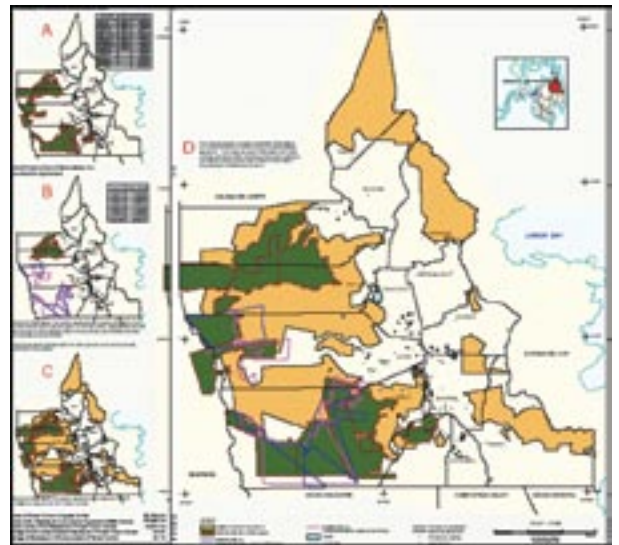
- IFMA allows cutting of inadequately stocked/ open and denuded forest & preserves uncut forests; designed to replace notorious TLAs.
- Sep. 1995 – Environment Sec. Alcala suspended IFMA clearcutting due to reported anomalies.
- Rexcon Farms, Surigao Sur - 12,000 cu m/PhP50M logs seized by DENR not possible from 1,079 ha “inadequately stocked” forests; Pres. Adviser helped nullify suspension.
- Provident Tree Farm, Agusan Sur (corporate ADB borrower) - ave. diameter of wood larger than from “inadequately stocked” forests seized by DENR; wood later released.
- ADB objected to suspension of clearcutting bec. it would hinder ability of borrowers to pay back loans (\$25M loan to IFMA), and endanger 2nd loan.
- 15% of IFMA forest lands (deliberately) misclassified as denuded/ inadequately stocked.
- legal DENR document for contraband products, “new strategy for illegal logging”.



- Dec 2001- signing by DENR & Shanalynne (owned by N. Zealander-Singaporean), multibillion peso pet project of ex-Environment Secretary.
- industrial pulp co-production & forest conservation in 250,000 ha, designed by Finnish firm.
- \$1billion investments eg, tree cloning lab/seedling bank for massive refo.
- dredging of Nasipit port, railway system.

Background

- early 1990s – awarding to Shanalynne by Central Office of 110,00 ha (5 parcels) for forestry, no info to regional DENR.
- 1996 - application disapproved bec. satellite photos (from NGO) showed area heavily forested.
- 2005 – lifting of logging ban in Caraga.



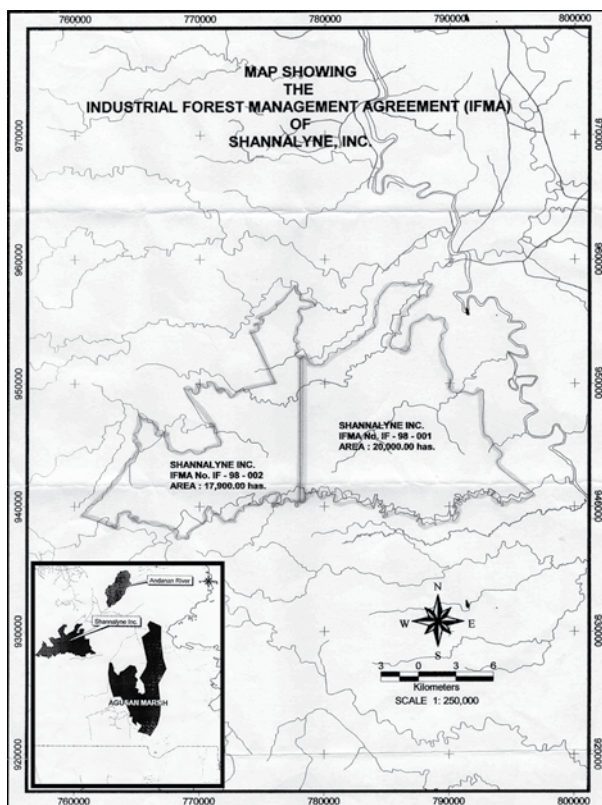
Shanalynne - IFMA

Agusan Marsh as Ancient Inland Sea

- tree species: Marsh *Terminalia copelandi* vs coastal *Terminalia catappa*;
- coastal *Hibiscus tiliaceus*;
- brackishwater crocodile *Crocodylus porosus*;
- < 20 m elevation between Agusan Marsh and Butuan Bay;
- Presence of shell middens.



Dracontomelon dao



IFMA Name	IFMA No.	Province	Area	Contracted	Date/Engine	Status
NASIPIT LUMBER CO., INC.	IFMA 18	AGUSAN DEL NORTE	2014	26-Jun-82	31-Dec-07	Existing
SKYLINE AGRO-FOREST CORP.	IFMA NO. 05	AGUSAN DEL NORTE	2000	18-Mar-91	31-Dec-15	Existing
BUTUAN FALCATA WOOD PRODUCTS, INC.	IFMA 94-007	AGUSAN DEL SUR	980	1-Jun-94	1-Jun-19	Suspended
CASILAYAN SOFTWOOD DEV CORPORATION	IFMA 059	AGUSAN DEL SUR	5000	28-Jul-83	31-Dec-08	Existing
CASILAYAN SOFTWOOD DEV CORPORATION	IFMA 07-0007	AGUSAN DEL SUR	12727	8-Jun-07	31-Dec-31	New
PROVIDENT TREE FARMS, INC.	IFMA 011	AGUSAN DEL SUR	11500	21-Jul-82	31-Dec-07	Existing
ITP DEV'T. CORP.	IFMA 25	AGUSAN DEL SUR	8201	8-Mar-80	31-Dec-14	Existing
PROVIDENT TREE FARMS, INC.	IFMA 001	AGUSAN DEL SUR	20770	14-Oct-91	31-Dec-17	Existing
ROYAL MATCH INC.	IFMA 019	AGUSAN DEL SUR	5800	25-May-92	31-Dec-17	Existing
EXTENSIVE WOOD PROCESSING CORPORATION	IFMA 23	AGUSAN DEL SUR	6000	9-Jun-92	31-Dec-23	Existing
ROYAL MATCH INC.	IFMA 94-009	AGUSAN DEL SUR	1000	11-Aug-94	30-Jun-19	Existing
EMCO PLYWOOD CORP.	IFMA 10-08-002	AGUSAN DEL SUR	1712	9-Nov-82	9-Nov-01	Existing
SHANNALYNE INC.	IFMA 98-001	AGUSAN DEL SUR	20000	15-Jun-98	31-Dec-23	Existing
SHANNALYNE INC.	IFMA 98-002	AGUSAN DEL SUR	17900	15-Jun-98	31-Dec-23	Existing
TECLAND INC.	IFMA 98-003	AGUSAN DEL SUR	11112	15-Jun-98	31-Dec-23	Existing
TECLAND INC.	IFMA 98-004	AGUSAN DEL SUR	12322	15-Jun-98	31-Dec-23	Existing
PIPOC RESOURCES INC. (PARCEL 2)	IFMA 35	AGUSAN DEL SUR	8600	15-Nov-82	7-Dec-07	Existing
ARAS-ASAN TIMBER CO., INC.	IFMA NO. 13	SURIGAO DEL SUR	1600	22-Feb-84	31-Dec-08	Existing
IREXION FARMS, INC. (PARCEL 1)	IFMA 94-002	SURIGAO DEL SUR	1562	24-Jun-82	31-Dec-10	Existing
IREXION FARMS, INC. (PARCEL 2)	IFMA 94-002	SURIGAO DEL SUR	129	24-Jun-82	31-Dec-10	Existing
PIPOC RESOURCES INC. (PARCEL 1)	IFMA 35	SURIGAO DEL SUR	45590	15-Nov-82	7-Dec-07	Existing
MEJORE WOODWORKS, INC. (PARCEL 1)	IFMA 03-2006	SURIGAO DEL SUR	27,241	31-Aug-06	31-Aug-31	NEW
MEJORE WOODWORKS, INC. (PARCEL 2)	IFMA 03-2006	SURIGAO DEL SUR	8,328	31-Aug-06	31-Aug-31	NEW
ARTIMCO, INC.	IFMA NO. 13-2007	SURIGAO DEL SUR	11,022	5-Jul-07	30-Jun-32	NEW

244,046 ha = total area IFMAs, 59% in Agusan del Sur

Flora Caraga

Propagating Native Plants and Tree Species that are Economically, Traditionally, Culturally and Historically Important to Butuan, Agusan, Caraga Region and the Philippines, and Protecting their Groves and Mother Trees.

Agusan Marsh Strategies

1. ADB Agusan River Basin Development Project/
Others
 - petition for science-based development;
 - lobby thru intl. NGOs (eg Oxfam).
2. Enforce existing protection/Increase protection
 - national: NIPAS, AMWS;
 - Ramsar;
 - UNESCO Biosphere Reserve?
3. 'Presence' or ongoing activity or (as deterrent to illegal activities) eg, research
 - Global Environment Centre: Peatland Project;
 - international collaboration;
 - Jan. 2008 Proposal Writing Workshop;
 - others: Whitley Fund for Nature, Ramsar Small Grants.

4

**SeaBRnet
and Regional topics**

Ecosystem Rehabilitation of Lake Biwa and its environs, Japan - a socio-ecosystem approach

Prof. Kazuhiko Ogino

Professor Emeritus, Forest Ecology, University of Shiga Prefecture, Japan

Lake Biwa

Lake Biwa is located in Shiga Prefecture, Kinki Region of Honshu Island. It is the largest fresh water lake in Japan. Millions of people are living on the coast and its environs. More than 14 millions of downstream inhabitants also lives on Lake Biwa.

The surface area covers 674 km² and the depth reaches 103m at its maximum, and averages 41m. Water capacity is estimated at 27.5 billions m³. It also is one of the ancient lakes ranking the Baikal and the Tanganyika. The natural history of the lake dates back ca. 4 million years before present. It develops many indigenous organisms, valuable fresh water and terrestrial ecosystems as well.

People living in Shiga Prefecture is deemed responsible of the resource management and environment protection of Lake Biwa and its environs.

Statistics of Shiga Prefecture

Shiga prefecture inhabited by ca. 1.4 million population covers 402 thousand ha in total, 98% of the areas or 384 thousand ha feed Lake Biwa.

Forested areas cover 202 thousand ha. of which 184 thousand ha are privately owned, farm land, mainly paddy 61 thousand ha, others 69 thousand ha. Forest management plan so far mainly directed artificial plantations, Sugi and Hinoki having covered 78 thousand ha. of area. The naturally regenerated forest ca. 100 thousand ha. were always politely or boldly put aside from the forestry promotion policy.

People's Mountain Life in 1950s

In 1950s people's devices in the mountains were mainly of manually driven ones as wooden sledges, hand saws and hand axe etc. Charcoal making was practiced in the extensive areas of mountain villages. Forestry labour



Regenerated beech forest by sprouting, 60 years ago.

as logging, site preparation, tree planting, weeding were operated by man power. Seasonal slash and burn agriculture went higher up into the mountains where upland rice, buckwheat and so on were cultivated. Practically no forest roads were available and no cars could be driven into the forest. Nevertheless, network of woven footpaths led people deep into the forest. Many people engaged in various types of mountain works. People were economically poor, but they held warm touch of humanity. In their belief wild fruits in season, running waters were given as the blessing of the nature, not the commodities supplied on commercial base. Natural vegetation zones

Located in the central part of Japan, Lake Biwa and its environs are within the realm of the temperate climate. And therefore the vegetation zone of Lake Biwa Plains and lower montane is of Cameria Class, or evergreen oaks, characteristic of the warm temperate. Where the climate is warm in summer but cold in winter belongs to Mid-temperate, deciduous oak vegetation dominates. Upper montane or northern part of the Shiga prefecture is dominated by beech class vegetation, or Sugi (*Cryptomeria japonica*)-beech mixed forest vegetation, characteristics of cool temperate. Due to deep snow during winter, high moor develops on the top of the mountain ridges.

Socio-ecosystem, or people and nature interactive system

People lived in the areas, converted the original vegetation drastically. At present "Natural" Vegetation is hardly encountered. Any piece of land exhibits the results of human interactive work on the nature. Even in the remote deep mountains evidences apparently shows the area was exploited. Mountain villagers practiced charcoal making and seasonal slash and burn agriculture. In some other region of Japan, wood handicrafts as lacquer base, round wood chip were practiced. Small mammals, nuts, berry, wild vegetable and fugi are still well pursued. Big games as bears were the target of the mountain dwellers. Hard livelihood under low resource density

The area should be recognized as the mountain village ecosystem. Original natural cool, mid-temperate, mixed sugi-beech vegetation was extensively exploited. We only see the naturally regenerated secondary forest of beech, or deciduous oaks, which can not be declared the "genuine natural forest".

Paddy farmers deeply depend fuel wood not only for energy but for ash, mineral resources, P, K, Ca, Mg etc., or fertilizer. Lowland hills were widely harvested for fuel wood. Organic matters, branches, litters were collected for compost. Another important fertilizer, N was excreta and urine. Farmers needed forest area in proportion to paddy area. Vegetation originally believed evergreen oaks (*Shiia*, *Castanopsis*, *Quercus* spp.) extensively converted into deciduous oaks (*Quercus serrata*), or red pine (*Pinus densiflora*). Coppice stands or low forest plantation of deciduous oaks (*Q. acutissima*) were introduced. These were the combination of farm and forest, or the farm-forest ecosystem. Farm forest was owned and managed by farmers.



Charcoal kiln remain

In the vicinity of the farm villages people grew Sugi (*Cryptomeria japonica*) high forest for construction purposes.

Both of the mountain village and the farm forest ecosystem are highly contrasted the urban ecosystem, densely populated, intensive energy consuming system. Reforestation Project in 1960s

In 1960s trend in fuel consumption as well as in fertilizer use turned drastically. Petroleum and chemicals were introduced. Farm forest and remote mountains were abandoned. Nobody, even the owners looked the area useless. Forestry Agency led reforestation program to the abandoned remote mountains. Extensive areas of naturally regenerated broad leaved forest were converted into artificial coniferous forest. Sugi (*Cryptomeria japonica*) was the major tree species, Hinoki (*Chamaecyparis obtusa*) followed.

Forest Organization of Shiga Prefecture was established in 1965, which later was reshuffled into Lake Biwa Forest Organization in 1974. The organization was managed on loan from national finance, local government downstream.

The organization drew up a contract with landowners to share the benefits after 40 years. The owners of ca. 24,937ha signed the contracts. The organization planted 19,622ha of Sugi and Hinoki. The expected result was not fulfilled, probably due to heavy snow and mal-management and poor technical performance. Lake Biwa Development Plan '72-'97

In 1970s in accordance with national development plan, a mega-scaled, regional, development plan was introduced to Lake Biwa. It was supported under the jurisdiction of national law. It was aimed at water resource exploitation, natural ecosystem protection and economical development of Kinki region at large. Well over 2,000 Billion yen was invested during 25 years.

Various projects were incorporated. Extensive man-made forest project was one of 22 projects. Useless remote mountains were the main target. Aftermath of development plan and Present status

The development plan undoubtedly stimulated rapid growth of regional economy, but unexpected aftermath remained in environs of Lake Biwa. In the remote mountains no more charcoal making is practiced. People, forest owner himself lost interests on forestry or mountain ecosystem and abandoned forest management.

Die-back of deciduous oak (*Quercus mongolica*) is spreading. In the farm forest no more fuel wood has been gathered. Farmers also abandoned forest management. Die-back of red pine rapidly expanded. Undergrowths grew rapid and dense. Evergreen trees are invading. Bamboos which used to be controlled and managed for resources and food. But they grew too quick and to dense. And resulted in rampant growth of bamboo.

Forestry management was discouraged and deteriorated. No thinning operation was applied. No logging was practiced. No forestry management was available.

Mountains and Water

In one of the remote mountain village, artificial plantation of Sugi was first introduced in 1973. In one of the small catchment of the area ca. 60.9ha plantation of Sugi and Hinoki was expanded year by year. Finally plantation covered 58.5 ha, almost entire slope of the catchment. Plantation was solely performed by Forestry Organization.

Villagers adjacent to the valley uses the water for drink. Recently it was warned the water became muddy when it rained heavily. Flood was very quick. Quicker than before. It seemed ironical that the plantation was aimed at water supply for Lake Biwa. The successful plantation resulted in muddy water to the villagers.

Ecosystem rehabilitation of Lake Biwa's environs

Under the circumstances mentioned above, concurrent people, villagers, citizens, land owner, forester, administration and researchers forced to collaborate for the degraded ecosystem rehabilitation. In 2004 local government enacted a prefecture law of forestation for Lake Biwa. It declared the forestation should be based on natural ecosystem law. The forestation should aim at not forestry promotion but environmental protection. Not only the man-made forest, but also farm-forest as well as mountain village ecosystem should be the target of the forestation. I deemed necessary to draw detailed plan for forestation in accordance with the regional requirement either natural or social. The forestation should be worked out in principle people's participation. Local Committee for Forestation Planning was organized by law. Within the territory of 8 Branch Office of Shiga Prefecture,

10-15 committee members were nominated by local government. The committee listened to local villagers, discussed and worked out the basic plan of the regional forestation.

Local government searched for fund for the new scheme. New taxation was levied upon. All the household of Shiga prefecture are imposed JYN800.- a year.

Budget specifically allotted to newly introduced forestation plan is expected to amount JYN600 million since 2006. The amount is equivalent to 10 % of the conventional forestry promotion projects.

Goal of ecosystem rehabilitation of Lake Biwa

Under the local governmental law of forestation of Lake Biwa, new scheme of ecosystem rehabilitation was launched. Tentative goal of the scheme is to create a vivid socio-ecosystem relation. Well protected bio-diversity and high stock natural forest are aimed at. In the mountain village ecosystem rehabilitation of die-back forest is first concern. In the farm-forest ecosystem control of rampant bamboo is urgent. Man-made plantation should be taken intense care of to look forward to thicker and quality log production.



Problems to be solved

New scheme of ecosystem rehabilitation has just started. There already several problems has raised. Administration process of the local government is always so slow in decision making. Although the officials are personally good, sometimes excellent, but bureaucratic in the administration structure is obvious and reluctant change.

At the same time the bottom, local people are not always so wise. Even in the very remote mountain villages, those who engages in forestry become rare. Their experiences

in mountain life become very scarce. Their stock of wisdom become lesser. The mountain villagers become older. Little human resource is expected. And therefore, sustainability of village life become very doubtful resource.

NGOs living in the urban area is more energetic. But their activities looks sporadic. They know nothing about mountain life, nor natural ecosystem. At the moment they are still uncertain. It is deemed necessary to network scattering NGOs to go further.

References

- Forest and Forestry Statistics, Shiga Prefecture
- Administration Documents of Shiga Prefecture
- Agricultural, forestry products of Shiga Prefecture

Country Report during August 2005 and August 2007 - Japan

Dr. Akiko Sakai

MAB-Japan Coordinating Committee/ Yokohama National University

Kunio Iwatsuki

Chairperson, Japanese National Committee for MAB

This is a short report of MAB-Japan activity during past two years.

Monitoring of four BRs in Japan

Japanese MAB committee organized a special group to monitor the four Biosphere Reserves in Japan. This group was financially supported by the government of Japan through the Ministry of Education, Culture, Sports, Science and Technology (Mext) during April 2003 and March 2007, and the result was published in March 2007 in the form of "Catalogue of UNESCO/MAB Biosphere Reserves in Japan, Version II". The Co-ordination Committee to the MAB-Japan mainly worked on this monitoring. The report of was edited by a special editorial committee under a chairpersonship of Professor Kunio Suzuki, Vice-Chancellor, Yokohama National University, also the chairperson of the Co-ordination Committee.

There are four Biosphere Reserves in Japan and they all are in the area of National Park. These Biosphere Reserves are managed by the Ministry of Environment in their conservation issues according to the regulation of the National Parks, and researches are carried out there by various scientists according to their own scientific curiosity. We have no particular system to observe the Biosphere Reserves under MAB-Japan, although it will be noted that the areas are maintained in better way in their conservation issues.

