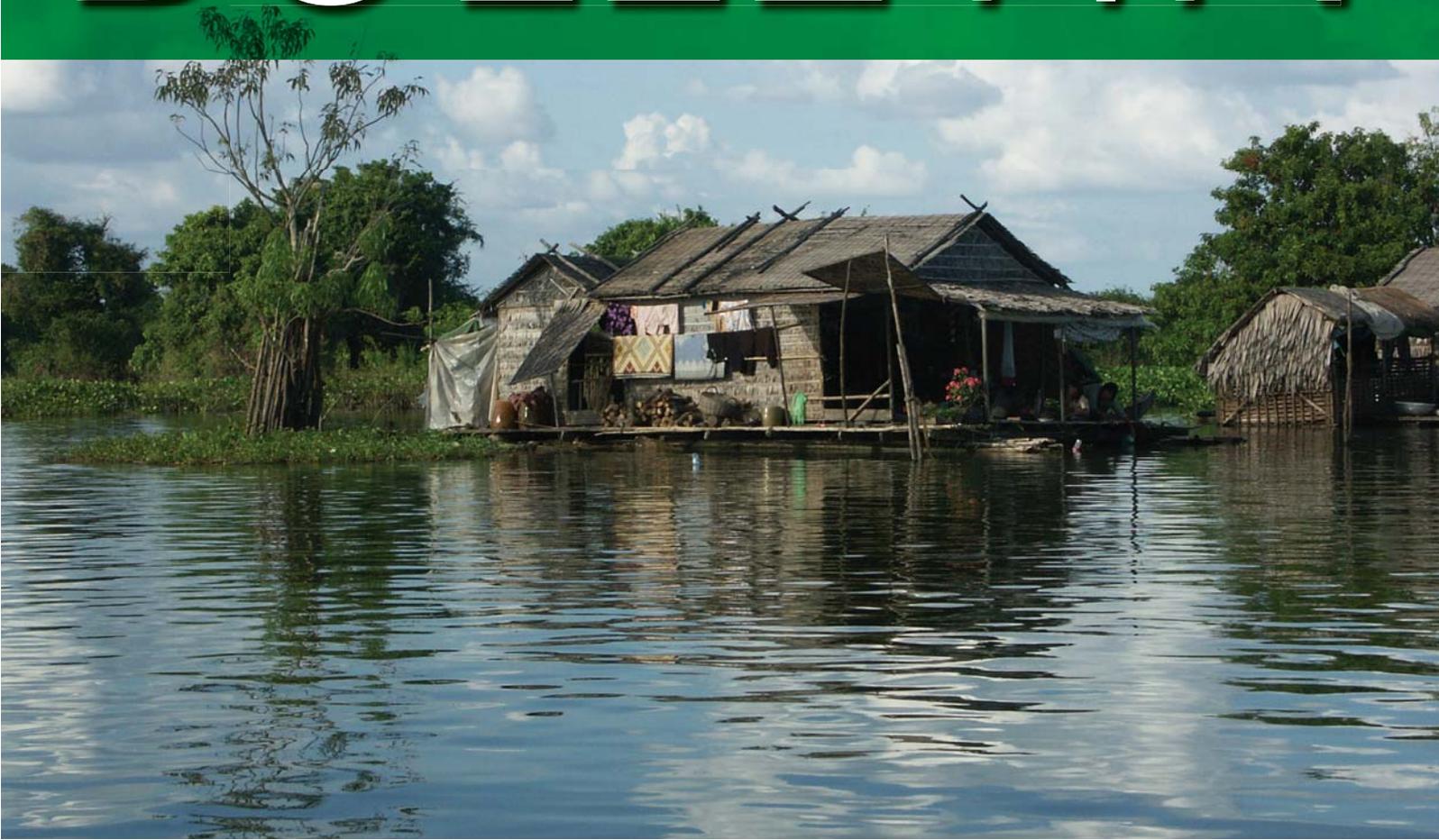
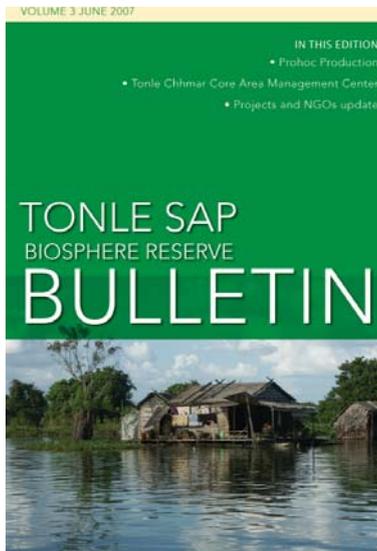


IN THIS EDITION

- CFO- A Myth or Reality
- Prohoc Production
- Tonle Chhmar Core Area Management Center
- Projects and NGOs update

TONLE SAP BIOSPHERE RESERVE BULLETIN





VOLUME 3 JUNE 2007

Cover Image: Floating villages of
Tonle Sap Lake.