The problems faced to these areas for conservation issues are common to all the four Biosphere Reserves in the following respects:

- (1) Increase of tourists in these days by general interests in eco-tours gives a heavy pressure to the nature in various ways. In the case of Oodai-Oomine BR, the number of tourists is actually regulated, and such a regulation has some effect to sustain the natural vegetation there.

- (2) Road construction and other development are performed in some particular areas, not in core area, and reforestation after destruction gives another type of pressure to their primitive nature. In some areas, particular construction is performed to save the soil erosion, and this is another artificial pressure to the nature.
- (3) Some of the wild animals increase in number, in some cases terribly in rapid speed, and damages the vegetation in some extent. Japanese deer, wild pigs, monkeys and bears are those especially giving heavy damages to nature. Management of these wild animals is under consideration, although we need promote urgently to have even the basic research in the ecology of these wild animals.
- (4) Introduced species are observed in some areas in the Biosphere Reserves and give a variety of influence to nature. Various efforts are conducted to manage this problem, but further contributions are badly expected.
- (5) There are decline of vegetation in various places, even where those above mentioned factors are not severe, and we have no sound evidence for the reason why such a decline is seen recently. Climate change may be a reason to have influence to such a phenomena.

There are some other problems to be discussed.

Yakushima Biosphere Reserve is registered as World Natural Heritage, and a special committee to manage the WNH serves to sustain this area carefully. Research activities are variously performed there. Flora and fauna are quite diverse there, and basic research on biodiversity is promoted in various ways. Conservation biology is also promoted in this site, and a number of papers have been issued.

Oodai-Oomine BR is now included in the area of Kumano-Kodo World Cultural Heritage. When an application was made for the Kumano-Kodo WCH, Oodai-Oomina BR was completely neglected and the conservation issues are discussed as management of National Park. The first conference of Sacred Natural Sites was organized in relation to the application of Kumano-Kodo WCH, and this BR is widely appreciated as a traditional sacred site by which biodiversity has been sustained.

MAB-Japan activity in Asia in general

Japanese government has continuously contributed through its Fund-in-Trust to the UNESCO Jakarta Office as the sector of Asia-Pacific region for Natural Science field. The activities based on this FIT have been reviewed annually, and the review meetings in Jakarta yielded effective promotion of various performances in this field. Promotion of additional BR registration and BR networking in this region are the examples of fruitful results of those activities.

The result of review meeting in Jakarta Office or Natural Science activities in Asia-Pacific region is recorded in the report on "annual review meeting on science sector activities in UNESCO office, Jakarta, in the year concerned, supported by Japanese Fund-in-Trust".

Usual activities of MAB-Japan

Except for the monitoring of BRs, MAB-Japan has been rather inactive in these years. The official reports have been issued regularly, and in the past two years the following publications were edited and issued by the Co-ordination Committee under the umbrella of MAB-Japan: Japan Info-MAB no32, issued on 25, October, 2005. There are some other articles issued in various journals in Japanese, unfortunately, however, they are not very much interested in general public.

Expecting to raise the visibilities of BRs, various performances have been made within Japan, although they are not so fruitful. Many articles have also contributed in Japanese in various journals and newsletters, but few Japanese are interested in BR activities. Recently, World Natural Heritages are popular in Japan, and a number of tourists visit the WNHs, although visitors to the BRs are mostly interested only in National Park or WNH visibilities. It is a pity for MAB-Japan to note it, and it is badly expected to promote activities around BRs, though we do not know any actual performance to succeed it.

Laos' Position on Biodiversity Conservation and Management

Mr. Savanh Chanthakoummane

Head of National Protected Area Unit, Department of Forestry, Ministry of Agriculture and Forestry, LAO PDR

Abstract

Lao PDR is one of the few remaining countries in the region which not only in the richness its endowment of forest resources, biodiversity and land forms, but also culturally, politically and economically. During the past two decades, the dominant challenge for conservation has been to protect this biological and cultural heritage during a flood tie of population growth, economic development and commercialization of natural resources. As part of this response, in 1993 protected areas have been established by Government and now the protected area system comprises 20 which coverage of about 14% total land area.

Lao PDR is intimately associated with one of the world's major wetlands, the Mekong River system. Laos is one of the four Lower Mekong Basin countries and the Mekong runs for some 1,700 kilometers through Laos, forming much of the country's western border with Thailand and Myanmar. There are fourteen major Mekong tributaries in Lao PDR, as well as hundreds of smaller streams.

The Mekong basin covers 88 percent of the country (208,000 square kilometers). Less than one quarter of this is lowland plains which contain the majority of the Laotian wetlands and are the most densely settled and economically significant parts of the country.

The country has a number of wetland areas which are of international significance, including the Mekong River, the Xe Pian, Xe Khampho, Bung Nong Ngom complex, the Khone falls, Seephandon cataracts, the Xe Khong Plain, The Xe Champhon, Nong Louang wetland and so on, that are distributed in different provinces.

Champasack Province with its landscapes and or wetland (Mekong River) and its people living in this expect to the expanding development and trade exchange with neighboring Thailand, Cambodia and Vietnam.

Champasack experienced 13% annual growth in recent year. However, much of the growth is based primarily on the exploitation of natural resources associated with forestry, cultivation of agricultural products (rice and coffee) and the potential for hydro development.

Champasack Province has embraced the concept of economic development with the wide used and conservation of its natural resources by establishing nearly 30% of its total land base as protected areas,

including three national and eight provincial protected areas, excluding wetlands. Although this reflects a strong commitment, the concern in Lao PDR, as in most of Asia, is to move beyond mere "paper parks" to serves managed for the objectives for which they were originally established.

Against this long term trend, the years 1997 and 1998 have been exceptional and may prove highly influential. First, weather patterns throughout region were affected by a severe El Nino event. Many protected areas and wetlands have been shown to be vulnerable to drought and forest fires, which has important management implication at the site level. Then come to regional financial crisis and an ensuring period of economic recession and political upheaval. This will present some intensified challenges for conservation agencies and protected area managers, including reduced Government budgets and greater pressures to meet the subsistence needs of surrounding communities.

Donors and International organizations, such as the UNESCO, IUCN, MRC and any others they may have a key role to play in promoting fresh and innovative thinking as well as providing general support. Although the underlying challenges of protecting biodiversity remain as relentless and global as ever, in Southeast Asia, the context in which to meet them has changed.

Introduction

- Prime Minister Decree 164, on 29 Oct 1993
 - 20 National Protected Areas Management System;
 - 57 Provincial Protected Areas Management System;
 - 144 District Protected Areas Management System;
 - 23 Provincial Protection Forests;
 - 52 District protection Forests.
- National protected Areas Cover more than 3.3 million hectares or 14 % of total land areas;
- There are 11 transboundary Protected areas;
- One very important wetland or Ramsar site.

Biodiversity data

- Large mammals 177 species;
- Small mammals 52 species;
- Bats 103 species;
- Birds 692 species;
- Reptiles & Amphibians 166 species.

Legislative background

Lao PDR has been signatory of the Conventions on:

- Conventional on Biological Diversity or CBD;
- Conventional on Climate change;
- Conventional on International Trade of Endangered Species in Flora and Fauna or CITES;
- Conventional on Ramsar;
- Conventional on Cultural and Natural Heritages.

International Status: Culture Heritages

- Luangphabang
- Champasak, sacred spring, holy place.
- Hintang Archaeological Park

International Status: Natural Heritages

- Nam Ha, ASEAN Heritage Park
- Trans-boundary World Natural Heritage Property (TWNHP) Lao PDR and S.R Vietnam
- Ramsar site

National Initiatives

- National Forestry Strategy 2020;
- Biodiversity Strategy and Action Planned 2010;
- Forestry Law;
- Aquatic and Wild Animals Law;
- Land Law;
- Water and Water Resources Law ;
- Regulation on National Protected Areas, Aquatic and Wild Animals Management.



Our objectives

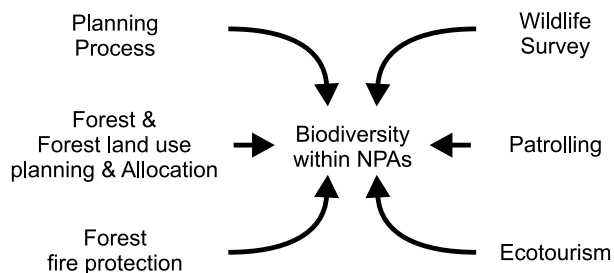
- Effective and efficient management of natural and Biodiversity resources;
- Promote local communities' capacity to participate in natural and biodiversity resources management and conservation;
- Integrated natural and biodiversity resources management and rural development;
- Develop ecotourism approach which benefits to local communities;
- Sharing of appropriate scientific information and technology.

Current Management

Protected Area Management Systems:

- Participatory protected Area Management;
- Integrated Conservation and Development;
- Protected Area Co-Management;
- Forest & Land used Planning and Allocation in Protected Areas;
- Communities Based Ecotourism in Protected Areas.

Participatory Protected Area Management System



Conservation efforts in Champasack Province

- Internal Consultation meeting (District & Provincial level);
- Report to governor and line ministries concern;
- International Meeting;
- Report to line ministries and prime minister office;
- Information is being checked; criteria of "UNESCO".

Conclusions

- The Biodiversity Conservation is new to Lao PDR. However, Lao PDR can be completed and success to the regional and international obligation and or agreement ;
- To conserve biodiversity effectively the living condition of local communities must be developed;
- To protect and conserve natural biodiversity effectively can not be done alone;
- Exchange idea, experiences and information sharing is can be help in conserve natural biodiversity.

Diversity in Cultural Perceptions of Ecological Resources: Lessons from New Zealand and Hong Kong, China

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Abstract

This paper is a comparative and critical examination of how differences in cultural perceptions, philosophies and needs impact on the use and conservation of ecological resources. A westernized, south Pacific 'developed' country, 'Aotearoa' New Zealand, is studied in relation to the Special Administrative Region of Hong Kong, within China. Attention is given to pragmatic aspects of the sometimes dysfunctional and contradictory approaches of use vs conservation within multicultural and technologically diverse societies. The assumption that perceptions of ecological resources are uniform within countries and even within administrative jurisdictions is challenged, as is the assumption that peoples identified as belonging to one particular culture think the same way with respect to value systems and eco-resources. Sociological and socio-economic considerations can cut across cultural features and influence the way eco-resources are, in fact, utilized. The assumption that 'west is best' in matters of eco-resource perception and use is also challenged. From this comparative analysis a model is proposed which may assist planners and resource managers faced with sustainable ecosystem management, in a socio-political climate that finds the concept of 'quality economy' a pragmatic and wise necessity in the 21st Century.

Key words: cultural diversity, ecological resources, contradictory, perceptions, ethnicity, quality economy, technological development, Hong Kong, China, South Pacific, New Zealand.

Introduction

We live in an age of increasing ecological awareness. It would be hard to find a person, group, organization, culture, company, political jurisdiction, country or international body that does not include the objective of sustainable development in its mission statement or equivalent. As Treweek (1999) wisely reminds us, despite a general acknowledgement of this need, little progress has been made in deciding what is sustainable and what is not. Earlier, Eckholm (1982) cautioned that the biosphere seldom presents human societies with imperatives; rather society faces choices about what sort of world we want

to live in and how we respond to environmental issues depends on broad human goals. Clearly, these broad human goals may vary markedly with culture.

Defining sustainability is not an easy task. The underlying reasons for this are both cultural and scientific. Despite an explosion in the numbers of ecological publications as articles in scientific Journals and a huge array of ecological text-type books on the market, Ecological Impact Assessment (EcoIA) is still a very young and developing dimension of its parent system, EIA.

The problems of applying good ecology to issues of sustainable use of ecological resources, stem from the



complexity of most ecosystems, the immaturity of ecology as a science (Grubb & Wittaker, 1991), fragmentation of ecology into trendy subdisciplines, the difficulty of making reliable ecological predictions, the time constraints of EIA and especially EcolA (e.g. no time to conduct a 4-seasons or even 2 seasons, wet vs dry, approach) and the bias towards the 'cute and cuddly'(charismatic taxonomic groups, e.g. beautiful birds and colourful pandas) shown by many 'green groups'. Of course, many other collateral factors can work against a scientific evaluation of sustainability and how much biodiversity is necessary for ecosystem function and process (Smith et al, 1993). Paramount here being the political process (Moss, 1991) and the attraction eco-issues have to non ecologists (non scientist). This aspect can be especially strong in so called democratic 'developed' countries such as New Zealand, where anyone can present 'ecological ideas', under the Resource Management Act, (RMA), to environmental decision making bodies and precipitate compromise planning decisions based on the resulting diluted and ineffective science (see Maxwell, 2007). Negative comments on the biological content of environmental assessments have been made before (e.g. Spellerberg, 1994).

Diversity in cultural perceptions, in terms of what is a valuable eco-resource to one culture, may not be so viewed by another. In this way cultural differences can impact strongly on conservation. The implication in

many text books and even ecological papers dealing with biodiversity conservation and the values of genetic resources, is that the 'conservation ethic' is a constant which transcends cultural diversity. In reality, this is often not the case as may be seen with snakes in China, whales in Japan, snails in France and 'mutton birds' (Petrel family) in New Zealand, to cite just four examples. Variations in what may be seen as desirable species worthy of conservation or awarded the status of keystone species also occurs within ecology (Treweek, 1999). Some of this may be attributed to expediency (easy to record and cheap to survey) (Treweek, 1996), but it may also be imbedded within the subculture of particular groups of ecologists.

As we examine aspects of diversity in cultural perceptions of ecological resources using a comparative study of two relatively small jurisdictions, New Zealand (of 4 million people) and Hong Kong SAR of China (with 7 million), it is wise to keep the above ideas firmly in mind. Outstanding are, difficulties in defining and measuring sustainability, having willingness, time and resources to apply good ecology to ecological assessments, the realities of excessive democracy compromising scientific quality and cultural variations in what conservation means in practice.

New Zealand is considered first followed by Hong Kong SAR and we conclude with an effort to distil 'lessons' from a comparison of these two jurisdictions.

Cultural Perceptions of Ecological Resources in New Zealand: Yesterday and Today

The conservation history of N.Z. in historic times (~ the last 1000 years) can be usefully approached in terms of how different cultures perceive ecological and to some extent geological resources. Such perceptions are not always based on a philosophy of conservation. Four perceptions, two largely extinct and two existent, are identified. This 4-way classification is based on a study of the rather dispersed literature available which ranges from histories (e.g. King, 2003; Bassett et al, 1998) conservation management (e.g. Given, 1990; Molloy & Davis, 1992; O'Conner et al, 1990), biogeography and ecology (e.g. Kuschel, 1975), Maori-European interactions (e.g. King, 2003, Salmon, 1991; Phillips, 2000) restoration ecology (e.g. Porteous, 1993) general accounts of landscapes and wildlife (Molloy, 1994) and current concerns in eco-resource management and use (Maxwell, 2007).

The four perceptions identified are:

- (i) Traditional Maori culture (TMC);
- (ii) Pioneer European exploit and transform culture (PE&T);
- (iii) Neo-conservation culture (NCC);
- (iv) Neo-iwi rights (NIR).

Each will be outlined in turn.

Traditional Maori Culture (TMC)

(TMC) was thought to be based on a holistic relationship between people and their surroundings. This conservation ethic encouraged eco-resource use regulation by degrees of 'tapu', a notion of sacredness. Some types of 'tapu' were temporary e.g. the closing of a resource site ("rahui") to hunting or gathering until it had recovered from overuse. Family or tribal (iwi) members may be selected as 'resource managers' (to use modern jargon) to attempt sustainable use. These manager equivalents were given a title, Kaitiaki (= stewards). The conservation ethic of TMC was good, but far from perfect. The use of fire as tools for land change (clearing), cultivation (e.g. inducing bracken fern, *Pteridium esculntum*, growth as a fern-root food; however its exact status as safe food is not 100% clear (Broker et al, 1987)). Moa (large, now extinct, emu-like bird) hunting contributed much to ecological change. In addition, the introduction by Maori of the Pacific rat,

Kiore (*Ratus exulans*) is thought to have contributed to population decline and ecological change in an extensive range of native fauna, from small birds to land snails (Molloy, 1994). This rat had a valued status in pre-European Maori society as both food and links with the spiritual island home (Hawaiki) somewhere in the distant Pacific Ocean.

Pioneer European exploit and transform culture (PE&T)

The ecological impacts of the first human settlers in New Zealand were significant but far less than those brought by the European (pakeha) phase PE&T. The first 150 years of European influence has seen dramatic and extensive ecological changes and landscape transformations. Far too numerous to cover here in detail, the following illustrate how a philosophy based on overpowering nature made so many changes:

- today only 25% of New Zealand still supports native forest
- exotic grassland on cleared forests and drained wetlands characterize the PE&T era; testimony to the power of fire, axe, saw and plough
- introduced mammals, birds and fish spp number 80 +
- introduced/naturalized plants number 1697 spp (Edger & Conner, 2000; Webb et al (1988))

Perhaps the most ecologically potent exotics were the mammals, especially the European rabbit and Australian marsupial, the Brush-tail Possum (*Trichosurus vulpecula*) introduced for food and fur respectively. Even in 2007 massive possum control is attempted to reduce colossal numbers of this marsupial pest, from ~70 million and restore possum-damaged forest ecosystems. Control measures are an issue of long debate and while a full account of the ecological impact of *T. vulpecula* is completely beyond the scope of this paper, the possum mistake is a near perfect example of how serious an unscientific animal introduction can become. Today, possums outnumber people by 18 to 1, sheep by 2 to 1 and cattle by 12 to 1.

Neo Conservation culture (NCC)

The last 20 years or so have seen an emergence of what we have called a neo-conservation culture (NCC), the current focal force being the Department of Conservation

(DOC). Conservation was seriously restructured in 1987, when the Conservation Act was passed by Government to abolish the NZ Forest Service (NZFS), Dept of Lands & Survey and NZ Wild life Service and create a new conservation order DOC (Molloy, 1994). Another key driver of conservation thinking and one which predates DOC by decades, is the Royal Forest & Bird Protection Society (a large NGO). All political parties embrace a conservation ethic and, in many different ways, describe some version of what New Zealand people would think of as a conservation estate, in which conservation efforts tend to emphasize five priorities:

- endangered species protection,
- marine reserve creation,
- conservation through a substantial law, the Resource-Management Act (RMA),
- accepting and or forging conservation partnerships with Maori tribes (iwi) and
- planning/extending/upgrading visitor services (a response to overseas tourists who seek outdoor experiences).

Neo-iwi-rights (NIR)

Although in global terms, interactions between indigenous people and recent settlers within New Zealand Society are mostly positive, there are nevertheless overt symptoms of disharmony and ethnic inconsistency. This is sad, as the gift of most of the outstanding volcanic landscape of central North Island (Tongario National Park, TNP) by a Maori chief to the N.Z. Government in 1887 was notable as the world's 4th National Park (historically) and the first to be freely given by an indigenous people. At present, TNP covers 76,000 ha.

Today, the NIR perception typically emphasizes iwi (tribal) rights to ecological resource such as sea bed (Maxwell, 2007) shellfish and mutton bird (*Puffinus griseus*, family Procellariidae or Petrels). These iwi 'rights' can be tribal or racial in modis operandi as such they can cause intertribal and interracial disquiet and debate (see Maxwell, 2007). The mutton bird, *P. griseus* is officially a 'protected native', except that a large traditional (Maori/iwi) take is permitted on southern New Zealand islands. Mutton birds are also freely for sale in local fish shops. The impact of the annual legal take by Maori is ~ 250,000 (Heather & Robertson, 2000). I have found no scientific studies of the ecological impact (EcolA) of this mutton bird

harvest. It appears that, the sociological power of the NIR discourages such studies. Experiences at resource consent hearings (under RMA) would suggest that interpretations of conservation matters are somewhat inconsistent and ecological issues involving iwi are treated with more tolerance and latitude than those of the general (non-Maori) population.

The NZ Situation: A Summary and Synthesis

Today, the N.Z. populace continues to be dominated by two broad cultural traditions; those of Maori, a Polynesian group and regarded as indigenous people and those from European, mainly British, origin. Asian peoples, especially Chinese, have had a presence in N.Z. since the gold rush days of the 1880's (Wright, 2004) but only a limited official recognition was given to this group until very recent years (1990's especially). Now it has become fashionable to describe N.Z. as a multicultural society. However, the 'mission statements' (sociological roles) of the N.Z. Department of Conservation (DOC) continue to reflect the needs and interests of European ('pakeha') and Maori New Zealanders. No detectable recognition is given to island Polynesian groups such Samoan or to important Asian groups such as Chinese people.

Thus we could conclude that the cultural perceptions of ecological resources are still developing as New Zealand defines its culture for the 21st Century (Johnson & Moloughney, 2007; Ip, 2007)

Cultural Perceptions of Ecological Resources in Hong Kong

It is convenient and helpful to identify four broad aspects of ecological resource perception and management in the recent history of Hong Kong (last 300 years or so). We distinguish:

- (i) Traditional Fung Shui Woodland perception (~ 300 years ago to present) (TFSW);
- (ii) Post World War II (WWII) Afforestation Period: 1950 – 1975 (AP);
- (iii) Country Park Promotion period 1976 – 1990's (CP3);
- (iv) Conservation and Quality of life Period: 1990's – present (CQLP).

Each will be addressed in turn.

The Traditional Fung Shui Woodland perception (TFSW)

tends to be left out of discussion in the context of Parks and Reserves, yet this tradition lies, we feel, at the heart of the Conference theme; how culture can genuinely contribute to a positive perception of ecological resources and, moreover, do so in a long term, sustainable way.

Some excellent studies have clearly shown the importance of Hong Kong's Fung Shui Woods (FSW) to tree biodiversity conservation (Chu & Xing, 1997) and to understanding and managing such core ecological process as vegetation succession (Zhuang & Corlett, 1997). These small stands of semi-natural vegetation range in size from 600 m² to 6 ha (Webb, 1995; Yip et al, 2004) are a source of many ecological suitable trees including rare and precious local plants for Hong Kong and Southern China (SCI Bot and AFCD, 2003) as well as contributing to rich heritage captured in the cultural protected woodlands (Webb, 1995) of Hong Kong's 'New Territories' (Johnson, 2000). Today, one can enter the 'back yard' of a rural village house or house cluster and see Fung Shui tree species integrated into the landscape (Hung 2007, personal obs.)

Today some 116 Fung Shui Woods have been surveyed (Yip et al, 2004) but only a few have direct protection under HKSAR law (Ordinances) however most receive some soft protection (flexible) under the Town Planning Ordinance. At present, the enduring cultural values of FSW provide on-going environmental conservation. Some academics feel that this may not be enough (Yip et al, 2004) and advocate more formal official level protection, arguing that these FSW enrich cultural and ecological knowledge. Wisely, in our view, some have accepted that although certain aspects of Fung Shui are superstition, other assumptions are, in fact, quite scientific (Yip et al 2004). Superficially, the desire to have or judge a landscape to be "auspicious" and keep forces of "bad luck" at bay as happens with Chinese geomancy of which Fung Shui is part, may appear superstitious; but it is deeper than this. It is an acquired cultural wisdom drawing from centuries of Chinese culture (Yip et al, 2004). The abovementioned ecological and biogeographic studies of FSW underscore this wisdom and help to identify its scientific foundations. In many cases the plant biodiversity of CPs is not yet (and may not be for several human life spans) as good as that of the larger FSW (Chu & Xing, 1997; Maxwell & Tam 1999; Maxwell, 1997).

We contend that the FSW system, with its ecological foundation, contains much that could contribute to new models of Park management in an era of expanding ecotourism and ever increasing visitor numbers to country Parks, Regional Parks and biosphere Reserves. If specialist eco-education sites such as the 148 ha Kadoorie Farm and Botanic Garden (KFBG) can successfully combine botanical, zoological, organic farming and garden functions, then on a smaller scale, FSW linked with villages can become mini eco Parks. Parks do not need to be huge to do good. Centuries of FSW have already demonstrated this but, at present, such village size parks are not yet integrated into Park management thinking. Ecologically, the network of FSW in Hong Kong could be seen as a linkage ecomosaic in a fragmented landscape. Such a FSW model may thus give new life, energy and direction to quality economy thinking in the context of Biosphere Reserve use. To this point we shall return later.

The post war Government led afforestation programme using *Pinus massoniana* and *Casuarina equisetifolia* (two hardy species) aimed at soil erosion and slope stabilization but resulted in newly 10,000 acres planted in Reserves by 1959. By the early 1960's, the initial momentum grew and 1,000 – 3,000 acres of new planting was achieved every year (Grant, 1960).

In this period, practical aims dominated and these ecological resource trees were seen as tools for erosion control and landscape stabilization, necessary as the population began to expand during the first two decades after experiencing the environmental insults associated with WWII.

Although the immediate post war (WWII) period was characterized by Government led afforestation using very restricted plantation species, other pockets of eco-awareness had endured. Outstanding in their importance these are the Fung Shui Woods (see (i) above) and we wish to emphasize their importance again here. We do this because, in our considered opinion, these precious cultural forest stands are perhaps equivalent to mini 'Country Parks'. There may be wisdom in finding ways to acknowledge the importance of these village woods as part of a mosaic of linked public and private park system, while at the same time rewarding their village owners for sustained efforts in FSW management.

The Country Park Promotion Period (CP3), 1976 – 1990's was formally started with the enactment of the Country Parks Ordinance (CPO) in March 1976 (Jim & Wong, 2006). In 1977 a 'crash programme' (Jim & Wong, 2006) was accelerated by the Agriculture and Fisheries Dept, AFD, with an objective to place, 38,850 ha (150 sq. miles) of countryside under the protection and management of the Country Park system. This programme embraced CPs and Sites of Special Scientific Interest (SSSI) and the objectives were achieved beyond expectation. By 2005, 41,583 ha had been designated CPs or SSSIs or similar. In this way, ~ 40% of the total territory of HKSAR had become Protected Areas (PAs): a fine achievement, placing this part of China way in front of most jurisdictions world wide. During CP3, the AFD changed its name to AFCD; a justified title change for a Government Department that had done so much for conservation.

Park management aims included both scientific and cultural aspects and these are explained in the official words of the Country Parks Authority (CPA) relating to legal objectives, i.e. *"to encourage their (CP)use and development for recreation and tourism; to protect vegetation and wild life....; to preserve and maintain buildings and sites of historic or cultural significance...; and to provide facilities and services for public enjoyment...."*

To these objectives we should add another ecologically important role carried out by CPA and AFCD, that of fire control. Fire has been one of the most severe threats to ecological habitats in CPs, undoing decades of assiduous afforestation and ecosystem enhancement (Jim & Wong, 2006). However, effective anti-fire publicity and public education aimed at attitude change have reduced hill fires in CPs from ~ 300/year in 1985 to ~ 70/year in recent years. Today it seems that the importance of avoiding hill fires near rural grave sites especially is becoming an established cultural perspective.

Clearly, the official CPA objectives and that of fire management reflect a perspective that is relevant to the needs and values of Hong Kong people. In a sense, they provide a modern cultural infrastructure which can help the people re-connect with nature.

Conservation and Quality of life Period (CQLP) 1990's - present

It is impossible to assign an exact date to the emergence of a culture which places a value on conservation and quality of life. Signs of this emerging perspective were evident in the 1980's, but it has only relatively recently been possible to see widespread evidence for the expression of this trend. Today, ~ 11-12 million park visitations occur (Jim & Wong, 2006) representing all age and social groups involved in a wide range of activities e.g. hiking, BBQ, tai qi exercises, boating, walking, plant and bird watching, photograph and even poetry writing.

The unwanted SARS episode (in 2003) generated a huge interest in CPs as a welcome escape to fresh air and safety from SARS. The Parks were thought of as the, "lungs of Hong Kong"!

Educational activities for school age people and often their parents attract ~ 200,000 citizen participants yearly. The Open University of Hong Kong makes active use of CPs as living laboratories. Hong Kong's first dedicated home grown course uniting biology and earth science for Hong Kong dwellers was developed to cater for growing local academic interests and needs within a specialist Hong Kong focused environmental studies programme (Maxwell, 1999). Research on student (Mature, ages 20-60, average 34 years) opinions and attitudes to CPs showed that, contrary to a popular notion that HK people are Park-shy and rarely use or visit CPs compared to odd 'westerners', local Chinese people do value CPs and the ecological resources contained therein. In fact, this study revealed that the tranquility, rustic, open landscapes and vegetated hills were valued much more than the vigorous exercise potential of marathons, cross-country running and biking – these were seen as more 'western' in cultural terms (Shin & Maxwell, 2003). This finding would be culturally in phase with the Chinese expression for landscape, "Shan Shui" or "mountains water"; a perfect image for Hong Kong!

The popularity of hiking as an active (immunity-boosting!) non-extreme recreation is rapidly growing (Dr. Yeung Ka-ming cited in O'Young, 2005) as the AFCD organized HK Hiking Festival demonstrates each November. Many books (e.g. Walkers Companion, AFCD; Choy & Stokes, 2005; Owen & Shaw, 2001; Hau (2003); Dudgeon & Corlett, 1994; 2004) are available to support this trend.

Many more, extend the walking opportunities, enabling people to exercise growing and on-going interests in nature studies ranging from plant appreciation (e.g. Hu and Walden, 1987; Hu, 2005) to birds (e.g. Lock and Hui, 2004), and general biodiversity (embracing flora, insects, spiders, birds mammals, amphibians and reptiles, e.g. Hau, 2003). A pleasing number of these ecological books are not only in user-friendly prose, they are bilingual: Chinese-English. The recent excellent publication by Friends of CPs and AFCD entitled, "88 Hong Kong Natural Wonders" (Choy & Stokes, 2005) demonstrates, conclusively, in our view how the ultra urban, commercial energy of ~ 7 million people can live side by side with numerous natural landscape treasures. The authors call on Hong Kong dwellers to use, enjoy and respect these 88 precious places. This call is delivered as a bilingual (Chinese-English) message which touches on all cultures.

These books, University Courses, and Hong Kong made Sunday TV broadcasts by Open University of Hong Kong (e.g. 'Hong Kong Habitats' series) are testimony to the existence of CQLP in the history of eco-awareness development in Hong Kong.

Finally, an account of Hong Kong's ecological perceptions in 2007 would not be balanced without a brief mention of the many urban Parks, some with important ecological and biodiversity functions, administered and managed by the Leisure and Culture Services Department (LCSD). Although urban or suburban in location some are large (e.g. Kowloon Park with 13.4 ha) and provide vital roles in promoting enjoyment, recreation, tree and wildlife appreciation and, importantly, successful captive breeding programmes for outstanding important Asian birds. From such Aviary and breeding services, local people/park visitors can appreciate the value of such biological resources. In our view the positive relationships between AFCD and LCSD is underemphasized and both Government Departments in Hong Kong do a good job of linking people with Parks and reinforce a conservation philosophy within in the HK cultural systems.

Contrasting Perceptions: Lessons to Learn

Our comparative study focusing on a critical examination of the ways in which the different cultural traditions of New Zealand and Hong Kong influence how people

perceive ecological resources, reveals some interesting similarities and differences. From these we can draw some conclusions and identify some lessons and, using both conclusions and lessons, we propose a model which may help in at least some aspects of Biosphere Reserve management.

The concept of sustainability is central in both jurisdictions and both suffer from the imprecision that still comes with the term and associated ecological uncertainty that follows. Likewise, problems of an immature EcolA system which apply to ecological assessment, measurement, application and prediction exist in both jurisdictions. A full analysis of the EcolA/EIA systems is beyond the scope of the present paper and has been addressed earlier in a study which showed, that with its Technical Memorandum (TM) the Hong Kong EIA process gives superior guidance on content compared to the open-ended, New Zealand system (Maxwell, 2004). The latter allows all manner of citizen submissions on an ecological resource use or development issue to surface, which could appear to some as democracy in action. This it may be, but the consequences often involve compromised and diluted scientific quality when various levels of government try to please the various stakeholders or participants (Maxwell, 2007). An expensive, professional ecologist may be contracted by a local (NZ) authority to do an Assessment of Environmental Effects (AEE) for a particular development or resource use consent, produce a very scientific AEE and watch his recommendations changed in an attempt to please a particular 'conservation' group, iwi (tribal spokesperson) or pro-developer lobby (Maxwell, 2006; 2007). This example is pertinent because it was a case where NCC (neo-conservation culture) and NIR (neo-iwi rights) cultural perceptions described above interacted within the New Zealand EIA/EcolA process. The outcome was a 'decision' influenced by some science (the AEE) only. In reality, the 'decision' was a stop-gap measure based more on being seen to 'do something' rather than what was wise, long term and more sustainable environmental decision making. The particular case to which the above comments refer relate to a complex, protracted resource concept application to construct a marina (Whangamata marina) in part of a coastal area characterized by a mangrove (*Avicennia marina* var. *resinifera*) dominated bay. The history of this marina project proposal is already a decade old and the subject of numerous EIA, EcolA, AEE type reports, de-

bates delays and political activity. Its complexity is huge; the full description of which is well beyond the scope of this present paper. One useful lesson rediscovered by this Whangamata marina saga is that compromise and selective use of ecological items within an ecosystem, designed to satisfy particular sectors within a multicultural society, may not be sustainable.

In our view, the Hong Kong Park management philosophy based on community access to ecological assets in a controlled sustainable manner, works for Hong Kong dwellers. The periurban countryside and seascapes cater for 7 million people. To date, the Whangamata marine saga continues to suffer from a failure to take a big picture view of multi-use planning and design a marina complex with walkways, mangrove trails, wetland tours, small boating, education paths, shellfish harvesting sites as well as marina functions. The proposal is hampered by narrow, sectional socio-cultural perspectives. Multicultural realities are out of focus; the genuine interests of all cultural groups, Maori, European, Samoan, Chinese and so on have not surfaced in this typical New Zealand eco-resource decision making process.

From a scientific viewpoint, perhaps the most important lesson to surface from our study, relates to ecological function of components of ecosystems. As an examination of the vast ecological literature will reveal, much uncertainty remains on questions vital to scientific ecosystems management. Three review works illustrate this situation. The first is McCann (2000) on the 'diversity-stability debate', which shows that the question of what and how much biodiversity is necessary to sustain a given ecosystem is still debated and crying out for more research. The second is a paper by Kohm et al (2000) who contend that much more science needs to be injected into conservation in practice and that science, in turn, needs to make more effort to make their knowledge more user-friendly for practical conservation managers and their decision makers. The third is very critical of the notion biodiversity for biodiversity sake, suggesting that the lots of rhetoric about biodiversity conservation leaves unanswered the practical questions about precisely which biodiversity is to be conserved and why (Meijaard et al, 2005).

In the same review book, "Life after Logging", another contributor argues that much conservation appears to be driven simply by desire to conserve as much biodiversity

as possible, irrespective of the costs this might imply for the people who depend upon forests for their livelihoods (Sayer, 2005).

This conclusion by Sayer (2005) has a powerful transnational and trans-jurisdictional ring to it and is especially relevant to this Ecotone/MAB workshop theme. In New Zealand, harvesting of natural ecosystem resources is not encouraged at all in protected areas (Regional, National Parks, Marine Parks). In Hong Kong, while sustainable harvesting is not encouraged in Country Parks, it is possible and has been for centuries in those remnant, mini Parks known as Fung Shui Woods (FSW).

Clearly, the important message and lesson arising here is that a blind belief in biodiversity preservation for its own sake should not be allowed to exclude the controlled harvest and sustainable use of ecological resources by local people. What is needed is an infrastructure which allows good ecology to be conducted with a view to enhancing both ethnic/local people happiness and wise ecosystem use at the same time.

Meijaard et al (2005) attempted to reconcile wild life conservation and production forestry in Indonesian Borneo and remind all eco-managers that other vertebrates, such as monkeys and hornbills, are, in effect, defacto unofficial, but natural eco engineers and forest managers. Indigenous forest-dwelling groups can have and do have similar functions.

Many of the messages and findings from the Meijaard group in their "Life After Logging" could be applied to Biosphere Reserves and similar in New Zealand, Hong Kong and, importantly, Maolan BR in Guizhou Province, China.

There have been misgivings expressed with 'ecotourism' and concerns that 'ecotourism' brings ecological degradation (e.g. Zhuang & Liao, 2006) a concern relevant to many countries and jurisdictions. Most of this concern stems from the type of 'ecotourism' which may often be little more than walks in the forest. The subject is very big and beyond the scope this paper but a novel approach to upgrade ecotourism has been suggested by Maxwell and Hung (2005), which advocates transforming so called 'ecotourists' into eco restoration volunteers, led by trained ecologists.

This approach, like those calling for more and better ecological science in Forest Park Management, it in keep-

ing with the push for wise use of ecological resources and their improvement: pristine ecosystems are rare and most ecosystems would benefit from repair, rehabilitation and eco-restoration activities.

Pockets of volunteer eco-repair activity is evident in both New Zealand and Hong Kong but the potential for expansion to involve overseas tourists as well as local tourists as active eco-restoration participants remains. In New Zealand, Hong Kong and China, tourist visits are growing rapidly and many seek more meaning, purpose and quality in their experiences: the day of the professionally led ecotourist as eco-restoration volunteer may be dawning (Maxwell & Hung, 2005).

Concluding Thoughts

Our paper gave thematic treatment to what is normally thought to be a developed, clean and green, conservation-conscious country, New Zealand, in contrast to the small, vibrant, high rise, built landscape of Hong Kong. In reality, both jurisdictions have a well developed conservation infrastructure and both attempt to cater for some diverse cultural differences. Far from being a one-way street in which 'developed' New Zealand can teach Hong Kong how to manage its environment, the converse also applies and both could benefit from a detailed comparative analysis of eco-resource management systems.

A number of cross-border 'lessons' emerged from our study, the most important and relevant of which included:

- solid science within ecological assessment should be a precondition for ecological decisions aimed at serious sustainability
- the use or harvest of ecological goods and materials from ecosystems should be based on careful biodiversity assessments which identify the functional status of target plants or animals within ecosystems
- human interactions with and within ecosystems should be seen as part of nature not isolated from it
- local cultures with long historical associations within natural or semi-natural ecosystems should be helped by the application of ecological knowledge to sustainable harvest desirable resources from these systems
- a more creative, scientific approach to the explosive growth of 'ecotourism' is advocated in which tourists

are involved with and integrated into the holistic management strategies of Park administration

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Literature Cited

- Bassett, J., Sinclair, K. and Stenson, M. (1998). *The New Zealand Story* Reed books.
- Brooker, S., Cambie, R. & Cooper, R. (1987) *New Zealand Medicinal Plants* Reed.
- Chu, W.H. and Xing, F. W. (1997). A check list of vascular plants in fung shui woods in Hong Kong. *Mem. H.K. Nat. Hist. Soc.* 21: 151-172
- Dudgeon, D. & Corlett, R. (1994). *Hills & Streams, An Ecology of Hong Kong*. HKU Press.
- Dudgeon, D. & Corlett, R. (2004) *The Ecology and Biodiversity of Hong Kong* Friends of CP's & Joint Pub. Co. Ltd.
- Eckholm, E. (1982). *Down to earth: environment and human needs*. Pluto Press, London.
- Edger, E. & Conner, H. (2000) *Flora of New Zealand Vol V Grasses*. Manaaki Whenua Press, Lincoln, N.Z.
- Given, D. R. (1990). *Species Management & Recovery Plans for Threatened Plants* Botany Division. Dept., DSIR, Christchurch.
- Grant, C.J. (1960). *The Soils and Agricultural of Hong Kong*. Gov. Press. H.K.
- Heather, B. & Robertson, H. (1996) *The Field Guide to the Birds of New Zealand* Viking.