Photograph by Sonja Endlweber

Published by Tonle Sap Biosphere
Reserve Secretariat

364, Preah Monivong Boulevard
Phnom Penh, Camodia

Tel: (855-023) 22 10 79

Email: secretariat@tsbr-ed.org

JUNE 2007

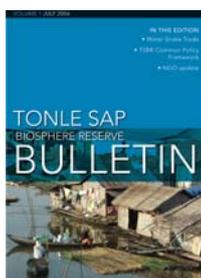
This publications forms part of the
Tonle Sap Environmental Management
Project, provided by an ADB financed
loan to the Royal Government of
Cambodia.

Editorial Group: Neou Bonheur, Y Lavy,
Nop Nimol, He Hin, Sin Hong and
Long Kheng

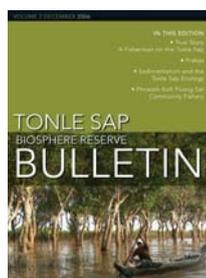
Proofed by Ly Sophorn and
Chhea Linna

Printed by Ponloeu Pich Printing House
Layout by Ly Sophorn and Chhea Linna,
Tonle Sap Biosphere Reserve Secretariat

Previous edition



Vol.1 July 2006



Vol.2 Dec. 2006

Letter from the editor



The Tonle Sap Biosphere Reserve is one of Cambodia's most valuable natural assets. It provides fish protein and irrigation water for a majority of the population of Cambodia and boasts unique biodiversity. The TSBRS Secretariat was established to foster cooperation, communication and knowledge exchange among all stakeholders.

The Tonle Sap Biosphere Reserve Bulletin, published by the Tonle Sap Biosphere Reserve Secretariat, is part of the overall strategy to improve and increase the knowledge and understanding of decision and policy makers, the technical officers and the public about the unique natural ecosystem and its value by providing them with comprehensive and up-to-date information. This Tonle Sap Bulletin is a sub-output of a Tonle Sap Biosphere Reserve Database funded by the Tonle Sap Environmental Management Project.

From scientific research news, to project updates and information by a wide range of stakeholders working in the Biosphere Reserve, the Bulletin is intended to bring up the most interesting topics, critical issues and problems faced by the Tonle Sap Lake. In addition the Bulletin will provide a space for stories about the life of rural people who make a living from the natural resources of the Lake. It is a platform for interactive discussion and dialogue through sharing the views and concerns from individuals, scientists and social groups. No doubt data and information are the vehicle for progress in all aspects of society. Your contributions in form of articles, reports, livelihood stories and project results are highly welcomed. Your feedback on the current issue is very much appreciated.

Hope you will find the TSBRS Bulletin both interesting and informative.

Neou Bonheur

Permanent Deputy Director of TSBRS and
National Director of TSEMP



If you would like to submit a story, announce an event or a publication or comment on an article please contact the editor on Tel: (855-023) 221079.

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TONLE SAP
BIOSPHERE RESERVE
BULLETIN
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CFO-A MYTH OR REALITY

A Quick Analysis of Progress

BY NEOU BONHEUR
PROJECT DIRECTOR, TSEMP

Background

The Tonle Sap Environmental Management Project (TSEMP) is designed to support three inter-related components, namely (i) component 1 “Strengthening Natural Resources Management Coordination and Planning”; (ii) component 2 “Organizing Communities for Natural Resources Management in the TSBR”; and (iii) component 3 “Building Management Capacity for Biodiversity Conservation in the TSBR”. Component 2 is a major bulk of the Project aiming to establish over 160 Community Fishery Organizations around the Tonle Sap Biosphere Reserve – a very challenging task for Fishery Administration (FiA) to achieve in a short period of time.