- Hau, C.H. (2003). *Hillsides. HK field Guides 3*. Wan Li Book Co., HK.
- Hu, S.Y. (2005). *My story with Hollies*. Cosmos Books Ltd.
- Hu, S.Y. & Walden, B.M. (1987) *Wild Flowers of South China and Hong Kong Part 2*. All Noble Co. Ltd., HK.
- Ip, M-Y. (2007). *Being Maori-Chinese*. Auckland Univ. Press.
- Jim, C.Y. and Wong, F.Y. (2006). An evaluation of the Country Parks system in Hong Kong since its establishment in 1976. In: Jim, C.Y. and Corlett, R.T. pp 35-58. *Sustainable Management of Protected Areas for Future Generators*. IUCN.
- Johnston, H. & Moloughney, B. (2007). *Asia in the Making of New Zealand*. Auckland Univ. Press.
- Johnson, E. (2000). *Recording a Rich Heritage: Research on Hong Kong's 'New Territories'* LCSD, Hong Kong.
- King, M. (2003). *The Penguin History of New Zealand*. Penguin.
- Kuschel, G. (1975). *Biogeography & Ecology in New Zealand* Junk, The Hague.
- Kohm, K., Dee Boersma, P., Meffe, G. and Noss, R. (2006). Putting the science into practice and the practice into science *Conservation Biol.* 14(3): 593-4.
- Lock, F. and Hui, W.L. (2005) *Appreciating Wild Birds*. (2nd Ed.) AFCD. Hong Kong.
- Maxwell, G.S. (1999). S122, *A Foundation Course in Biology and Earth Science* OUHK Press.
- Maxwell, G.S. (1997). Large Flowers in *Enkianthus quinqueflorus* from the hills Sai Kung East Country Park *Mem. H.K. Nat. Hist. Soc.* 21: 217-220.
- Maxwell, G.S. and Tam, P.C.F. (1999). The ecological status of *Baekkea frutescens* in Sai Wan hills of Sai Kung East C.P. *Mem. H.K. Nat. Hist. Soc.* 22: 155-164.
- Maxwell, G.S. (2004) Different systems, similar aims: how a critical study of Hong Kong and New Zealand EIA's can help both systems. *Proc. Symp. Cross-Border Envir. Mang.* Nov. OUHK.
- Maxwell, G.S. and Hung, C.L. (2005). Ecotourists as eco-restoration volunteers: dream or idea waiting to happen. *Proc. Ecotone/MAB/UNESCO Workshop, LaoPDR*, Oct: pp 125-133.
- Maxwell, G.S. (2006). AEE on Removal of mangrove seedlings from Whangamata Harbour, Waikato Region, NZ. Rept. For Envir. Waikato 20pp.
- Maxwell, G.S. (2007). Cross-Border Cooperation vs Interjurisdictional competition: the realities of excessive democracy. *Proc. Enhancing Cross-Border Envir. Coop.* SEPA, OUHK, Hong Kong, June.
- Molloy, J. Davis, A. (1992) *Setting Priorities for Conservation in New Zealand's Threatened Plants & Animals*. Dept. of Conservation, Wellington.
- Molloy, L. (1994). *Wild New Zealand*. New Holland.
- McCann, K.S. (2000). The diversity-stability debate. *Nature*. 405 (11 May): 228-33.
- Moss, R. (1991) Water pollution and the Management of Ecosystems: A case study of Science and Scientist. In: Grubb, P. and Whittaker, J. (Eds.) *Toward a More Exact Ecology*. Blackwell Scientific.
- O'Connor, K.F., Overmars, F. & Ralston, M. (1990) Land Evaluation for Nature Conservation: A Scientific Rev. *Conservation Sci Pub.* #3, Centre for Resource Management. Lincoln University.
- O'Young, A. (2005). Step out of the City. In: *The Hong Kong Story* pp 26-27, SCMP.
- Owen, B. and Shaw, R., (2001). *Hong Kong Landscapes: Along the MacLehose Trail*. Geotrails.
- Phillips, C. (2000) *Waihou Journeys*. Auckland Univ. Press.
- Porteous, T. (1993). *Nature Forest Restoration*. QE2, Trust.
- Salmon, A. (1991). *The Two Worlds: First Meetings Between Maori and European*. Viking, Auckland.
- Shin, N. and Maxwell, G.S. (2003). Factors related to student satisfaction and motivation in Distance Science Learning: A case study in Biology & Earth Science. *Indian J. of Open Learning*. Vol.12 (# 1&2) 17-28.
- South China Institute of botany (2003). *Rare and Precious Plants of Hong Kong* Cosmos Books, Hong Kong.
- Sayer, J. A. (2005). Forward In: Meijaard et al., *Life After Logging*. Centre for International Forestry Research, Jakarta.
- Smith, T., Bruford, M. & Wayne R. (1993). The preservation of process: the missing element of conservation programs. *Biodiversity Letters* 1: 164-67.

- Spellerberg, I.F. (1994). The biological content of environmental assessments. *Biologist*. 41(3): 126-28.
- Treweek, J. (1999). *Ecological Impact Assessment*. Blackwell Science.
- Treweek, J. (1996). Ecology and Environmental impact assessment. *Jl. of Applied Ecology* 33: 199-199.
- Webb, R. (1995). The Village Landscape. In: Hase, P. & Shinn, E. (eds) *Beyond the Metropolis*. Joint Pub. HK.
- Webb, C., Sykes, W. & Garnock-Jones, P. (1988). *Flora of New Zealand Vol IV Naturalised Pteridophytes, Gymnosperms, Dicotyledons*. Botany Div., DSIR, Christchurch, NZ.
- Wright, M. (2004). *Read Illustrated History of New Zealand* Reed books.
- Yip, J. K. L., Ngar, Y.N., Liu, E.K.Y., Lai, C.c. (2004). *Venturing Fung Shui Woods*. Friends of CPs, AFCD, Cosmos Books, H.K.
- Zhuang, X.Y. and Corlett, R. (1997). Forest and Forest succession in Hong Kong, China. *Jl. Trop Ecol.* 14; 857-866.
- Zhuang, X.Y. and Liao, G. (2006). Development status and prospect of the nature reserve system in Guangdong, Prov., China. In: Jim, C.Y. and Corlett, R.T. (Eds) Chap. 3pp. 19-33. IUCN.

Role of Local Cultural and Spiritual Values toward Sustainable Management in Biosphere Reserves (BRs) in Vietnam:

Case Study in Cat Tien Biosphere Reserve (CTBR), Vietnam

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International Context

Article 8(j) of the Convention on Biological Diversity (CBD) stated: subject to its national legislation, recognize, respect, accommodate, 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 wider 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

Conclusion of the World Parks Congress in Durban, SA, September 2003 (8-17 September 2003): sustainable and effective management of PAs can only happen if it is taken into practice, not in a certain period of time, but through out the life time of generations. The empowerment of local cultures, like NATURE, needs critical support to be able to recover itself from centuries/generations of oppression, exploitation and neglect. Among the local indigenous peoples, effective management of PAs can happen if it is only if the VALUE of the local cultures is recognized, respected and promoted.

Implementation of the Millennium Development Goals (MDGs) is to benefit indigenous peoples, cultural diversity and dialogue between indigenous societies and States need to be recognized as driving forces for sustainable development, "understood not simply in terms of economic growth, but also as a means to achieve a more satisfactory intellectual, emotional, moral, cultural and spiritual existence" (Art. 3, UNESCO Universal Declaration on Cultural Diversity, 2001)

Summary of the study

This study aims to recognize and understand deeply the set of local cultural and spiritual values and its role toward sustainable management in CTBR.

The results of the study show that the local and indigenous people in CTBR hold a distinct hidden cultural treasure and they still remain indigenous knowledge systems and set of cultural and spiritual values regard to biodiversity conservation and sustainable development in many ways.

Among of cultural and spiritual values, the gong culture of indigenous communities reside in CTBR is apart of the cultural space of the gongs in the central highlands of Vietnam which was recognized by UNESCO as a Masterpiece of the Intangible Heritage of Humanity on 25 November 2005. They still offer/hold many thanksgivings yearly and using mantras and/or prayers that very much deeply connected to sacred forest, biodiversity conservation and sustainable development. Their handicraft weaving garments which are woven many pictures of animals that they love and want to protect for generations, etc. Epic poems are also one of their wonderful cultural treasures. These are unique legacy, immeasurable value to the humanity. These traditional poems reveal a detailed overview of their society, a wealth of information about geographic landmarks, plants and animals, house work, field work, fishing, village life, drinking wine, beating gongs, fighting and making love, wedding, mourning, friendship, love and compassion, the wind, the moon, the cloud, space, mosaic and music of the forest, etc., especially the wonderful linkage between biodiversity and cultural diversity, all interconnected.

Their deep reverence for the forest is also revealed in their practice of preserving certain pristine groves of old-growth forest absolutely untouched. Such a mature stand of trees is recognized by the entire community as a sacred forest sanctuary: it is the habitat of the Spirit and, for that reason, is never touched.

Economic and social transformations have drastically affected the traditional way of life of these communities and no longer provide the original context for the culture. Transmission of this way of life, knowledge and know-how was severely disrupted during the decades of war during the last century. Today, this phenomenon is aggravated by the disappearance of old craftsmen and

young people's growing interest in outside culture led to the loss of cultural diversity and identity.

Biodiversity conservation and sustainable management of CTBR is indeed the most difficult issue because of the poverty and the national policy and regulation. The balancing conservation and livelihoods remains an ardent process. It was found that there are major differences between people groups in the study site related to ethnicity. The indigenous people (Ma and Stieng) were found to enter the core zone more often than the Kinh people as livelihood still largely depends on the natural resources of the BR while the core zone is prohibited by the national special use forest regulations. The Ma and S'tieng communities have lived dependently on the forest resources, soil, water and biodiversity for long time. The livelihood of the people have been relied on these resources up to now so that some indigenous knowledge of forest, soil, water and biodiversity have been preserved and adapted to new circumstances.

The social cultural characteristics and the community organizations of the Ma and Stieng have somehow adapted with natural, socio-cultural and environmental conditions in their living place such as changing in residential place, social structures and community traditional organizations. In that changing process, the set of cultural and spiritual values still plays an important role toward biodiversity conservation and sustainable development.

This study also found that to maintain the value of biodiversity in Cat Tien BR requires the protecting the set of cultural and spiritual values, the indigenous knowledge systems and the co-operation of stakeholders. Interestingly, indigenous people would like to get involved in sustainable use of forest products through establishing the community conserved areas by using their traditional practices in BR. This is good foundation for us to enhance, facilitate the formulation and development of community-based management.

One of the greatest challenges faced by protected area and biosphere reserve managers in Vietnam and in CTBR in particular is compliance with site regulations (national special use forest regulation as "the" reason for compliance everywhere. The local and indigenous people are not allowed to take anything from the core zone while

many of them reside in this zone for a long time). How do the various kinds of values on which a site is protected — spiritual, cultural, scientific, economic — affect the level of compliance?

This question raised for the decision makers in Vietnam. We must accept the truth that the more we understand, acknowledge and integrate cultural and spiritual values, indigenous knowledge into protected area, biosphere reserve establishment and management, the more successful we will be in achieving their protection, and the protection of the environment in general.

Table1: Forest law violation in Cat Tien National Park (CTBR) from 2000 to 2005 (recorded)

Items	Years						Annual Average	Rate* (%)
	2000	2001	2002	2003	2004	2005		
1. Cases of law violation	486	498	519	367	351	254	413	100
+ Hunting	48	69	80	51	71	40	60	16
+ Fishing	124	126	79	67	58	29	81	11
+ Wood	27	20	49	15	23	10	24	4
+ Other forest products	119	148	171	127	106	97	128	38
+ Other forms of violation	168	135	140	107	93	78	120	31
2. Number of violators	802	906	915	580	524	387	686	100
+ Hunting	65	111	127	68	72	46	82	12
+ Fishing	159	212	121	99	95	39	121	18
+ Logging	36	41	88	30	40	9	41	6
+ Other Forest Products	239	324	369	239	202	211	264	39
+ Other forms of violation	303	218	210	144	115	82	179	26

Source: Calculation from the data of Cat Tien National Park Management Board, Tran Duc Luan, 2006

Note: * The percentage of annual average

Table 2: The proportion of surveyed households that collected and used forest products

Particulars	Above poverty line (n = 85)		Under poverty line (n = 65)		Total Sample (n = 150)	
	Ethnic Minorities (n = 47)	Kinh (n = 38)	Ethnic Minorities (n = 53)	Kinh (n = 12)	Ethnic Minorities (n = 100)	Kinh (n = 50)
No collection/use	43%	97%	21%	92%	31%	96%
Collection/use	57%	3%	79%	8%	69%	4%

Source: Household survey, Tran Duc Luan, 2006

Note: Ethnic Minorities include Chau Ma and Stieng people.

Box1: A simple estimation of human pressure on Cat Tien National Park

According to Tran Van Mui (2006), there are over thirty people groups inside and offsite of Cat Tien National Park, in which Kinh (67.1%); Tay (11.1%); Nung (8.1%); Ma (6.2%); Stieng (2.3%); HMong (1.1%); Dao (1.3%); Hoa (1.1%); Muong (0.7%); others (1.0%) constitute the population.

The proportion of surveyed households is representative for village 4, but should the research considers a larger scale to get a better picture of the entire Park, it needs to increase the sample size, particularly that of the Kinh households. Arbitrarily, the estimation of the human pressure on the park is developed on the assumption that the proportion of surveyed households (Table 2) entering the park to collect and use forest products is representative of the whole population in the buffer zone of Cat Tien National Park. As it is, Ma and Stieng is about 69% while Kinh is about 4% of the total 173,947 people who are both inside and offsite the Park.

The simple estimation on human pressure is calculated as follows:

People groups	The proportion of people inside and offsite of the Park(*)	Estimation on the total human pressure to Cat Tien National Park
Kinh	67.1%	{67.1% * 173,947 people * 4% } = 4,662 people
Ma & Stieng	8.5%	{8.5% * 173,947 people * 69% } = 10,202 people
Others	24.4%	Not estimated

It seems that although the total population of Ma and Stieng people is lower than Kinh people, the percentage of households entering the park and the number of human pressure exerted to the Park by Ma and Stieng people is two times higher than Kinh. Therefore, it can be concluded that Ma and Stieng people have heavy reliance on forest resources.

Source: (*): Tran Van Mui, 2006; Data estimate, Tran Duc Luan, 2006

Box 2: Why do Stieng and Ma people still enter the park?

A Stieng respondent said: “The forest is the home of our ancestors. Hence, we often visit it if we need to”. The researcher explained that this was Cat Tien National Park forest law violation. “That is our right as indigenous people”, he asserted.

Source: In-depth interview, Tran Duc Luan, 2006

East Asian Biosphere Reserve Network - EABRN

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MAB-Regional Networks

- Afri-MAB - Africa;
- Arab-MAB – Arab States;
- Euro-MAB – 32 European Countries;
- Ibero-MAB – Latin American Countries;
- REDBIO – East Atlantic Biosphere Reserve Network.

MAB Sub-Regional Networks in Asia and Pacific

- EABRN – East Asian Biosphere Reserve Network;
- PacMAB – Pacific Countries MAB Network;
- SACAM - South and Central Asia MAB Network;
- SeaBRnet - The Southeast Asian Biosphere Reserve Network.

EABRN

- EABRN launched during 1994 with members from five countries including China PR, DPR Korea, Japan, Mongolia, Republic of Korea and subsequently upon the request from Russian Federation Far Eastern Part of Russian Federation included in the network;
- EABRN activities are financially supported by Republic of Korea;
- EABRN organizes biannual meeting to discuss the progress and new initiatives, carries out small scale research projects and organizes training courses for capacity building;
- Secretariat from 1994-2002 UNESCO Office Jakarta; since 2003 UNESCO Office Beijing.

Previous EABRN Meetings

- EABRN-6 Meeting, Jiuzhaigou Biosphere Reserve, China, September 1999;
- EABRN-7 Meeting, Vladivostok, Russian Federation, September 2001;
- EABRN-8 Meeting, Hustai Nuruu Biosphere Reserve, Mongolia, August 2003;
- EABRN-9 Meeting, Jeju Islands, Republic of Korea August 2005 – Insular Biosphere Reserves;
- EABRN-10 Meeting, Tereji Camp, Mongolia – Sacred Sites in Biodiversity Conservation;
- EABRN-11 Meeting - China – 2009-Sustainable social, ecological system: potentially appropriate solution at local level.

EABRN Mid Term Review

- EABRN Project Secretariat carried out independent evaluation of activities during 2005;
- EABRN activities reviewed largely in three phases: Period 1 (1994-1997), Period 2 (1999-2004) and Period 3 (2005-2008);
- The main assessment of the EABRN activities reported as follows:
 - limited theme selection of EABRN Meetings
 - lack of capacity building
 - lack of large scale projects
 - Shortage of funding and donation
 - Lack of Supply and Adoption of Guidelines or Statements Adopted at EABRN

It is necessary to adopt a strategy by focusing programs and projects in a direction of contributing to multi-lateral environmental agreement including Millennium Development Goals while continuing existing programs.

EABRN 10 Meeting

- Came up with the Terelj Statement
 - Sharing and transfer of information and experiences in BR Management including field evaluation
 - Trans-boundary BR conservation in EABRN member states
 - Third World Biosphere Reserve Congress; need to organize a special regional session on EABRN; to prepare a summery report or a brochure on EABRN; distribute tangible outcomes of EABRN to the participants.
- Called upon UNESCO Member States and other relevant international organizations to establish an International Network of Sacred Sites for Environmental Conservation;
- Recognized the excellent work on sacred natural sites that has been carried out by the EABRN countries and encouraged its further development;
- Recognized and appreciated ongoing collaboration between UNESCO and IUCN regarding the recognition of the biological and cultural values of sacred natural sites;
- Explored options for the MAB EABRN BR network to use biosphere reserves as pilot sites for testing IUCN/UNESCO guidelines on the management and conservation of sacred natural sites;
- Capacity Building
 - 3rd EABRN Training Course on GIS Applications to BRs management – this time there will be a special focus like climate change.
- BRs Review
 - The importance of independent BRs was acknowledged;
 - Lack of funding might play a role to invite international experts for review;
 - From the 11 EABRN Meeting it was decided to have a separate session during EABRN meeting for presenting review of one BRs from each country.

EABRN Biosphere Reserve Atlas

- Based on the recommendations of EABRN-9 meeting UNESCO Office Beijing initiated preparation of Atlas
- The main objectives of this atlas :
 - to transform complex data into easily readable information for the general public and school children, and
 - to increase the knowledge of teachers, school students and community on Biosphere Reserve Sites (BRs) under the World Biosphere Reserve Network (WBRN)
- As first case Chinese MAB Committee volunteered to provide the necessary data – we greatly appreciate Chinese MAB Committee for their enthusiasm
- EABRN Biosphere Reserve Atlas – P. R. China released June 2006 copies available for download from UNESCO documentation portal at: <http://unesdoc.unesco.org/images/0014/001470/147076m.pdf>



For more information www.unescobeijing.org

Making Cultural Values and Linkages with Biodiversity: A Case of Southwestern Coasts and Islands, Korea

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Introduction

This presentation is an interpretation of existing environmental elements and cultural artifacts as ways toward conservation and sustainability. Some cases in southwestern coasts, tidal flats and cultural artifacts are dealt with. Also this presentation describes a venture of a cultural institute to define an archipelago as a place composed of geographical, biological and cultural diversity. It is preparing a place of conservation and sustainability endowing cultural values newly interpreted. Composite of mountains, tidal flats, and islands will be dealt.

Korean West and South Coasts, Sea, Islands

Korean West and South coasts, sea and islands are composed of geographical, biological diversity and tangible/intangible cultural artifacts.

Mihwang Buddhist Temple at the southwestern end of Korean peninsula is an example. It is located at a coastal mountain filled with evergreen broad-leaved trees, facing tidal flats and Dadohae archipelago. Legend of Mihwang Temple (established: AD 749): tells the story of establishment. The mountain view and religious aura seemed to be appropriate from small harbor nearby where the boat from abroad (India) with Buddhist scripts, sacred artifacts and figures arrived. It includes the theme of marine way and mountain location.

In the past priests and common performers of traditional percussion music had started their religious trip from this temple to the islands. They were dead nearby at one island and became the figures of this marine tragedy.

Evergreen broad-leaved forest Representative vegetations in the forests of Korean southern and southwestern coasts and islands are pines and some kinds of *Quercus*. *Camellia japonica*, *Magnolia hypoleuca*, other great variety of trees are growing in these areas making the areas as ecologically highlighted niches for the trees and surrounding livings.

Temples, village forests, village shrines, gardens have been the functional places of preserving these world of biodiversity, Village forest is cultural, sacred site as well as natural, ecological site. In folklore it is a religious protector of village and villagers, a landmark of villagers' communal identity.

In middle or old aged Koreans' consciousness there is itinerary route from southwestern end of Korean peninsula (called 'Tangkkeut' which means end of mainland including Mihwang temple) to the dimming island Bogildo. These sites above are on this itinerary linkage with continuous image of diverse evergreen trees, relaxed and/or spiritual cultural spaces.

These sites can be called cultural construction of nature putting human space, meaning and cultural value on the natural world. Especially forests with *Camellia japonica* and other evergreens have been highly appreciated in this part of Korea. Beside these sites, so many households have

managed personal gardens imitating and enjoying natural biodiversity. Also they have borrowed natural landscape into their house gardens over the walls and other spaces. They have transformed these diverse plants into their aesthetics. All of these are located on the transitional linkage between nature and culture making people access to natural world more intimately, making people appreciate the value of nature through the path of cultural value.

Nowadays the notion of geographical continuity among mountain, mountain ways, marine area is a key for the priests, believers, visitors and tourists. At the center of this continuity Mihwang temple resides. In Korea Mihwang temple is characterized as an epistemological and real linkage from an end of Korean spinal mountains to the marine area and islands. People's notion of mountains, marine areas, islands and the continuity itself contributes preservation and sustainable use of these areas. Local elites, cultural NGOs, ecotourism groups have produced cultural and ecological maps, small performances, mountain temple concerts combined with traditional Buddhist ritual. All of these were well known in Korea with their message of beautiful natural landscape and spirituality. Visitors have expressed their personal aspirations adding stones on the mountain roads. This custom contributes constructing cultural ecology in the forests. It is a kind of adding cultural value (human aspirations including well being) in this natural world (making cultural ecology) and making supernatural world join with the cultural, ecological world.

Next year, Mihwang temple plans to launch religious, performing trip in the Dadohae archipelago. This is a kind of revitalization of tradition and also a realization of marine venture failed in the past. Moreover this plan transcends old theme of religious, performing trip. For it is envisioning power of making community among all beings including human, earth and sea linked by the 'trip of islands'.

Between Land and Sea: Tidal Flats and All Lives

Below the mountains Mihwang temple there are rice fields leading to the sea. In southwestern and western coasts, quite a lot of rice fields are from reclamation which conveys a lot of environmental problems. The sites free

from reclamation, tidal flats exist between earth and sea. In some sites salt fields occupy some portion of tidal flats. From Mihwang temple to the islands mosaic of mountain, rice fields (at natural hills or from reclamation in several hundred years ago or from recent reclamation), tidal flats, sea, and islands continue.

Coastal and island tidal flats as intermediate substance represent continuity or linkage from earth to sea. Tidal flats are also those made from the soil flowing from mountains and fields. Nutrients derived from earth are stored, transformed in the flats and nourish marine microorganism, fauna, flora and human beings. Korean term 'pul-bat' means mud field and in this word, 'bat' borrows the meaning of farming field on the earth. From the past tidal flats have been the sites of marine food resources. Waterways between flats have been important traffic ways for transportation and fishing boats. Recently, beyond these functions, people have put environmental and cultural values. As large scale of reclamation prevails NGOs, environmentalists and scholars resist to protect tidal flats' functions of controlling water pollution, of migratory water birds' staying sites, of breeding-feeding marine lives and of local fishermen's economy. Also tidal flats have become tourists' and students' 'breathing', 'experiencing', learning places of marine nature. Old cultural ritual 'maehyangje' where people buried logs of aromatic tree (Chinese juniper) in tidal flat was the one in which the aspiration of protecting human life, the dreams of new world were expressed. Now it has been revived in a new context of 'environmentalism'. On October 28, 2007, at Tongmak seashore of Kanghwa, in the middle of West Sea one revived and transformed maehyangje was held. There people prayed realization of the world of lives and peace. The lives of tidal flats, fields, grain of Kanghwa-do were celebrated. In fact it was a religious expression of alternative world of environmentalism and a political activism by the young generation's 'Chorok-dang' (a kind of green party) which is being prepared.

Tidal Flats: Geological, Biological and Cultural Diversity between Land and Sea

Korean West Sea and parts of South Sea are mainly belong to a macro-tidal regime where the tidal height where the tidal height reaches up to 10 meter on the coast in the

north of West Sea. In some places the width of tidal flats is about 10 km.¹⁾ Tidal flats occupy an area of about 2,900km² in South Korea, about 1,000 km² in North Korea.²⁾ The gross area of Korean tidal flats is known to be ranked as 5th largest in the world.

The remarkable characteristics of Korean tidal flats are their geological, biological and cultural diversity. Extremely fine mud, silt, sandy silt, muddy sand, silty sand and sand they show quite various sediment types. From the heavily indented coast to the long and flat one, from the large estuary to the surrounding of small island, tidal flats are located in the quite different sites of geomorphology. More than one million migratory waders and other waterbirds are estimated to come to west coast of Korea during the spring and fall migration. The tidal flats are used for feeding, breeding and roosting grounds. Lee, Paek and Kim reported that 38 species and 167,565 individuals were observed from April to October in 1999 at one large coastal flat 'Saemangeum' located at west-south coast.³⁾ Over 20 species of salt plants were reported in the southwestern coasts and islands.⁴⁾ Seaweeds (algae) including *Porphyra tenera* are farmed in the tidal flats. Zhang explains *Neanthes virens* and 5 other similar species, *Tapes philippinarum*, *Mactra veneriformis*, *Meretrix lusoria*, *Tegillarca granosa* (shellfish) and over 10 species of similar ones, *Portunus trituberculatus*, *Penacus chinansis*, *Trachypenacus curvirostris* (crustaceans), *Limanda yakokamae*, *Muraenesox cinereus* and other 17 fishes, *Octopus ocellatus*, *Sepia esculenta* (mollusk) as examples of fauna and resources for human being in tidal flat.⁵⁾ Besides these fishes, far more ones are living

- 1) Chul-Hwan Koh 2002, A Brief Introduction to Geomorphology, Reclamation and Conservation, Saemangeum Wetland Report, Korea, (Kyoung-Mann Cho ed.), Seoul: Korean Society for the Life of Saemangeum, p. 14.
- 2) Soo-Chul, Park & Chul-Hwan, Koh 2001, Depositional process of tidal flat, The Korean Tidal Flat, (Chul-Hwan Koh ed.), Seoul National University Press, p. 6.
- 3) Han-soo Lee, Woo-Kee Paek and Jin-Han Kim 2002, Migratory Waders on Saemangeum Tidal Flat, Saemangeum Wetland Report, Korea, (Kyoung-Mann Cho ed.), Seoul: Korean Society for the Life of Saemangeum, p. 32.
- 4) Jeom sook Lee 2001, Halophytes in the southern region of the Korean Tidal Flat, The Korean Tidal Flat, (Chul-Hwan Koh ed.), Seoul National University Press, pp. 172-173.
- 5) Chang Ik Zhang 2001, Fisheries production on the Korean tidal flat, The Korean Tidal Flat, (Chul-Hwan Koh ed.), Seoul National University Press, pp. 195-210.

and microorganisms such as benthic diatom form a first producer of the ecosystem.⁶⁾

Adaptation to Ecosystem and Marine Resources

The beginning of settlement in Korean tidal flat might date back quite far. Some important Neolithic relics of human dwelling were found nearby the seashores of southwestern part of Korea. Significant ancient relics might be so many shell mounds nearby tidal flats. These relics tell that in bronze or in early iron age, people had adaptive cultures to their tidal flat surroundings.

The significance of this adaptation might reside in the fact that people got high protein resources with so simple tools, that are, human hands and some gleaning or chopping-picking tools. We can also find out, even in present time, quite significant adaptation with simple but highly efficient tools and with concrete knowledge of tidal flat surroundings.⁷⁾

The tools and technology are adaptive to the resources and geological characteristics. In southern tidal flat areas of Korea, like as Suncheon Bay where flats with deep mud are quite developed, people have used slippery transportation tool, named 'Pulbae'(mud boat), which is pushed by one person with her one foot. In Hampyong bay where a lot of small rocks and sand are distributed, people walk and glean the oysters with small gathering tool called 'chose', very simple but manipulated efficiently only by the hand with dexterity. Average weight of oysters gathered in an hour by one woman (from 30 to 80 years old) was 790.9g (net weight) in March, 1999. In Saemangeum tidal flats in the west-south coast of Korea, where shell gleaning is developed, people use specified tool convenient to walk and pull through the shallow surface of mud flats. All these techniques can not be supposed to be inherited from ancient societies. But at least we can say that they show quite simple but highly efficient technology with concrete adaptation to specific

natural surroundings. The principle of the technique might be transmitted through many generations, with some transformations following the cultural process of 'adaptive advance'.

This type of adaptation has sustained family economy up to now in many parts of Korea and it had been activated vigorously in the important estuary zones before the rivers were closed by the modern reclamations.

These adaptive patterns might be seen as quite trivial from the modern development perspective. But they tell that adaptation to the specific natural ecosystem is far more sustainable in economy. In this case economy is operated on the basis of ecology. Also thinking about emerging sustainable ways replacing the recent ones, the traditional adaptations can give guiding principles and wisdom in pioneering the sustainability. The characteristics of emerging sustainable ways can be those which are designed to search for local specialization and diversity not only in terms of economic survival but also of socio-culturally desirable life patterns and their networks in local societies. They are being designed to search for endowments of authentic meanings of ecological-cultural interactions, to search for the development based on life-support system for natural environment and man.⁸⁾

Thousand Islands on Tidal Flats: Dadohae in Shinan County

Dadohae means archipelago which is located mainly in Jeollanamdo province, mainly in southwestern sea. In Dadohae, there is a (marine) national park. This park has two areas, one at Shinan county, the other at Jindo county.

62.6% (1989/3167) of Korean islands are distributed in Jeollanamdo. Among them 1,004 islands are in Shinan county located in southwestern sea, representing Dadohae, Korea. The pronunciation of 1,004 ('chon-sa') is similar with the Korean pronunciation of angel. Youngsters have enjoyed this similarity when they use cellular phone or computer communication. Shinan county uses the number as its identity 'The Islands of 1004'. On the one hand this phrase means that so many islands are spread, on the other hand the county utilize the youngsters' linguistic enjoyment.

6) Joong-Ki Choi 2001, Microcosm on the Korean tidal flat, The Korean Tidal Flat, (Chul-Hwan Koh ed.), Seoul National University Press, pp 89-102.

7) June Takeda, Eung Chol Lee & Kyoung Mann Cho, 2001, The Anthropological and Ecological Importance of Tidal Flats to Hapan and Korea with Special Reference to Oyster-Gathering Activities, Lowland Technology International 3

8) Kyoung-Mann Cho 2002, Future Path for Saemangeum, Saemangeum, Wetland report. Seoul: KSLS.

Mosaic or spectrum of geological, ecological diversity is conspicuous in the islands of Shinan county. Tidal flats surround all most all islands except some islands in remote and deep sea. Islands are 'on tidal flats' in ebb tide. A lot of intricate and small channels of tide become water ways for boats and fishermen who catch shellfish, octopus and other livings in the flats. In some islands like Bigeum-do people have managed huge salt fields which need for sustainable solution to protect villagers' economy and to protect land-salt field-tidal flat continuum which can guard tidal flat and sea from landfill. Other islands like Uido, Hongdo, Heuksando in deep area command precipice, evergreen broad leaf forests, pine forests, grasses and fishes in variety. Especially Uido has largest sand dune in Korea. In the islands including some ones in deep sea areas, sand, sandy silt shore and steep precipices are developed mainly in northwest. Silt, Flat, silty sand and salt plants are in southeast.

Cultural Approach for Conservation and Sustainability: Dadohae Islands and Tidal Flats

Dadohae, especially in Shinan county naturalness is comparatively well conserved. In National Park area, forests and sand dunes are well kept. But the island tidal flats which have quite extraordinary geological combination with islands are endangered by small or large development plans. Recently tour and leisure projects endanger forests and shores. Salt fields are diminishing as the import from China grows. Recently cultural approach for these islands is being suggested as a contribution to solution.

For the tidal flats and sea where human intervention has been from far ago, people's economic activities

themselves are illuminated. Small scale and simple technology from long ago is a tangible/intangible cultural relic which brings sustained yield. Autonomous fishing (catching) organization and the custom 'divide and turn' of fishing area have resulted in control of over catch sometimes consciously but mainly unconsciously. This 'divide and turn' had been applied to the forests too when the villagers used wood branches for their heating. But now newly revised, more encompassing scheme is needed, for the endangered one becomes the place itself transcending the individual resources. Salt fields are cultural relics too. But to enhance sustainability and economic return, cultural value of the place is needed. Forests which have been strongly conserved are now illuminated as place where biodiversity is realized. Cultural values are on the place experience (landscape, visiting, etc). Resources which have been endowed cultural values for their traditional knowledge, for their linkage with people's cultural experience interact with the value of the place.

The Institute of Island Culture, Mokpo National University is preparing a plan to encompass geological, biological and cultural diversity heading for making 'place' effective in conservation and sustainability. Issues of 'islands on the mosaic of various tidal flats', 'from tidal flats to sand dunes and mountains', the institute is investigating composite of this diverse world endowing or creating culturally appropriate and detailed meaning. The notion of composite is quite similar with that of naturally created in Mihwang temple area. But in this case where cultural relics are not enough, human economical, social, aesthetic, religious experiences and some sacred sites (artificial or natural) become more important. A scheme for the place where 'cultural values in composite natural diversity' will be produced.



**Private Sector
Initiatives and Support
for Biosphere Reserves**

Linking Conservation of Biodiversity and Culture Diversity at Komodo National Park, Indonesia

Mr. Tamen Sitorus

Head of Komodo National Park, Indonesia

Abstract

Protected areas are is of the earth's most important places that help to sustain life and safeguard biodiversity for humans. It has long been one of the main strategies for safeguarding the world's biodiversity. It can offer a range of benefits including protecting biodiversity, enhancing fisheries, boosting tourism, providing economic opportunities and reducing conflict. But pressures on the environment caused by economic development and other human activities make it difficult to protect natural areas that are large enough to accommodate entire ecosystems.

Indigenous people who over centuries have managed the natural resources they held in common property and interaction between people and nature has been intimate and harmonious. However increasing competition for the use of natural resources has increased resulted from population growth and the pursuit of rising material standards of living. Economic tensions tend to raise conflicts. This condition has caused pressures on natural resources. Destructive practices for within protected areas have severely threatened natural resources. The traditional view of protected areas is isolated repositories for natural heritage. Hence indigenous and local communities are ignored. The Vth IUCN World Parks Congress' theme "Benefit beyond Boundaries" has recognized the importance of protected areas for communities and the economic activities in and around them (Lockwood et al, 2006).

Komodo National Park is a protected area that is located where 4 group of settlements have existed long before the Park was established. Conflict of interest of using natural resources between local community and conservation should be harmonized.

This paper outlined the linkage between community livelihood and ecotourism activities as an alternative practical solutions in protecting natural resources in Komodo National Park.

Komodo National Park

Komodo National Park (KNP) is located between the islands of Sumbawa and Flores at the border of the Nusa Tenggara Timur and Nusa Tenggara Barat provinces, this are of Indonesia is part of the Wallacea Region of Indonesia and the South-East Asia Coral Triangle-identified as a global conservation priority area. KNP includes three major islands, Komodo, Rinca and Padar, and numerous smaller islands together totalling of 1,817 km². KNP was established in 1980 and subsequently designated a Man and Biosphere Reserve by UNESCO in 1986. and a World Heritage Site in 1991. KNP was initially established to conserve the unique Komodo dragon (*Varanus komodoensis*), and its habitat.

KNP also includes one of the world's richest marine environments. It encompasses 510 square miles of exceptionally diverse marine habitats, including coral reefs, mangroves, seagrass beds, seamounts, and semi-enclosed bays. These habitats harbor more than 1.000 species of fish, some 385 species of reef-building coral, and 70 species of sponges, and endangered marine species such as Dugong (*Dugong dugon*), dolphins (10 species), whales (6 species)- including the blue whale (*Balaenoptera musculus*) and sperm whale (*Physeter macrocephalus*), marine turtles such as tge hawksbill and green turtles (*Eretmochlys imbricate*) and *Chelonia mydas*.

There are approximately around 4.000 inhabitants living within the Park, spread out over 4 settlements (Komodo,

Papagarang, Rinca and Kerora). An estimated 15.000 people live in fishing villages directly surrounding the Park. Park inhabitants mainly derive their income from a pelagic lift net ('bagan') fishery, which is targeting squid and small schooling pelagic fish. This fishing method is not affecting the sedentary marine ecosystem in the Park and is therefore not in conflict with the Park's objectives. Additional income and food is derived from hook and line fishing, trap fishing, reef gleaning, and other fishing methods. Non-inhabitant fishermen also use pelagic lift nets and a variety of other methods such as compressor fishing, hook & line fishing and gillnetting in Park waters.

Traditional community in KNP has been subject to outside influences. Mobility, mass communications and immigration have brought change. The villages now consist of more than one ethnic group and more than one culture. The majority of fishermen in and surrounding the Park are Moslems, with a strong informal institution of Koran recitation. Hajis have a strong influence on community dynamics. Most communities can speak Bahasa Indonesia, with the Bajo and Manggarai languages being used mainly for daily communication (Singleton et al, 2002).

Pressure and threats to KNP

Although bagan is the dominant gear-type in KNP, several destructive fishing practices (DPFs) such as dynamite-, cyanide-, and compressor fishing (mostly done by non-Park inhabitants), reef gleaning and plain over-fishing, severely threaten the Park's marine resources. Terrestrial threats include the increasing pressure on forest cover for fuelwood and water resources as the local human population has increased 800% over the past 60 years. In addition, the Timor deer population, the preferred prey source for the endangered Komodo dragon, is still being poached. Pollution inputs, ranging from raw sewage to chemicals, are increasing and may pose a major threat in the future.

The pressure is leading to degradation of the terrestrial resource base. The collection of firewood from the mangroves and surrounding forests degrades them, and leads to the loss of breeding grounds and shelter for marine life and terrestrial species, the loss of windbreaks, increased erosion/siltation, and the loss of food sources for some species. Increased extraction/diversion of

water leads to reduced water available for dependent fauna, changes in the water table, and will affect plant distribution patterns (Pet et al)

Exploitation of the natural ecosystem in the KNP waters has increased and become more intensive over the past few decades. A cash economy has developed and the standard of living in the area has increased since 1980. This observation is based on the increasing number of people who have made the pilgrim's journey to Mecca, and the growing number of boat owners, buildings, and televisions in the area. The use of destructive fishing practices, such as bombs and poisons, has increased with the increasing need for cash, and has had a negative impact on the Park's quality as a source of replenishment. Law enforcement is not the answer to minimize these conflicts.



Village women cleaning and drying cuttlefish

Management system

Area management within the Park is based on zoning. The zoning system for KNP includes and covers both terrestrial and marine areas. A single zoning system has been designed for the entire Park with a total of 7 types of zones which includes Core Zone, Wilderness Zone with Limited Tourism, Tourism Use Zone, Traditional Use Zone, Pelagic Use Zone, Special Research and Training Zone, and Traditional Settlement Zone.

Two of these zones, for example, are Settlement Zone and Traditional Use Zone. In both zones, communities living inside the Park has a chance and exclusive rights to do their daily activities, including traditional extractive activities, as long as they are in sustainable manner (Law No. 5 of 1990 concerning Conservation Natural Resources and their Ecosystem).



Zoning map of Komodo National Park

The National Park authority focused conservation management on protection of the Komodo dragon and ecosystem. In 2005 The Park collaborated with a Joint Venture company PT Putri Naga Komodo to set up tourism concession from which the profit will be channeled back for park management to sustain park operation. This sustainable financing scheme is implemented through Komodo Collaborative Management Initiative (KCMi). The KCMi is intended to address the dynamic challenges and opportunities facing KNP in a comprehensive program of investments, policy reforms, management interventions, community development projects, and institutional strengthening. KCMi will enhance stakeholder involvement in the management of KNP, and involve all important stakeholder groups, including the Park authority, local government, the Joint Venture PT Putri Naga Komodo, with additional inputs from local communities (Mous, 2004).