The Community-Based Organizations (CBO), considered as part of the decentralization process, have evolved for many years before the commencement of TSEMP (2003) in several forms, for instance community forestry organization, community fishery organization (CFO), community protected area, and water users community...etc. What so ever is called, the main principle of CBO is the same – delegation of resources management function to an organized group of people. Often these CBOs are supported by external funding through projects or non-governmental organizations, but their success and achievement vary from one to another depending on legal framework, commitment of stakeholders, capacity and funding support.

CFOs in particular have also experienced a difficult path, they

► Staff AS (left) and Head of Kork Dong CFO (right), Battambang province.

only received broader support as a potential form of management when the Prime Minister of Cambodia declared abolishment of fishing lots in favor of CFOs in 2000. Recognizing the importance of environmental management and especially CBO, the Government of Cambodia and the Asian Development Bank signed the loan agreement “TSEMP” worth of 19 millions in various currencies to support organization of CFOs around the Tonle Sap Biosphere Reserve.

During the time of legal development, many CFOs have been supported mainly by NGOs, including FAO, which provides good platform for TSEMP to build on and expand. For three years of its implementation, a lot of work remained to be done though some progress has been made. There is a constant criticism on overall progress of CFOs, which cause misunderstanding and frustration among the responsible agencies and donors that are part of the Project.

This article is intended to provide a balanced view of CFOs development, its important turning point from a theory to practice that can be further developed to practical self-reliance CBO or CFO. A visit was made between 22-24 May 2007 to three

CFOs based in Battambang and Kampong Thom to interview members of CFO committee and makes a quick analysis of the progress and recommendations, acknowledging that more CFOs should be visited in order to make the assessment more objective.

Current Progress of the Visited CFOs

a. Kork Dong CFO

Kork Dong CFO comprises of four villages located in Peam Ek commune, Ek Phnom District, Battambang province. Kork Dong began her establishment in 2001 under the support of Women Development Association (AS). Seven members of Kork Dong committee were elected in 2001 and reelected in 2004 to include two women. 400 members, including 142 women have been registered in Kork Dong. Kork Dong covers an area of 3,046 ha not including residential areas. Its boundary was demarcated in 2005 with four concrete poles worth of US\$30 each with funding support from OXFAM. By-law agreement was developed in 2002 and was approved by the provincial fishery administration in 2006. CFO Area Agreement was passed to the provincial administration and ready for further submission to



the Fishery Administration in Phnom Penh for final approval. With funding support from OXFAM, AS assists Kork Dong to develop management plan with training supported by PIU/FiA. Kork Dong is able to set up a fishery conservation area (1,700x50m) with funding support from UNDP/GEF Small Grant (a total of US\$32,737 has been allocated to AS to support three CFOs in Battambang). Kork Dong set up a credit funding of about 30 million riel with seed contribution of US\$ 5,000 from USA and Cambodian Ministry of Foreign Affairs. They set up a committee to manage the credit with interest rate of 3% per month. They are positive about self-management after withdrawal of AS or TSEMP. All are positive about the importance of CFO which brings benefit to the members in terms of increased fishery productivity, access to credit, and livelihood training.

b. Boeng Spung CFO

Boeng Spung CFO comprises of three villages covering an area of 575 ha, located in Sankor commune, Kampong Svay district, Kampong Thom province. It was established with funding support from JICA in 2001. Since then 11 members of CFO committee were reelected three times, and 300 (of which 96 are women) or about 30% of population were registered as members. Members of CFO obligate to contribute 500 riel for registration and paying member fee of 1,500 riel per annum. The collected fee is kept in safe to be used for different activities of CFO. This CFO has finished preparation of CFO Area Agreement, By-law Agreement, mapping and boundary demarcation, management plan following almost the same procedures adopted by Kork Dong. An area of 450m by 50 m was set aside for conservation. The only difference is that management plan has to be reviewed by provincial fishery administration in Kampong Thom. There is no clear rule on how



to collect fee from non-members in exchange for fishing in the CFO area. CFO committee members strongly believe in CFO which has already resulted in increased fish production, recovery of flooded forest, and decrease in illegal fishing.

c. Boeng Rumper CFO

Boeng Rumper CFO comprises of three villages located in Taing Krasang commune, Santuk district, Kampong Thom province. It was established in 2006 with 477 members registered. 9 members were elected for CFO committee. This CFO undertakes several activities such as signing the CFO Area Agreement, preparation of management plan assisted by PIU, conducting mapping and boundary demarcation, and setting up 6 money saving groups in March 2007. A total amount of US\$18,614 was given by UNDP Small Grant through Khmer Women Support NGO to implement various activities such as tree planting, livelihood training and protection of conservation areas. In-kind contribution in the form of labor inputs from the CFO is estimated at US\$ 7,058 and NGO contribution is US\$ 5,300. With