Towards Harmonization with the Local Community

Local community involvement through the establishment of Forum for Community Communication (FCC). FCC was set up to address complaints, concerns, and input from the community. Through this way, community also takes an important part in management of the National Park. Some state-run protected areas in some parts of the world suffer from ineffective management, inadequate allocation of resources, lack of local support, and incursion from local communities (Lockwood, 2006).

The Park includes socio-economic development programs as a means to provide incentive to local communities to reach the overall goal of nature conservation, both by

creating alternative (non-destructive) sources of income as well as aiming for private sector oriented and self-regulating measures for protection.

The Park together with collaborative management has initiated a number of community alternative livelihoods to obtain tangible benefits from conservation of natural resources through Incentives for Sustainable Livelihoods program.

The objective of the Incentives for Sustainable Livelihood is to provide positive incentives to resource users in and around the park to switch from destructive practices, such as cyanide and blast fishing, to biodiversity-sensitive livelihoods (KCMi Project Document, 2004).

To achieve this goal, the component will involve scoping of alternative livelihood schemes based on the sustainable use of marine resources, providing community development grants, and stimulating the local economy through the development of sustainable micro- enterprises.

A series of community development activities are conducted according to the three elements. Some of the past activities that have been done are seaweed farming, sewing and weaving, and fish culture project (Mous, 2004).

A community-based Financial Management Units (FMUs) was established as one of the key programs for community development with the purpose of managing micro-credit programs through a Sustainable Enterprise Fund (SEF) set up to fund viable and sustainable options for micro-enterprise development in the approved alternative livelihood options. This fund will be administered locally by a committee of community leaders, which will review funding proposals from villages within the park and buffer zone. Enterprises will be selected based on their ability to generate economic returns and contribute to the conservation of natural resources.

Furthermore, villagers from Komodo have been involved in carving of Komodo dragons sold as souvenirs for tourists. The Park made a space available where locals can sell souvenirs near the main entrance gate of Loh Liang (Komodo). The Park provided series of training to improve their skills and helped in providing carving tools. The sustainable financing scheme in Komodo National

Park has set up a new fee system namely Contribution to Conservation Fund. Visitors coming to the Park pay a certain amount of money according to the length of stay. The money will be channeled back to support the park management where to improve community development program in the Park. Women groups in the villages are trained to produce handicraft (bracelet from coconut husk as a token of appreciation for visitors paying for the Conservation Fund). Young people from the villages have started to seek profession as tourist guides by joining Naturalist Guide training conducted by the Park authority to open more job opportunities that link with conservation in the Park. As a result, local community will eventually be the best guardian to the park since they get benefit from the park.



Carver in Komodo village

The Role of Ecotourism

Ecotourism development has become a prominent approach to address socioeconomic concerns in a conservation issues. Ecotourism is considered to be a form of resource use that contributes both to conservation and rural development by generating revenue for park management and by providing local communities with sustainable livelihood alternatives and economic benefits (Borchers).

Apart from community development program, ecotourism can also generates additional income for local community. KNP is not only well known among international tourists, but also among environmental experts and world's tourism industry. Because of its unique biodiversity and scenic beauty and in spite of its remoteness and underdeveloped facilities, KNP today is one of the most visited nature reserves in Indonesia. During the PATA Travel Mart 2007 held on 25-28 September 2007 in Bali, number

of delegates were visited KNP. In short, the presence of Komodo dragon has invited more foreigners (tourists, researchers, documentation film makers) to come and spend dollars in the region to enjoy the uniqueness of the nature (savannah, coral reef, fish and other sea creatures) in the Park. Tourism to the Park has the potential to contribute significantly to the surrounding local economy, through employment and revenue generation, and to stimulate local development (Walpole et al, 2000)

Conclusion

The most effective way to protecting natural resources in protected areas is community involvement. One way of gaining support from community is ensuring that the local people benefit directly from conservation, and other activities associated with the protected area.

Community is an important stakeholder with whom Park management must seek to cooperate. More of the benefits of conservation need to be delivered to local people by enabling them to benefit from the protection of the park.

Local communities in Komodo National Pak are able gain economically from the protected area with which they live through alternative livelihoods and ecotourism. They also can offer means by which people's awareness of the importance of conservation can be raised.

References

- Borchers, H., *Ecotourism as a Conservation Strategy in Komodo National Park, Indonesia*, University of Auckland
- Lockwood, M., Worboys, G.L., Kothari, A., *Managing Protected Area: A Global Guide*, Earthscan, London, 2006
- Mous, P., Halim, A., Wiadnya, G., Subijanto, S., *Progress Report on The Nature Conservancy's Komodo Marine Conservation Project*, 2004
- Singleton, J., Sulaiman, R., *Environmental Assessment Study Komodo National Park*, 2002
- Walpole, M.J., Goodwin, H.J., *Local Economic Impacts of Dragon Tourism in Indonesia, Annuals of Tourism Research*, Vol 27, No.3, pp.559-576, 200

Private Sector Initiative in Establishing New Biosphere Reserve

Show Case : Giam Siak Kecil - Bukit Batu Biosphere Reserve Project

Riau Province, Sumatera, Indonesia

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Abstract

Sinarmas Forestry (SMF), on June 2006, proposed to the Government of Riau Province on the utilization of 72,000 hectares of SMF's production forest areas to be developed as part of a new Biosphere Reserve, together with GSK Wildlife Sanctuary (75,000 ha) and BB Wildlife Sanctuary (24,800 ha).

The proposed GSK-BB Biosphere Reserve will include two existing protected areas as the core areas, and the SMF's concession areas which has been set aside as buffer zone. This contribution will effectively link the two core areas by a broad corridor and will have a total of almost 172,000 ha. The project also includes various development areas of about 500,000 hectares such as SMF's plantation forests, oil-palm plantations, and other development areas – function as transition area.

In order to achieve the sustainable management of the GSK-BB Biosphere Reserve especially for improving the community income and prosperity, therefore some requirements are needed to be carried out. Those requirements are stated as the following :

- Strong commitment from the government, both local and national level.
- Implement a collaborative, multi-stakeholders and cross-sector management model for managing the GSK-BB Biosphere Reserve.
- Stakeholders involvement in the planning process and supported by high-quality researchs and studies which executed by competent experts.
- A strong multi-stakeholders management institution that supported by group of experts.
- A sufficient funding supports for managing the GSK-BB Biosphere Reserve.

Introduction

The initiative of establishing Giam Siak Kecil – Bukit Batu (GSK-BB) Biosphere Reserve came through a process which initiated by Sinarmas Forestry (SMF) in 2003. On February 2004, the Sustainability Action Plan (SAP) was produced by SMF where the company's intent for conservation and development in the GSK-BB area is broadly outlined. The plan highlighted the 72,000 hectares of peat-swamp forest concession areas be set

aside for conservation between GSK and BB – in essence all the forest identified as having high conservation value forest (HCVF). This is a large contribution and not only represents a 73% increase in the protected area here, but links the two reserves into one continuous block which is optimal for conservation. In July 2004 a separate consultant, funded by SMF, supported the SAP and further proposed the development of a broader conservation programme for the whole area in question.

On June 2006, SMF proposed to the Government of Riau Province on the utilization of 72,000 hectares of SMF's production forest areas to be developed as part of a new Biosphere Reserve, together with GSK Wildlife Sanctuary (75,000 ha) and BB Wildlife Sanctuary (24,800 ha). The proposed GSK-BB Biosphere Reserve will include two existing protected areas as the *core areas*, and the SMF's concession areas which has been set aside as *buffer zone*. This contribution will effectively link the two core areas by a broad corridor and will have a total of almost 172,000 ha. The project also includes various development areas of about 500,000 hectares such as SMF's plantation forests, oil-palm plantations, and other development areas – function as *transition area*.

Description of the Area

Climate

The climate in Riau Province is humid tropical with average temperatures around 30°C and humidity above 70%. The monsoon usually is from October to early January bringing the rainy season, with rainfall averaging between 450 and 550 mm/month. Between January and August the average monthly rainfall lies between 250 – 350 mm/month followed with a short dry spell in September of only 150 mm/month.

Socio-economic

Riau is a Indonesia's province located in Sumatra island. It is about 8 million hectares and has a population of about 5 million. More than 70% of local communities' income in the area is generated from agriculture, such as oil palm and rubber plantations. About half of the oil palm holdings in Riau belong to small scale farmers (less than five hectares) or small community operations (less than 100 hectares). In a complicated web of arrangements they may be co-owned, co-managed, integrated, accepted (or ignored) by the large corporations who usually operate the mills and thus control access to the market.

Furthermore, tourism is basically non-existent. Despite attempts by the provincial authorities to bring tourists from e.g. neighboring Singapore it has not taken off. The lack of facilities in the fields, transportations, informations and guidances are the main reasons. Ecotourism, despite abundant possibilities to develop in Riau, is also not present.

Most traditional villages are located along riverbanks and appear rather un-organized and without any clearly defined boundaries. Transmigration villages, in contrast, have clearly identifiable land use plans for housing and agriculture, and have distinct boundaries.

Formal education levels in traditional villages is generally lower than in transmigration villages. Traditional village people typically leave school after two or three years or only graduate from elementary school. Most children from transmigration villages complete elementary school and junior high school while this is uncommon among the local communities.

Administration

The smallest government unit in a village is the Desa. It addresses administrative and developmental concerns. Above the Desa is the Kabupaten (district government). Districts are divided into Kecamatan (sub-districts). While the Desa and the Kabupaten are political units, Kecamatan is an exclusively administrative unit of the Kabupaten.

Directorate General of Forest Protection and Nature Conservation (PHKA) in the Ministry of Forestry (MoF) controls the protection status of protected areas. Division of Nature Conservation and Wildlife Management (KSDA) of Riau which under DG PHKA is in charge of law enforcement in these areas. However, provincial and district governments are in a transition phase as they are implementing the Autonomy Act. The Act is transferring substantial authority from central and provincial governments to local, district-level governments. One of the unintended impacts of this act is an increasing assertion of ethnicity and territorialism among the people. This means that land and resource claims are increasingly based on territorial boundaries of individual ethnic groups. This in turn is creating numerous problems regarding who has the legal rights to a particular area as only few areas have had village mapping conducted in the past.

Chiefs of the clans still play a significant role in deciding on forest and land claims. However, the power of many village Chiefs is diminishing, often because of their abuse of traditional authority for personal interest, mainly concerning forest and land issues.

Natural resource utilization: status, trends and sustainability

Riau's forests in general and the Giam Siak Kecil – Bukit Batu Wildlife Reserves in particular, are perfect examples of weak law enforcement and general ignorance about natural resource protection and forests ecological services that appears to be epidemic in Indonesia today. While meant to undo injustices of the past, the drive to local autonomy appears to have weakened the commitment of central and provincial government to protect natural resources. Under-employment, low wages and the potential social unrest may be the underlying reason why the government tolerates people over-exploiting natural resources and illegally squatting on land allocated for other purposes. In a vicious circle, many people and communities see the illegal exploitation by others and make a conscious decision to participate so they too can get at least some benefits before the forests are gone.

Illegal logging, legal logging, plantation operations, sustainable forest use, land claims, protected area management are the variables influencing the all important equation on employment and wealth in this area. Although Riau is rich in oil, gas and timber, the exploitation of natural resources has brought few if any benefits to the majority of its inhabitants. Environmental degradation affects the survival of especially the poorer sections of the population, many who still depend directly on clean rivers and intact forests. Many complain that they have lost the basis of their traditional livelihood to environmental pollution and land theft, and that they are thus forced to participate in illegal logging. Land disputes are commonplace.

Critical Landscape

The area around Giam Siak Kecil – Bukit Batu Wildlife Reserves has been called the GSK Landscape by some assessments (Jarvie et.al., 2003) and belongs to the Sumatran peat swamp forest ecoregion. The ecoregion is recognized as critical/endangered landscape due to degradation mainly by massive illegal logging, forest fires and forest encroachments. However, due to the present lack of governmental control, the existing *protected* areas are heavily impacted by illegal logging and forest encroachments, while the SMF contribution appears to be intact. It is thus a significant contribution to conservation efforts in Riau Province.

Sinarmas Forestry's Initiative in Establishing a New Biosphere Reserve

Vision and Mission

Sinarmas Forestry's initiative to establish Giam Siak Kecil – Bukit Batu Biosphere Reserve is aligned with its vision and mission as the following :

Vision

To be a world class Forestry Company, which practicing sustainable forest management and socially compatible, economically viable, and environmentally acceptable.

Mission

- To professionally manage and develop our forest resources in order to create value to all stakeholders through:
- Developing a sustainable high quality plantation forest at the best cost and lowest risk to supply pulpwood.
- Providing employment and business opportunities to the public and related industries, and improving the welfare of surrounding communities.
- Conserving forest areas of special merit and enhancing the forest environment.
- Contributing to government tax revenues and yielding a satisfactory profit.

Biosphere Reserve Mission

Furthermore, Sinarmas Forestry has two missions in establishing Giam Siak Kecil – Bukit Batu Biosphere Reserve :

- Establish a condition for supporting the achievement on conservation efforts at the local, national and international level, especially through sustainable utilization of natural production and plantation forest areas.
- Establish a condition of biodiversity and its ecosystem that could be preserved and utilized in long-term period, for increasing the community income and improving the community welfare.

The above missions are designed in order to address several key issues as the following:

- A complex of peatland areas with the peat thickness more than 3 meters, this result to a sensitive ecosystem and a complex of eco-hydrological system.

- Unidentified of biodiversity potencies.
- Threats from illegal logging practices, forest encroachment, forest fires, etc.
- Poor community surround the wildlife sanctuaries areas.
- Limited number of job opportunities.
- Conflicts (potential) between human and wild animals
- Ineffective on management of the wildlife sanctuaries due to limited the resources.

Benefit

This Biosphere Reserve Project has benefits not only for the company, but also for the government and the local community. The government and the local community will get benefits through this project through several things as the following:

- Conservation of biodiversity in the threatened landscape.
- Potential to be developed for environment services and ecotourism (job creation and new business opportunities).
- Stable water supply / hydrology for agriculture/ fisheries and household needs.
- Improved control on illegal logging, forest fire and forest encroachment
- International attention and support opportunities towards management of protected areas and local community development.
- Location for research, education and training
- May attract projects, contributing to local community development and biodiversity conservation.

Moreover, by implementing this project, Sinarmas Forestry will also take benefit by the following conditions:

- A stable water supply even during periods of drought and as a source of water to maintain canals and to extinguish fires during the dry season.
- As a multi-stakeholders management model, there is a higher probability to solve the complex problems such as: illegal logging, forest fires and land claims.
- Strengthening collaboration with the local government, NGOs and local communities.
- As seed sources of local species for rehabilitation efforts (green-belts, community forest projects, etc).

- Provides research opportunities – e.g. environmental services, identification of alternative species more adapted to peat swamp forest, (biological) pest control, etc.
- Media for developing a good company brand image.

Project Requirement

Eventually, in order to accomplish the project effectively, therefore some conditions are needed to be addressed:

- Strong commitment from the government, both local and national level.
- Implement a collaborative - multi-stakeholders - cross-sector management model for managing the GSK-BB Biosphere Reserve.
- Stakeholders involvement in the planning process and supported by high-quality researchs and studies which executed by competent experts.
- A strong multi-stakeholders management institution that supported by group of experts.
- A sufficient funding supports for managing the GSK-BB Biosphere Reserve.

Literature

Citizens International & Yayasan Inovasi Pemerintahan Daerah, 2004. *Developing a Framework for a Long-term Conservation Management, A Scoping Mission of the Bukit Batu Forestry District, Riau, Sumatera*. A Report to Asia Pulp & Paper Co. Ltd.

Jarvie, J., Jeyaraj, K. & Hardiono, M., 2003. *A High Conservation Value Forest Analysis of the Giam Siak Kecil Landscape – Riau, Sumatra*. A Report to WWF International.

Rainforest Alliance SmartWood Program, 2005. *High Conservation Value Forest (HCVF) Assessment for Siak District*. A Report to PT Arara Abadi, Asia Pulp & Paper/Sinarmas Forestry.

Sorensen, K.W., 2005. *Bukit Batu –Giam Siak Kecil, Developing a Biosphere Reserve in Riau Province*. A Report to PT Arara Abadi / Sinarmas Forestry.

Biosphere Futures: UNESCO Biosphere Reserves for Sustainable Development

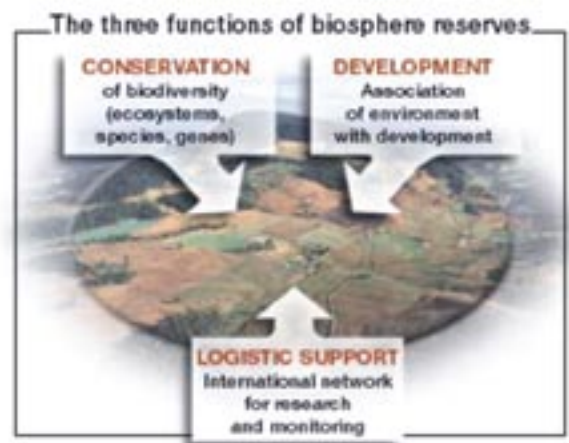
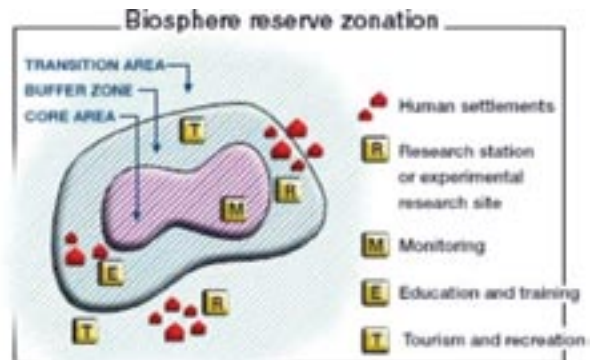
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Director, Center for Environmental Research and Education (CERE);

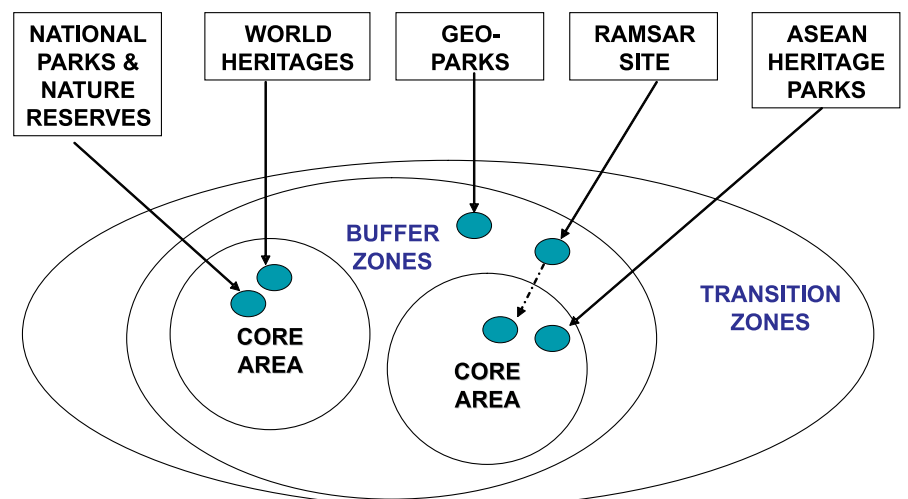
Secretary General, The Vietnam MAB National Committee

Biosphere Reserve Zones Contributing to Conservation and Development

- The idea of zoning originated with the 1974: combining a central core area, a delineated 'inner buffer zone' and an undesigned 'outer buffer zone';
- the Action Plan for Biosphere Reserves (Minsk, 1983): core, buffer and transition areas;
- the Seville Strategy of 1995 as a legally constituted core area and surrounding or contiguous to the core areas;
- Madrid Proposed discussion, 2008: Core area - 'Conservation for Development', buffer & transition zones (Buffer/connectivity Zones & Areas of Cooperation and Multiple Land-use) – 'Development for Conservation'.



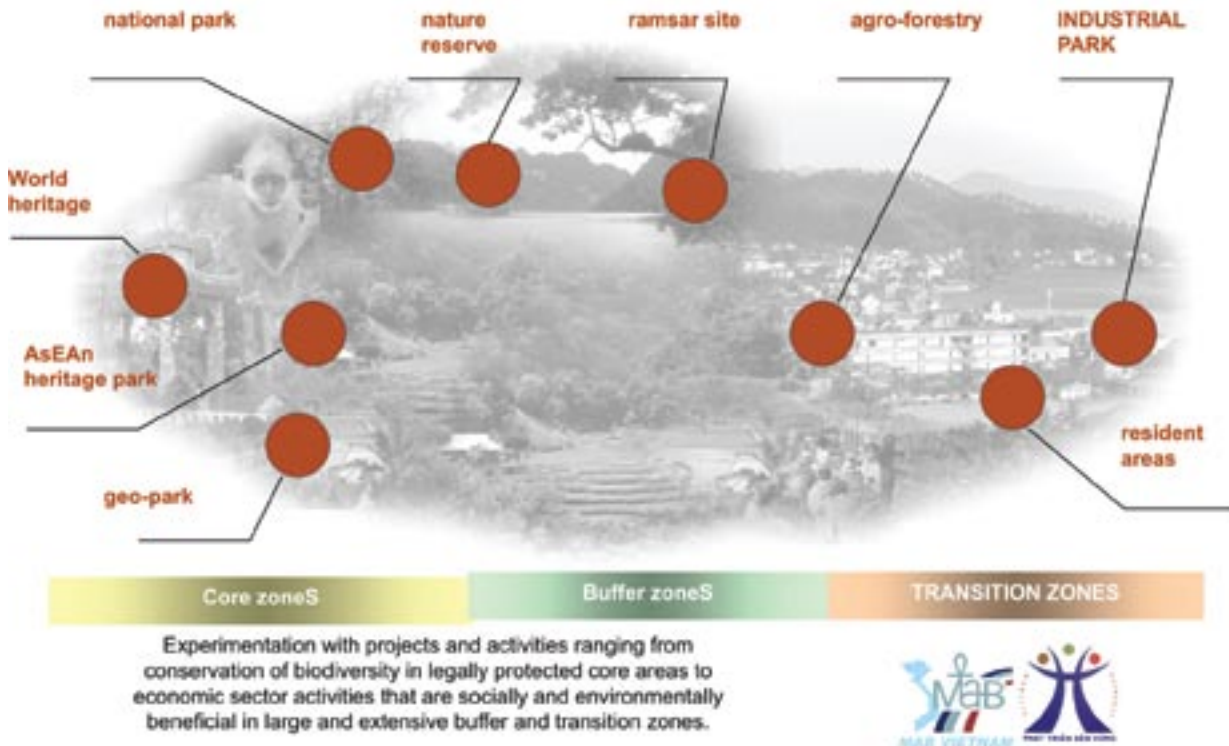
Biosphere Reserves as a Site of Integration



**BIOSPHERE RESERVES COORDINATED AND MANAGED
BY PROVINCIAL AUTHORITIES**

Biosphere Reserves as Learning Laboratories for SUSTAINABLE DEVELOPMENT

Vietnam biosphere reserve will be treated as a "laboratory" for testing sustainable development initiatives with varying mixes of environmental, social and economic sector components then be shared with all other parts of Vietnam for appropriate adaptation and application



Vietnam's Pilot Program

Biosphere reserves are demonstration sites for sustainable development

Vietnam's Strategy for SD (Vietnam Agenda 21) and 5-year National Plan for Socio-economic Development 2006-2010

Clean Development of energy efficiency and zero emission activities – Using bio-energy sources

The Program

Phase 1: 2006-2007: Articulating and consulting with partners

Phase 2: 2008: First generation of programs launched

Phase 3: 2009 – 2013: Implementation of first set of programs; design, development and launch of second and third generation programs based on evaluation and lessons learned from first generation programs

Phase 4: 2014-2015: Programme evaluation and decisions and recommendations for follow-up

MDGs, CBD-2010 and 'One UN'

DESD in Vietnam: universities, schools, vocation centers, CLCs, ASPnet and local communities

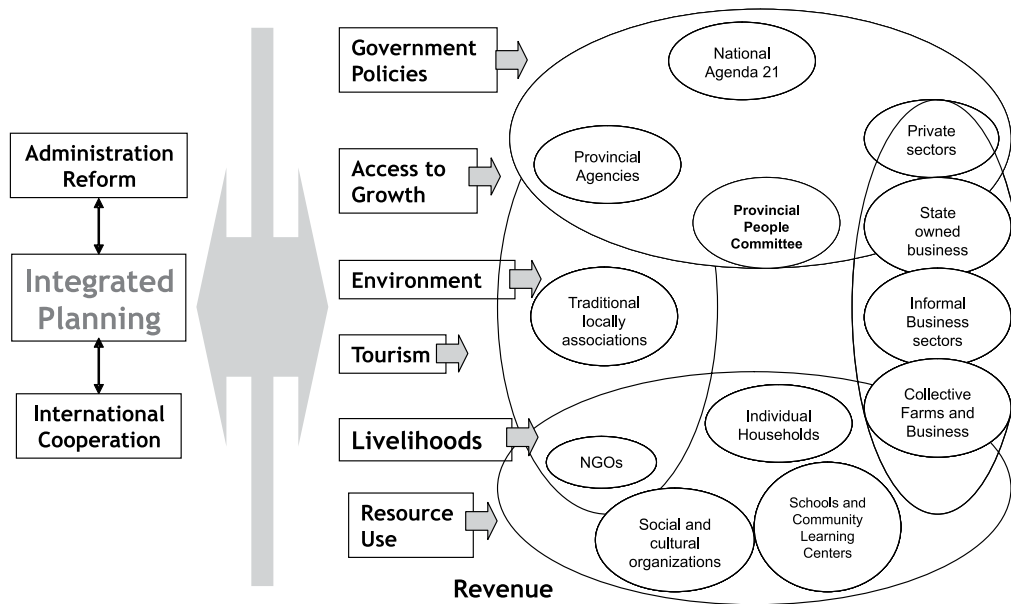
Commitment to CBD, long-term monitoring, indigenous cultures etc

Education activities on climate change, biodiversity and sustainable development interactions

Conservation for Development

Development for Conservation

Operation of Using Biosphere Reserves as 'Learning Laboratory' for Sustainable Development



Biosphere Reserves be Used for Innovative Research and Capacity Building Enhancing The Role of Ecosystem Goods and Services in Development

- Ecosystem services and their role in development: The Millennium Ecosystem Assessment (MA, 2001-2005)[1] identifies the following ecosystem services as important for human well-being and development: provisioning services, regulating services, cultural services
- The research and capacity-building functions of biosphere reserves and their contribution to assessing ecosystem services that are important for development
- The role of science in informing policy and the challenge of mainstreaming practice into policy implementation: the UNESCO-MAB experience
- Challenges for the future and suggested recommendations on how biosphere reserves can be used for innovative research and capacity-building enhancing the role of ecosystem services in development

Enhancing the role of ecosystem services in development

- It would be desirable to inform and train biosphere reserve managers about the currently available theory of science-policy-practice interaction

- A format for collecting policy-relevant information on ecosystem services derived from biosphere reserve experiences could be developed
- The active involvement of biosphere reserves in international research programmes on the role of ecosystem services in development should be promoted
- The development and implementation of further pilot projects in biosphere reserves ought to be encouraged
- Research on ecosystem services based on the MA conceptual framework ought to be enhanced in biosphere reserves

MAB and Biosphere Reserve Regional Networks: Main Drivers of MAB and Biosphere Reserve Agendas

- The AfriMAB Network:
 - Francophone sub-regional network;
 - Anglophone sub-regional network.
- The ArabMAB Network;
- EABRN – the East Asian Biosphere Reserve Network;
- The EuroMAB Network - 42 countries in Europe including Israel, Turkey and Russia, Canada and USA;
- The IberoMAB Network - Latin America and the Caribbean;
- NordMAB Network - North-Vidzeme Biosphere Reserve in Salacgriva, Latvia;
- PacMAB - the Pacific Man and the Biosphere Network;

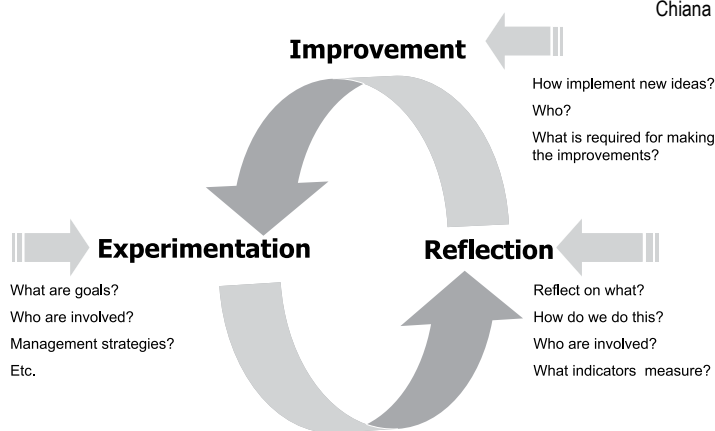
- REDBIOs - The East Atlantic Biosphere Reserve Network;
- The South and Central Asia MAB Network (SACAM);
- SeaBRnet - the Southeast Asian Biosphere Reserve Network;
- National Networks:
 - Canada Biosphere Reserve Association;
 - China BR Network;
 - The Jeju Initiative

Jeju Conference



Field-site training of biosphere reserve management between Vietnam, China and Pacific States

Systems Thinking and the Learning Laboratory for Sustainable Development



Vision MAB & Mission MAB

Version I: A world of integration of humans and nature that promote sustainable development, increase human well-being and society's capacity to cope with change.

Advance the understanding of complex social-ecological systems, promoting science in building resilience for sustainability.

Biosphere Reserves: Learning, Governance and Adaptive Management Approaches For Sustainable Development

- Addition of a section on adaptive management approaches;
- Use of the term 'platforms' instead of 'laboratories';
- Clarification of the relationship between governance, learning and adaptive management:
 - 'governance' relates to institutions and norms;
 - 'adaptive management' relates to practice;
 - 'learning' relates to both and provides a platform for interactions.

Establish Biosphere sites as demonstration areas and learning platforms with the aim of:

- maintaining and developing ecological, cultural and economic values
- securing ecosystem services for human wellbeing

Version II: A world where environmental resources and biodiversity are used fairly and equitably and poverty is eradicated to the level acceptable to all human beings.

Strengthening MAB and biosphere reserves towards ecosystem sustainability for future economic, social, cultural development through:

- Enhancing policy, governance, and political commitment towards better implementation of MAB Programme and biosphere reserve concept.
- Linking MAB programme with international programmes for management and governance of ecosystem services for human wellbeing.

Learning cycle



Maolan Declaration

Maolan Biosphere Reserve, Libo County

12 November 2007

We, the participants of the ECOTONE-SeaBRnet 2007 Meeting, witnessed the enormous efforts made by the Libo government and Maolan BR authorities in managing the Biosphere Reserve and promoting its status as Natural World Heritage. We were very impressed by the unique beauty and value of the natural landscape, biodiversity, geological, geomorphological and hydrological features and the rich tangible as well as intangible cultures of Maolan. We consider the site as an excellent example of linkages between biological and cultural diversity.

Historically, culture has always adapted to and with ecosystems, and conversely ecosystems have been historically modified by the presence of peoples and their management practices. The earth's ecosystems can therefore rarely be regarded as pristine but rather as the historical result of the complex relationship between culture and nature.

Recognizing UNESCO's work on intangible heritage, cultural diversity and the ethics of sciences, as well as in support of other international agreements and conventions, such as the Convention on Biological Diversity, we acknowledge 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 is however also recognized that not all indigenous practices and attitudes are in support of conservation.

We express our concerns about rapid societal change, the effects of increasing globalisation and economic development, and its impacts on the cultures of indigenous peoples, the ecosystems they inhabit, and in particular the intrinsic relationship between both.

We recognize that indigenous peoples have a vital role and responsibility in the sustainable management of ecosystems due to a broad range of factors including their geographical closeness to nature, indigenous knowledge, socio-cultural values and livelihood dependence on natural resources.

In the development planning and design of conservation regimes particular caution should therefore be paid to the indigenous context of Nature Reserves and to oversimplified approaches and judgements such as advanced vs backwards, scientific vs traditional, pristine vs man-made, developed vs under-developed, monetary economy vs subsistence economy and the like which do not reflect the complex interrelationship between cultural diversity and biodiversity and its importance as a platform for sustainable development.

The MAB Programme with the World Network of Biosphere Reserves at its core provides a workable tool to sustain the specific relationship between indigenous cultures and the natural environment, and to successfully combine sciences with indigenous practices and knowledge. The Biosphere Reserve concept does explicitly provide a mechanism for the integration of indigenous ecological knowledge and management systems in its zoning scheme.

However, we recognize that specific guidelines and innovative methodologies for a Biosphere Reserve management that appropriately addresses this topic are still lacking and that further appropriate and tangible studies need to be carried out – as cultural diversity encompasses much more than folklore and cultural expressions.

The participants believe that the Maolan Meeting and other related efforts that recognize the roles of indigenous peoples in nature conservation should greatly contribute to a global *Culture of Conservation*. When conservation becomes a cultural force, it will enable peoples to protect and sustain the biodiversity of our planet for present and future generations.

On November 7 to 12, 2007, China Biosphere Reserve Network (CBRN) held its 15th annual conference in Libo County of Guizhou Province, China. The theme of the conference is "cultural diversity promotes biodiversity conservation and sustainable development". During the meeting, there were 50 nature reserves, governmental and non-governmental organizations signing the Libo Consensus in order to clarify the long-existing neglect and prejudice on cultural diversity and share this idea with more people, especially to promote the implementation of such concept in conservation management.

*Secretariat, the Chinese National Committee for MAB
November 22, 2007*

Libo Consensus

We come from across the country and gather together at Libo of Guizhou, discussing and implementing a key philosophy of the World Network of Biosphere Reserves: to integrate conservation of biodiversity with protection of cultural diversity. We examine an issue of historical significance: Under current situation of China, how to promote biodiversity conservation and sustainable development through cultural diversity?

We pay close attention to this issue because:

Conserving biodiversity is our responsibility, and biodiversity is an issue inseparable from cultural heterogeneity. Diversity of cultures results from mutual influence and mutual evolution with biodiversity in the course of man adapting to social development and varying natural environment. However, this fact and the relations between the two "diversities" have not been thoroughly understood due to various reasons.

Economic globalization and rapid modernization make ecological problems and related yet implicit cultural issues conspicuous. Threats to biodiversity, as displayed in many places, are increasingly proved to be related to the loss of indigenous cultures aside from economic development. Cultural diversity has become an inevitable topic for biodiversity conservation and sustainable development against the background of globalization and modernization.

Our country is shifting from GDP-oriented development to scientific and harmonious development. In 1992, the United Nations issued the Convention on Biological Diversity; in 2006, the UNESCO published the

Convention on the Protection and Promotion of Diversity of Cultural Expressions. Both Conventions clearly point out the connection between cultural diversity and biodiversity as well as sustainable development. China is a signatory to both Conventions. To achieve the national goal of harmonious development between man and nature and to execute the two Conventions, we can no longer afford to ignore cultural diversity.

We have only established nature reserves for decades in our country, but cultural heterogeneity has had a long history here. The tremendous wisdoms held in store are nourishments that help us deal with and ease the various pressures we are faced with. Attention to cultural diversity is a necessity for as well as an indication of all nature reserves' effort in executing their duties and perfecting their management.

I. Issues we are faced with

- Nature reserves in our country started with the controversial closed protection, and the controversy has never really ended. Closed protection has been effective in preventing some criminal behavior, but also landed us in the predicament of conflicts with local communities;
- We used to think that biodiversity conservation was only an issue of science or policy and hardly an issue related to local cultures and traditions; we even thought they were contradictory;
- Traditional customs and beliefs were once viewed as superstitions and hence abandoned by us. Even today, some projects and policies, either on purpose or by accident, are still making an effort to replace and eliminate traditions without proper analysis;

- For ecological conservation, relocating original inhabitants has become prevalent. This method looks convenient and thorough, but often brings executors into unpredicted and deeper predicament;
- Sometimes attracting investments and implementing projects is necessary for taking in conservation fund and promoting economic development, but they often end up infringing upon the interests of original inhabitants and even giving rise to sensitive issues with regard to land property rights;
- In contrast to resource-extracting development, tourism brings opportunities to eco-friendly development, but also creates new negative impacts on local environment and community traditions;
- Some development projects, especially ecological projects, are increasing ecological compensation to localities. This is progress. But what should be compensated for? How? Is “fed by government” proper? A series of fundamental issues is surfacing;
-

The various problems listed above remind us that biodiversity conservation and sustainable development are encountering more fundamental problems, and that these problems are all directly or indirectly associated with a topic we are not so familiar with – “the diversity of cultures”. It calls for us to add a new point of view, i.e. a cultural point of view, in order to make our observations and judgments.

II. We believe

Separating culture from nature is the key problem with closed protection

- The reason why completely closed protection is repetitively proved unsuccessful and ineffective is that while unreasonable utilization is banned, indigenous cultures that have integrated well with nature is disconnected with nature by force. By cutting the reserves off from the foundation of indigenous cultures, they in turn lose the support from local residents – the main body of indigenous cultures
- The deficiency of closed management has been recognized by most reserve administrations, but management with involvement of local residents is still limited to economic aspect. To bring indigenous

traditions and wisdoms into the protection systems needs badly to be put into our working agenda, as economic fairness and compensation can barely replace cultural inheritance and development;

Respect of indigenous culture must be based on respect of related land property rights

- Not one culture can leave the land that nourishes it. Respect of various cultures must be based on respect of related land property rights and history. Modern economic development projects such as laying a road, opening up a mine, building a dam and developing a resort often lead to occupation of land from original inhabitants and even to their relocation. If cultural factors are not taken into account, these projects often result in the complete loss of traditions that have been environment-friendly and in a sequence of ecological problems.

Developing tourism cannot be cut off from the foundation of indigenous cultures

- Developing tourism has made indigenous cultures appreciated and stressed more than ever before. But this appreciation shall not be limited to exhibition of music, dances and costumes; attention should also be paid to inheritance and development of ways of living that retain large amount of indigenous knowledge and wisdoms. Otherwise the non-essentials are put before the fundamentals and the trifles are attended to the neglect of essentials, as the latter are the cultural foundation that is immediately related to biodiversity and sustainable development.

We shall bring into play the positive role of village regulations and folk conventions

- Some folk customs and religious beliefs retain plain and basic ecological consciousness and conception. They have helped restrain people’s behavior and maintain harmonious relations between man and nature. They are often more effective than written rules of the government. We shall change our past practice of excluding them without exception and explore ways to make them play a positive role.

Science and tradition complement each other

- Conservation of biodiversity requires not only modern sciences but also traditional knowledge. Past

successes and failures have repetitively reminded us that the two are not rivals but complementary to each other. This relationship, however, has been covered up by the bias of “science can solve all problems.” Now it is time for us to have a clear understanding of the relations between the two and enable them to supplement and enrich each other.

- Traditional knowledge is learnt and inherited mostly through customs and habits. Compared to modern sciences, traditional knowledge lacks of systematic categorization and record and they may just fit specific environment. This is also why traditional knowledge is diverse, which also determines that it has limitations. To explore its potential role requires us to shift our way of thinking and to observe and feel by immersing ourselves into it.
- To pay respect to and inherit traditional knowledge and wisdoms that are conducive to ecosystem requires us to re-evaluate our past criterion “Modernization represents advancement, tradition denotes backwardness.” To correct this criterion does not mean we return to traditions and decline modernization, but to advocate the toleration of cultural differences and respect the will and options of various cultures, with the aim of enriching the philosophy of modernization development.

Cultural change and adaptation do not take place by force

- Each culture evolves by interacting with nature and learning from other cultures. Some of the “obstacles” we encounter in conservation management are essentially issues of cultural change and adaptation, which cannot be resolved by simply using administrative powers.

We are facing an ultimate question: What kind of development do we need?

- The uniform, material-oriented modern development has rapidly deteriorated biodiversity and damaged the Earth’s ecological environment. It raises an ultimate question to mankind, especially nature protectors like us: what kind of development will enable both mankind and the Earth to win? It also urges us to explore new ways of development and conservation along the veins of various cultures that diverge

from each other yet all have adapted well to their environment. All above tell us that ecological and developmental issues are essentially inseparable from cultural issues.