▲ Boeung Spung CFO Committee member
Kompong Thom province.

the assistance of this NGO, CFO members received training on some alternative livelihood such fish culture, earth worm culture, and mush room farming. They have also received trainings from TSEMP through PIU. For just two years of its establishment a positive sign has been observed by CFO members, for example, they have seen an increase in fishery production, increased flooded forest, and a decline in illegal fishing and improved livelihoods. They requested support for construction of a spill weir, 50 concrete pipes for fish conservation, study tour, and rehabilitation of 1 km road. They believe they can carry on development of CFO after withdrawal of support.

Discussion and Analysis

Legal Procedures

It takes at least two to three years for each CFO to develop and prepare all necessary documents required by Sub-Decree on Management of Community Fishery Organizations adopted in June 2005. The required documents include (Article 24) CFO Area Agreement,

continued on page 4

...continued from page 3

list of CFO members and Committee members, By-Law Agreement, map at 1:50,000 with coordinates, declaration of CFO on the objective of CFO establishment and management plan, and other relevant documents which must be submitted to MAFF for registration and approval. All visited CFOs follow this procedure; however there is good practice for adoption of these documents at different level before submission to MAFF: boundary and map is approved by provincial governor, by-law agreement is approved by provincial fishery administration, and management plan is reviewed by Fishery Administration. But the validity period of three years for CFO (Article 26) seems too small given long time for preparation and approval of all required documents. The time-consuming for CFO development may be reduced to about one year when capacity and procedures become a routine exercise for fishery officials at both provincial and central level and for CFO members.

NGO Involvement

All visited CFOs with NGO support make good progress and are well

organized. Staff of NGOs do not have high-education background but technically sufficient to get things done with the communities. They have the skill to facilitate discussion among CFO members to develop area agreement, by-law agreement, and management plan, provide training on various topics, including livelihoods, but most importantly, they can facilitate access to external funding from donors to support CFOs. Relationship between government agencies and NGOs is more or less good and they can serve a catalyst between Fishery Administration, commune councils, other line agencies and community members. NGOs often know well local situation and can assist the line agencies where staff can not be deployed permanently in the area of concern.

Capacity

CFOs have gradually gain knowledge and understand organization structure of CFO and their important role in resources development within permitted boundary. Some of CFOs, for instance, Kork Dong CFO is ready to become a self-reliance CFO as they assured us during conversation. But in our opinion there is still weakness in some areas. Leadership, resources

allocation and planning, administration, record keeping, conflict resolution, consensus building and financial management are the basic skills to make CFO self-reliance. People often have diverse interest and come to conflict if there is no good leadership that can bring people together. The bigger the number of CFO members, the more difficult to manage them. Lack of incentive for some active and knowledgeable members may discourage participation. Another aspect of capacity building is the physical facilities and equipment necessary to operate their activities. These visited CFOs often cry for radio communication, transport, station, and infrastructure that can support their daily work, especially resources patrol. It may take some years before CFOs can stand on their own feet, but they will not reverse as many believe community based organizations like CFOs are a potential benefit to both resources stewardship and improved livelihoods.

Funding

Funding is crucial for CFO development and operation. It is an important factor of long-term sustainability of CFOs. There is some good practice adopted by all visited CFOs. First they created a safe box for collection of member fees, though it is small, it is a good beginning for fund raising. Secondly they collect fees from non-member for exploiting resources in the CFO areas. And thirdly there always a possibility for tapping external funding from donors, if CFO is well organized as an organization. Kordong and Boeng Rumper are able to get funding support from GEF/UNDP Small Grant, OXFAM and AS. They may get additional funding from Tonle Sap Sustainable Livelihoods Project which is now under way. So it is important for



◀ Boeng Rumper CFO Committee members

CFOs to have organization structure operational with good administration and management plan.

Livelihoods

Not much livelihood activities undertaken by visited CFOs or they are organized in a small scale. Alternative livelihoods other than fishery related activities are not many. But from discussion with these CFOs, livelihoods improvement is resulted from current good management of the resources in CFO areas. It is not difficult for anyone to guess that increased fishery production, recovery of forest, creation of conservation areas and decreased illegal fishing all contribute to improved livelihoods. However, there is several development opportunity that can be beneficial to livelihoods such as construction of spill weir or other irrigation scheme, improved agriculture inputs and productivity, rehabilitation of roads, construction of schools and hospitals, aquaculture, animal husbandry...etc. This development potential can be materialized through either commune council development plan or CFO plan. NGOs are good in providing livelihood support, for example in the case of Kork Dong and Boeng Rumper. Credit and money saving groups can support various livelihoods but interest rate is still high (3%/month).