III. We propose

- To make up as early as possible for our inadequate knowledge in cultural system, especially in its relations with eco-system while continuing with exploring and understanding the eco-system;
- To expand community participation in management, adding “bottom up”, “self-organization” and “localization” mechanisms so that local residents become the main conservation force;
- To investigate, collect, and categorize biodiversity-related local knowledge, customs and beliefs as important management resources for conservation and sustainable development;
- To bring protection of cultural diversity into the scope of responsibilities of nature reserves, and to clearly write it into the National Law of Nature Reserves that is under deliberation;
- To support everything that is rooted in local cultures and conducive to biodiversity conservation and sustainable development, including traditional knowledge, village regulations and folk conventions, customs and habits, and religions and beliefs, and to incorporate them into relevant rules and regulations if possible;
- To consider the cultural impacts of to-be-executed projects, and step by step establish formal procedures on evaluating cultural impacts or on hearings of cultural impacts in addition to evaluation of their environmental impacts;
- To actively help local cultural products find and open markets and at the same time, to avoid negative impact of markets on local ecology and cultures;

Cultural diversity has existed for a long time, but to include it in current biodiversity conservation system is a brand-new and laborious work. The above are just our preliminary recognitions and they have yet to be revised and perfected in real practice. Nevertheless, we believe that as long as we care for cultural diversity with down-to-earth actions, we will be more effective in accomplishing

our mission – to promote inch by inch the harmonious coexistence between mankind and the Earth.

*By November 2007, there have been 122 nature reserves listed under CBRN, with 28 ones of them belonging to the World Biosphere Reserve.

Signed by:

1. Guizhou Maolan Biosphere Reserve
2. Jilin Changbai Mountain Biosphere Reserve
3. Guangdong Chebaling Biosphere Reserve
4. Yunnan Gaoligong Mountain Biosphere Reserve
5. Zhejiang Tianmu Mountain Biosphere Reserve
6. Inner Mongolia Saihanwula Biosphere Reserve
7. Sichuan Wolong Biosphere Reserve
8. Yunnan Xishuangbanna Biosphere Reserve
9. Jiangsu Yancheng Rare Birds Biosphere Reserve
10. Shanxi Foping Biosphere Reserve
11. Inner Mongolia Dalai Lake Biosphere Reserve
12. Heilongjiang Fenglin Biosphere Reserve
13. Zhejiang Nanji Islands Biosphere Reserve
14. Fujian Wuyi Mountain Biosphere Reserve
15. Sichuan Jiuzhai Valley Biosphere Reserve
16. Guangdong Dinghu Mountain Biosphere Reserve
17. Hubei Shennongjia Biosphere Reserve
18. Inner Mongolia Honghuaerji National Nature Reserve
19. Guangxi Maoer Mountain National Nature Reserve
20. Guangxi Dayao Mountain National Nature Reserve
21. Inner Mongolia Hui River National Nature Reserve
22. Shenzhen Futian Neilingding National Nature Reserve
23. Heilongjiang Liangshui National Nature Reserve
24. Yangtze River Xinluoduan Dolphin National Nature Reserve
25. Yangtze River Tian'ezhou Dolphin National Nature Reserve
26. Anhui Yaoluoping National Nature Reserve
27. Jiangxi Jinggang Mountain National Nature Reserve
28. Guizhou Caohai National Nature Reserve
29. Guizhou Leigong Mountain National Nature Reserve
30. Inner Mongolia Hanma National Nature Reserve
31. Jiangxi Jiulian Mountain National Nature Reserve
32. Guangxi Mulun National Nature Reserve
33. Hunan Huping Mountain National Nature Reserve
34. Shanxi Changqing National Nature Reserve
35. Guangxi Nonggang National Nature Reserve
36. Guangdong Huidong Port Turtle National Nature Reserve
37. Guizhou Xishui National Nature Reserve
38. Hebei Changli Gold Coast Nature Reserve
39. Shanxi Pangquan Valley Nature Reserve
40. Heilongjiang Zhalong National Nature Reserve
41. Ningxia Helan Mountain National Nature Reserve
42. Shanxi Taibai Mountain National Nature Reserve
43. Liaoning Baishilazi National Nature Reserve
44. Inner Mongolia Dalinuoer National Natural Reserve
45. IUCN/SSC/ GASG
46. Beijing Human Ecological Engineering Association
47. Snowland Great Rivers Environmental Protection Association
48. Government of Libo County
49. Alax White Goat Protection Association
50. Alax Bactrian Camel Protection Association

6

Annexes

Annex 1: Agenda

Wednesday, 7 November 2007

- | | |
|-------------|---|
| 06:00-19:00 | Participants registration |
| 20:00-21:00 | Official Reception from Government of Libo County |

Thursday, 8 November 2007

- | | |
|-------------|-----------|
| 07:00-08:00 | Breakfast |
|-------------|-----------|

Opening session and welcome remarks (Room A)

Chair: Mr. Nianyong Han

- | | |
|-------------|---|
| 08:40-08:50 | Mr. Qunli Han, Director UNESCO Teheran Cluster Office
Representing Secretariat of Ecotone-SeaBRnet |
| 08:50-09:00 | Mr. Xiaogang Tian
Secretary General of Chinese National Commission for UNESCO |
| 09:00-09:05 | Dr. Zhiyun Yi
MAB China Secretariat |
| 09:05-09:10 | Mr. Yue Wu
Deputy Secretary-General of Guizhou Provincial Government |
| 09:10-09:15 | Dr. Nguyen Hoang Tri
Secretary General of MAB Vietnam, Vice President of MAB Bureau of the International Co-
ordinating Council |
| 09:15-09:20 | Prof. Kazuhiko Ogino
Representative of MAB Japan |
| 09:20-09:25 | Mr. Zhong Li
Representative of the State Environment Protection Administration of China |
| 09:25-09:30 | Ms. Haili Zhou
Representative of the State Environment Protection Administration of China |
| 09:30-09:35 | Mr. Chunshuai Qin
Representative of the Local resident of Maolan BR, China |
| 09:35-09:40 | Mrs. Yuanfen Meng
Vice Governor of the Qiannan Autonomous Prefecture |
| 09:40-09:42 | Maolan BR representatives introduced |
| 09:42-09:50 | Ceremony
Issuing certificate for new Chinese Biosphere Reserve Network (CBRN) members by Tianshou Gang
and Qunli Han |
| 09:50-10:00 | Introduction of Agenda and Group Photo |
| 10:00-10:20 | Coffee Break |
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Keynote speeches (Room A)

Chair: Mr. Zhen Zhu

Co-chair: Prof. Dr. Endang Sukara

- 10:35-11:00 Mr. Koen Meyers, UNESCO Office, Jakarta
Cultural diversity – a platform for biodiversity conservation?!
- 11:00-11:30 Mr. Nianyong Han, MAB China
Cultural Diversity –Sources of Wisdom for Biodiversity Conservation and Sustainable Development
- 11:30-11:50 Mr. Choubiao Chen, Government of Libo County
Strengthening Culture Diversity and Biodiversity Conservation for Sustainable Development
- 11:50-12:20 Mr. Jan van der Ploeg
Institute for Environmental Sciences (CML), Leiden University
The relationship between biodiversity conservation, poverty alleviation and indigenous peoples
- 12:20-13:00 Lunch

Case Presentations (Room A)

Chair: Dr. Gordon Maxwell

Co-Chair: Mr. Jing Guo

- 14:00-14:30 Dr. Herwasono Soedjito, MAB Indonesia
Research on Indigenous Knowledge in Indonesia: Protecting Traditional Culture and Conserving Local Biodiversity
- 14:30-15:00 Mr. Tingshuo Yang, University of Jishou
Multicultural Coexistence is the Key to Sustain Biodiversity
- 15:00-15:30 Dr. Nguyen Hoang Tri and Mr. Tran Phu Cuong, MAB Vietnam
Considerations of culturally appropriate preservation in establishing the proposed biosphere reserve in Camau Peninsular, Vietnam
- 15:30-16:00 Coffee Break
- 16:00-16:40 Mr. Hashi Dorjetashi, Association of the Sanjiangyuan Ecology and Environment Protection
Biodiversity Conservation & Local Culture at Sanjiangyuan
- 16:40-17:10 Mr. John Francisco A. Pontillas, Palawan Council for Sustainable Development and Dr. J.H. Primavera, SEAFDEC/AQD
Bridging Traditional Knowledge with Mainstream Technology to Sustain Cultural and Biological Diversity in the Product Development of Wild Honey: Focus on the Indigenous Peoples of the Palawan Biosphere Reserve, Philippines
- 17:10-18:00 Mr. Zhe Chen, Institute of Genetic and Development Research, Chinese Academy of Sciences
To protect the living space of cultural diversity: “Tu Feng” project of inheriting country culture of Yunnan
- 18:00-18:50 Dinner
- 19:30-21:30 Cultural event:
“Tu Feng” Project of Inheriting Country Culture of Yunnan
-

Friday, 9 November 2007

07:00-08:00 Breakfast

Case presentations (Room A)

Chair: Mr. Nguyen Hoang Tri (SeaBRnet Side)

Co-Chair: Mr. Hu Jinping

- 08:30-09:05 Mr. U Sit Bo, FRED A, Myanmar
Indigenous knowledge systems and techniques in natural resources management
- 09:05-09:35 Mr. Jincheng Ran, Director Maolan Biosphere Reserve, China
Comprehension of traditional culture is the key to reserve management
- 09:35-10:00 Dr. Neou Bonheur, MAB Cambodia
Community Participation in the Management of the Tonle Sap Biosphere Reserve
- 10:00-10:30 Coffee Break
- 10:30-11:05 Mr. Changqin Yu, Center of Ecology Research, Tsinghua University
The Nomadism and Biodiversity Conservation in the Arid Zone in China, a Case Study on Kazak and Beaver Conservation
- 11:05-11:35 Prof. Phan Nguyen Hong, Mangrove Ecosystem Research Centre, Hanoi National University of Education, Vietnam
The relationship between traditional culture and nature in the Biosphere Reserve of Red River Delta, Vietnam
- 11:35-12:05 Mr. Songhai Yang, Director Xishuangbanna Biosphere Reserve, China
Conservation of the biodiversity and cultural diversity in Xishuangbanna Biosphere Reserve
- 12:00-13:00 Lunch
-

Ecotone thematic session (Room B)

Chair: Mr. Jayakumar

- 14:00-14:30 Mr. Sonjai Havanond, MAB Thailand
Coastal Ecosystem Conservation for Enhancing Biodiversity and Fire Flies Ecotourism in the Inner Part of the Gulf of Thailand
- 14:30-15:00 Dr. Mushrifah Idris, MAB Malaysia
Ms. Nor Rohaizah Jamil and Mr. Ahmad Azmirol Azhar, Tasik Chini Research Centre, Faculty of Science and Technology, University Kebangsaan Malaysia
*Distribution of lotus (*Nelumbo nucifera*) using satellite images and water quality criteria in Tasik Chini, Pahang, Malaysia*
- 15:00-15:30 Dr. Shinji Tsukawaki, University of Kanazawa, Japan
Results from Research Programmes EMSB-u32 (UNESCO MAB-IHP Joint Programme Ecological and Hydrological Research and Training for Young Scientist in Tonle Sap Biosphere Reserve, Cambodia: Research and Training for Young Scientists) and EMSB (Evaluation of Mechanisms Sustaining the Biodiversity in Lake Tonle Sap, Cambodia) in Lake Tonle Sap, Cambodia
- 15:30-15:00 Dr. J.H. Primavera, SEAFDEC/AQD, Philippines
The Agusan Marsh Scientific Conference
- 16:00-16:10 Coffee Break
-

SeaBRnet and Regional topics

Chair: Ms. Mushrifah Idris, MAB Malaysia

- 16:10–16:15 Mr. Qunli Han,
Brief summary of Mr. Jayakumar's presentation on *East Asian Biosphere Reserve Network - EABRN*
- 16:15-16:50 Prof. Kazuhiko Ogino, University of Shiga Prefecture, Japan
Ecosystem rehabilitation of Lake Biwa and its environments
- 16:50-17:15 Dr. Akiko Sakai, MAB Japan
MAB Japan Activities in 2006 – 2007
- 17:15-17:45 Mr. Savanh Chanthakoummane, National Protected Area Unit, Lao PDR
Lao's position on biodiversity conservation and management
- 17:45- 18:20 Dr. Gordon S. Maxwell and Ms Karen Hung Choi Lun
EcoMax EcoSysRes Centre
Diversity in cultural perceptions of ecological resources: Lessons from New Zealand and Hong Kong
- 18:20-18:40 Mr. Nguyen Huynh Thuat, Cat Tien BR, Vietnam
Role of local cultural and spiritual values toward sustainable management in Biosphere Reserves (BRs) in Vietnam: Case Study in Cat Tien Biosphere Reserve (CTBR), Vietnam
- 18:40-19:30 Dinner

19:30-21:30 **Ecotone-SeaBRnet special session on 2008 Madrid Congress (Room B)**

Chair: Dr. Nguyen Hoang Tri and Prof. Dr. Endang Sukara

Saturday, 10 November 2007

- 07:00-08:00 Breakfast
- 08:30-12:00 Visit Local World Heritage Exhibition Center
Field visit to indigenous communities: Shui Indigo Dying, Yaogu village (Buyi ethnic people)
Organizers: Mr. Qunli Han; Mr. Zhijun Yi, Mr. Jiangchen Ran, Mr. Luming Wei
- 12:00-13:00 Lunch
- 13:00-18:00 Field visit to indigenous communities: Shui village (hand over of the 'The Sun Volume'), Yao village (mountain village)
Organizers: Mr. Qunli Han; Mr. Zhijun Yi, Mr. Jiangchen Ran, Mr. Luming Wei
- 18:30-19:30 Dinner

Sunday, 11 November 2007

- 07:00-08:00 Breakfast
- 08:30-12:00 Field visit to Maolan BR/WH scenic areas:
Daqikong River
- 12:00-13:00 Lunch at Dicui valley grassland
- 13:00-16:00 Field visit to Maolan BR/WH scenic areas:
Wolong River and Mandarin Duck Lake, Karst Landscape, Water Forest and Lajin Wetland, Xiaoqinkong river and old bridge
- 16:20-18:30 Discussion with Chen Choubiao, Governor of Libo County
Field review on conservation, research and management of Maolan BR/WH
- 18:30-19.30 Dinner
-

Monday 12 November 2007

07:00-08:00 Breakfast

Private sector initiatives and support for BRs (Room B)

Chair: Mr. John Francisco Pontillas

08:50-09:20 Mr. Tamen Sitorus, Komodo National Park
Linking conservation of biodiversity with private sector initiatives and cultural diversity at Komodo Biosphere Reserve, Indonesia

09:20-09:50 Mr Haris Surono Wardi Atmodjo
Private Sector Initiative In Establishing Of New Biosphere Reserve, Show Case: Giam Siak Kecil – Bukit Batu Biosphere Reserve Project, Province of Riau, Indonesia

09:50-10:00 Coffee break

Ecotone-SeaBRnet group discussion (Room B)

Chair: Mr. Qunli Han

Co-Chair: Mr. Koen Meyers

10:00–10:10 Brief summary on the presentation of Mr. Jayakumar by Mr. Han Qunli
Update on EABRN Activities – Sacred sites and biosphere reserves

10:10-12:00 SeaBRnet approach for Madrid

12:00-13:00 Lunch

14:00-14:40 SeaBRnet approach for Madrid

14:40-14:50 Ecotone Meeting 2009

14:50-15:20 SeaBRnet strategy for the coming years

15:20-16:00 Maolan Declaration

16:00-16:30 Coffee Break

16:30-18:15 Summary of the plenary session and conclusion (Room A)
Chair: Mr. Qunli Han
Summary report of Ecotone-SeaBRnet Group
SeaBRnet strategy and inputs for 2008 Madrid Congress
Summary report of CBRN groups
CBRN strategy and inputs for 2008 Madrid Congress

18:15-19:50 Closing ceremony and address (Room A)
Chair: Mr. Zhijun Yi
Mr. Chen Choubiao, Governor of Libo County
Mr. Qunli Han, UNESCO

19:50-21:00 Dinner

Tuesday, 13 November 2007

7:30 Departure of participants

Annex 2: Participants

Country	Name and Title	Organization and Address	Contact
Cambodia	Dr. Neou Bonheur Permanent Deputy Secretary	Tonle Sap Biosphere Reserve Secretariat, No. 364 M. V., Preah Monivong Building, Sangkat Phsar, Doerm Thkov, Khan Chamkarmon, Phnom Pehn, Cambodia	Tel./Fax: +855-23-221079; Email: bonheurenou@ yahoo.com
Indonesia	Prof. Dr. Endang Sukara Chairman	Indonesian National Committee for MAB Programme; Sasana Widya Sarwono, 3rd Floor, Jln. Jend. Gatot Subroto, Jakarta 12710, Indonesia	Tel./Fax: +62-21-5252362; Email: esukara@yahoo. com; endang.sukara@lipi. go.id
	Dr. Herwasono Soedjito Executive Secretary / Programme Director	Indonesian National Committee for MAB Programme; Gedung Kusnoto 4rd Floor - Puslit Biologi, LIPI, Jl. Ir. H. Juanda 18, Bogor 16002, West Java, Indonesia	Tel.: +62-251-321038, ext.: 37; Fax: +62-251- 325854; Email: hsoedjito@ yahoo.com; herwasono. soedjito@lipi.go.id
	Mr Tamen Sitorus Head of Komodo National Park	Komodo National Park, Jl. Kasimo Labuan Bajo, Ruteng 86554, Nusa Tenggara Timur, Indonesia	Tel.: +62-385-41004 / 5; Fax: +385-41005; Email: tamen_tnk@yahoo.co.id
	Ir Nurhadi Utomo Head	Gunung Leuser National Park, Medan Office; Jl. Sisingamangaraja KM 5,5 No. 14, Medan, North Sumatra - Indonesia	Tel/fax: +62-61-7879378; email: nhd_utm@yahoo. com
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Field trip



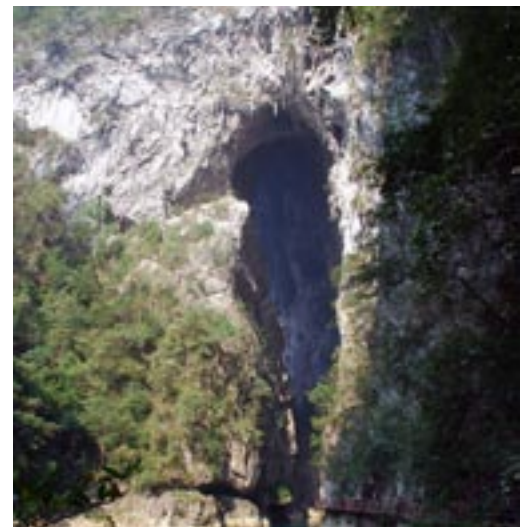
Discussion with local community



Indigo colouring



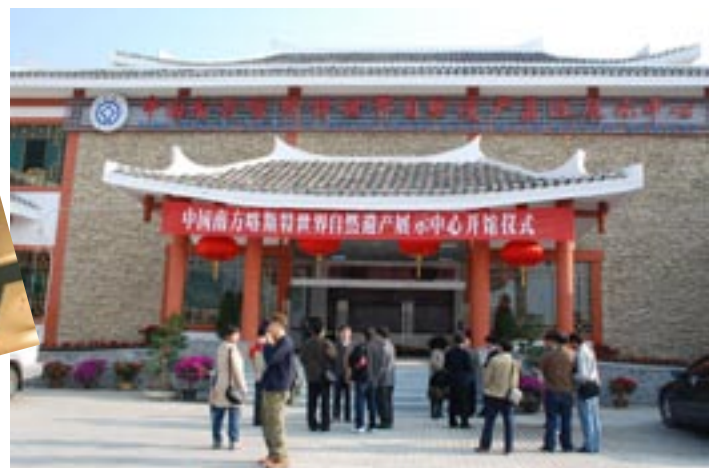
Yaogu village
paper production



Daqikong Natural Bridge



World Heritage Centre





Discussion with Governor



Plenary



Traditional performing art



Local people