A Way Forward

One never finds perfect answer to how CFOs can be developed faster and efficiently as this approach is new to Cambodia. Nevertheless, it is our first attempt to give a snapshot of current progress and to provide a set of recommendations that would lead to real empowerment of communities through Community Fishery Organization.

- Given the time-consuming and difficulty in preparation of

documents for CFO establishment, it may be efficient to extend the validity period of CFO to about 5 years or more so that they have sufficient time to implement the plan. There should be flexibility in renewal of existing CFOs without preparation of all required documents, for example they may revise the management plan and list of committee/CFO members. It is a good practice now to approve documents at different level that speed up the CFO official registration.

- NGOs can be a good link between responsible agencies and communities, and provide complementary work to sustain CFOs in need of assistance. The role of responsible agencies remains crucial, especially in terms of provision of policy and legal guidance, monitoring and evaluation, and check and approval of CFOs. NGOs involvement must be secured as they can continue support beyond project duration and can facilitate access to external funding.
- Capacity in both software and hardware has to be built gradually based on learning-doing. Incentive for qualified members of CFO committee can improve operation and administration and keep CFO running in efficient manner.
- There is now good practice by CFOs to set up safe box for fund raising, but the important thing is to make CFO operational with good management plan in place, which enables them to have access to special commune funds or direct foreign investment from donors like GEF Small Grant, ADB, or NGOs. In the long run, collection of fees from both CFO members and non-members as tax would substantially sustain funding for CFO activities

without relying on external support.

- The objective of CFO has in mind about improved livelihoods through good stewardship and improved access by communities to the surround resources. Therefore funding is better secured to support implementation of their management plan which would have a direct impact on their livelihoods. Other development opportunity such as infrastructure, hospitals, roads, irrigation schemes is better handled by commune council development plan, not by CFO plan.

Conclusion

Although not a single CFO has been officially registered by the Ministry of Agriculture, Forestry and Fishery (MAFF), the development process of CFOs is taking root and receives overwhelming support from a large number of government agencies, non-governmental organizations, donors, and especially the communities. All visited CFOs have indicated their determination in pursue of CFO, and we are sure that the other CFOs have the same desire. Even legal procedures are taking their time to get CFOs registered, many CFOs start to implement their activities such as patrol, setting up conservation areas, tree planting and setting up safe box for fund raising ...etc. For the last five years of their establishment, there is a positive sign of progress, for example, gaining capacity and knowledge for CFO development, improved access to fishery domain, improved livelihoods through increased fish catch and good management of resources, increased flooded forest cover and decreased illegal fishing. It is a real hope that this process will continue on their own into very far future, as there is a strong commitment from all levels of our society to see that happens. ■

PROHOC PRODUCTION SEASON

BY MS. Y LAVY,
TSEMP COMPONENT 1

The Prahoc production season has been part of Cambodian culture for a long time. Our ancestors called for the season and wanted to make our and the next generation aware and understand that it is time to prepare Prahoc (fermented fish paste), which serves as a food supply for families. Most Cambodian families enjoy the taste of Prahoc, only a small number don't. The production season only lasts for two months, from December to January. During this time fish migrate from the Tonle Sap to the Mekong River. For fishermen it is peak season, yields are high. People usually gather to buy fish and make Prahoc and Pha ork for consumption in daily life. Prahoc is mostly preserved and consumed whenever food shortages occur and is also eaten during the farming, seedling and harvesting season. Because Prahoc can be preserved for a long time, the tradition has been in place since long. The family of Uncle Horn and aunt



▲ Prahoc storage in jars and containers for trade.

Am live in Srang Mountain, Bak Ko village, (Prey Nheat commune, Korng Pisey district, Kampong Speu province) and left home at dawn at 4.00 am by motorbike for Dong village (Prek Phneuv

commune, Ponhea Leu district, Kandal province). This is the place where people gather to make Prahoc. Uncle Horn prepared equipment and materials (mat, small and big knives, basket, plastic container and sack etc.) to make Prahoc at this location.

He says he usually travels to this place from his hometown because the quality of fish is good, the fish are fresh and he can buy both small and big size fish. He doesn't want to buy the fish that are sold in his hometown since they are of poor quality and it's hard to cut the heads off. The quality of the Prahoc would be poor if he used those fish so it would mean a waste of fish and a waste of time. He indicates that today (January 3, 2007) he should in total make 55 Kg of Prahoc. In order to do this he requires 90 Kg of fresh fish. At 9.00 am he collected only 50 Kg of fresh fish: Real (*Henicorhynchus siamensis*),

◀ Aunt Am is removing fish heads.





◀ Uncle Horn is removing the scales by stomping on the fish with his feet.

It can be stored for years while preserving its quality and colour (white). Khnang Veng fish is not as good since the Prahoc will turn black if kept for too long. Prahoc made of Slek Reusey fish will turn red if preserved for too long because it consists of much grease.

This year her family has spent 100.000 Riel (including all expenses for travelling and buying the fish) for making 55 Kg of Prahoc. This conserved/fermented food can supply her family for a whole year. Especially during the farming season she can use the Prahoc and save money this way, since food does not have to be bought. She will be working in the rice fields during this time together with other farmers who she'll ask to help her in the fields.

After talking to Aunt Am for 25 minutes, she says she has to leave and go home. Its 2.00 pm and it will take her three hours to get back. On both sides of her motorbike she carries plastic containers filled with the Prahoc she made that day.

In general, Cambodian people consider Prahoc as an asset which can serve as a buffer in times of food shortage at the end of the year. It is also regarded as a subsistence food source for local people, together with the rice that is produced and can supply food for the whole year. This highlights the importance of fish resources to our people and reflects the value of natural assets, economy and the culture of the Tonle Sap Great Lake as the heart of our nation.



◀ ProDried waste (intestines and fish heads serve as fertilizer and fodder)

Prahoc is an asset which can serve as a buffer in times of food shortage at the end of the year.

Khnang Veng (*Dangila lineate*), Slek Reusey (*Paralabuca typus*) for 24.800 Riel (496 Riel/Kg), so he continued to increase the weight up to the amount he planned. To process the fish and produce 50Kg of Prahoc, he hired two more workers to remove the fish heads. The additional cost for these workers adds up to 7000 Riel.

Aunt Am says that making Prahoc is not a difficult task but it isn't simple

either. It takes time to cut off the fish heads and remove their scale. First the fish heads need to be removed, the fish needs to be put in a basket, then the scale needs to be washed off, and finally the fish needs to be preserved with salt in a plastic container after squeezing and pressing it and it needs to be stored in a good place. She clarifies that Real fish is a good species for making Prahoc.



TONLE CHHMAR CORE AREA MANAGEMENT CENTRE

An impression of the Inauguration of Tonle Chhmar Core Area Management Centre, Kompong Thom Province

BY YIN BUNNANG
DEPT OF ENVIRONMENTAL
EDUCATION AND
INFORMATION DISSEMINATION,
MINISTRY OF ENVIRONMENT

On the 10th of January 2007, The Tonle Sap Environmental Management Project (TSEMP) has officially celebrated the inauguration of the Tonle Chhmar Core Area Management Centre in Kampong Thom province. The event has presided by H.E. Dr. Mok Mareth (Senior Minister, Minister of Environment). Prominent guests included H.E. Nam Tum (Provincial Governor of Kampong

Thom) and H.E. Chhay Sareth (Provincial Governor of Pursat). Furthermore, many representatives of concerned ministries, development institutions, local authorities and surrounding villages also joined in the opening ceremony.

Boeung Tonle Chhmar is one of the three core areas in the TSBP. It covers 14,560 hectares of open water and creek system. The area supports a large variety of plant, fish and water bird species and many of them are known to be rare, vulnerable or endangered. The Boeung Tonle Chhmar Core Area Management

Centre contributes to the protection of the biodiversity in the area. The activities of the centre serve four objectives:

- Environmental Education and Dissemination;
- Monitoring, Protection and Conservation of biodiversity in the core area;
- Community Development based on local participation; and
- Development of Ecotourism

The Management Centre is located in Peambang commune, Stuong district, Kampong Thom province. Five floating villages with a total



of 2,518 people are living in the commune. The centre is situated in the heart of the Core Area. From the centre and the already existing observatory tower the whole area can be overseen.

Within the core area problems such as forest land clearing for dry-season rice cultivation, forest cutting for firewood and fish barriers is encountered. Commercial fishing through fishing lots is still taking place in the area and some of the poor community members use illegal fishing gears. According to the ranger operating in the area, forest fires have not occurred since 2004. The Core Area Management Centre will contribute to a more sustainable use of the natural resources in the area and the protection of biodiversity.

Several speakers highlighted the importance of the creation of the Boeung Tonle Chhmar Management Centre. The TSEMP project director (Dr. Neou Bonheur) highlighted that it is following previous achievements of setting up information and management centres within the Tonle Sap Biosphere Reserve, thereby increasing the network and possibilities to manage the Reserve. The provincial governor of Kampong Thom (H.E. Nam Tum) thanked the involved organisations for their cooperation and efforts since their activities will provide benefits to the whole nation. Continuing this cooperative approach will be beneficial to sustainable use of natural resources, the ecological condition and the conservation of the Tonle Sap Lake. The Senior Minister, Minister of Environment (H.E. Dr. Mok Mareth) focused on economic development of the area while at the same time protecting the environment. He stressed that without conservation, long term development is not possible. The richness in natural assets offers a great economic potential. He also addressed the Prime Minister's recommendation to develop more agricultural activities in the area besides the existing fishing activities in order to reduce poverty. This development should be combined



▲ Prominent guests joined in the Inauguration of Tonle Chhmar Core Area Management Center (CAM), Kompong Thom province.



▲ H.E. Dr. Mok Mareth contributed a donation and gifts to representatives of the local community

with preservation of the flooded forest and the grasslands that sustain a balanced ecosystem around the Tonle Sap Lake.

At the end of the ceremony the minister handed a complimentary certificate to Chumteav Keo Maly from the Chamber of Commerce in Takeo province. He contributed a donation for the construction of the centre. Besides this, gifts (cotton

scarf/kroma, rice and money) were given to representatives of the local community. ■

Contact:

#48 Samdech Preah Sihanouk, Tonle Bassac, Chamkarmon,, Phnom Penh

PROJECTS

» TONLE SAP ENVIRONMENTAL MANAGEMENT PROJECT

Brief of the 5th Project Steering Committee (PSC) Meeting

BY PMCO

Introduction

The PSC is a bi-annual meeting for the steering committee and all components of the TSEMP, both from national and provincial level. The meeting's purpose is to present the status of recommendations from previous PSC meeting, discuss any problems encountered in their implementation, and to disclose the future plan, including the activities to be carried out for further steps toward achieving the project goals and expected outcomes according to the project's pre-established timeframe.

The 5th PSC meeting took place on 22 January 2007 at Siem Reap province. On behalf of H.E Chan Sarun, the Minister of Ministry of Agriculture Forestry and Fisheries, and Chairman of PSC, H.E Sin Niny, CNMC vice chairman, gave a keynote address during the opening session.

Topics discussed and conclusions reached

Fostering community participation is crucial. Today, although there has been increasing local involvement in issues such as community fisheries or conservation action, there are still numerous government officials whose presence means



that local communities have less chance to independently develop their area of residence.

A plan to create more conservation zones in the Lake was rejected as currently 10 percent of the total Lake's area is conservation zones, an amount deemed adequate. However, other ways to suppress illegal activities in the core area must be found which will require the help of fisheries officials if such illegal activities relate to community fisheries.

It has been noted that education and awareness raising is likely duplicated by components of the TSEMP. Solutions could not be immediately achieved by steering committee member as the help of the relevant the ministry is necessary.

Problems surrounding community fisheries and fishing lots will be addressed after the results of detailed studies by TSSL become available. It was decided that TSCP can better implement the education and training to local communities than anyone else as it has much more time at its disposal. Regarding the issue of giving community fisheries the right to suppress illegal activities, although it sounds controversial as it goes against the legal code, it could be

applied if approval from the Ministry of Interior was received. This would mean that communities be assigned as justice police and then the Fisheries Administration would have to modify the necessary points of policy and strategy for the TSBR.

Recommendations from the 5th PSC meeting

- Modify and promote policy and strategy papers before the project's completion.
- Each component which has not finished its work according to schedule must revise its schedule and complete its project as soon as possible so as not to hold up overall progress.
- Regarding project extension: PMCO should set up special meeting with the PSC and then make a request to the MEF and the ADB with reasonable affirmations on progress.
- Collaboration between the PIO/PIU of each component and integrated planning must be performed in order to avoid duplication.
- PIO of component 2 and its specialists must speed up community fisheries formulation and select an NGO to



» TONLE SAP INITIATIVE (TSI)

The National Forum on the Tonle Sap Initiative

BY CATHERINE BARTON, TSBR-ED

On March 5 2006, Hun Sen, Prime Minister of the Royal Government of Cambodia, and the vice president of the Asian Development Bank (ADB), C.L Greenwood, opened the National Forum on the Tonle Sap Initiative (TSI). The event attracted over 300 policy makers, representatives from line ministries and relevant provincial departments, development partners, civil society groups and NGOs, who work in areas relevant to the TSI.

The forum had three primary aims. First, to discuss the TSI and share individual results to date. Second, to discuss alternative mechanisms for managing and coordinating development interventions in the Tonle Sap Basin with the intention of identifying new ways forward on development issues and challenges facing the TSI. Third, to consider ways of improving cooperation among all stakeholders and coordinating all TSI-related interventions.

Presentations were made by a number of organizations working on the TSI. The Cambodian National Mekong Committee provided a valuable overview of the TSI, and the Ministry of Rural Development told the forum about the government's continued commitment to improve rural water and sanitation services. The Ministry of Interior, the Fisheries Administration, and the ADB, also made presentations on key projects they are implementing in the Tonle Sap region.

After the presentations, the forum's participants divided into five working groups and came up with some important suggestions on a variety of key areas pertaining to the TSI. Most importantly, development issues and challenges in the

▼ TSI guests listen to a presentation at the forum



region were discussed, management structure and institutional arrangements debated, the programming and implementation of projects considered, and aspects of policy and legal frameworks pertaining to the Tonle Sap region deliberated. Finally, participants discussed communication and knowledge sharing issues regarding the TSI.

Excellency Dr. Tao Seng Huor, Senior Minister and Vice President of the Council for Agriculture and Rural Development (CARD) summarized the results of the discussion during the closing session of the forum.

"We fully support Prime Minister Hun Sen's recommendations," said Huor. "Especially re-identifying the extension of the Tonle Sap lake as appropriate to the actual geographical situation, taking clear and effective measures to stop the illegal grabbing of flooded-forest land in the Tonle Sap area, and examining the feasibility of establishing a Tonle Sap Authority or Supreme Council of the Tonle Sap under the guidance of the Royal Government of Cambodia."

Huor explained that the establishment of a Tonle Sap Authority, or a Supreme Council of the Tonle Sap, will be initiated by setting up a working group, with financial and technical support from the ADB. The proposed Tonle Sap Authority will have the authority to coordinate, manage, monitor and evaluate the implementation of projects with regards to the TSI.

It is imperative to amend and create laws relevant to the Tonle Sap region which will allow for the effective conservation and development of the region said Hour. Moreover, existing policies, laws and regulations, must be better promoted and disseminated, he said.

Huor said the idea of creating an information management system, which would be used for collecting, analyzing, updating and disseminating information regarding the planning and implementation of conservation, preservation, or development projects in the area, was valuable. It would allow concerned stakeholders, including government agencies, civil society members, NGOs and other development partners, to better coordinate their work in the Tonle Sap region, he said.

The Forum's working groups also proposed that a surveillance system and a research institute be created for the Tonle Sap region. This could help achieve another of the Forum's key suggestions: that more attention be given to raising awareness and building understanding of the important developmental challenges in the region among the general public.

The importance of involving the public was a key issue raised by participants in the forum. Using both formal and non-formal education, and with participation and cooperation from all involved stakeholders, the forum proposed that communities

PROJECTS

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be encouraged to take ownership of conservation and development planning in their area. This could be achieved by developing an incentive policy for the participation of people in the decision making process regarding their livelihood in the community.

Huor said that properly mapping and creating an inventory of land, water, and forests in the region was important. This is, he said, linked to the need for a clearly identified boundary of the Buffer Zone and the Transfer Zone of the Tonle Sap.

Finally, the forum concluded that a joint policy to improve coordination between line agencies, in conjunction with improved individual policies within each line agency – which would be, of course, developed in accordance with the joint policy - were key to improving implementation of Tonle Sap projects.

After the forum concluded, a working group, chaired by CARD, was established to follow up the recommendations made by the National Forum on the TSI and to begin preparation for the proposed National Tonle Sap Authority. <<

» TONLE SAP SUSTAINABLE LIVELIHOODS (TSSL)

BY RICHARD L. SMITH, TEAM LEADER/COMMUNITY LIVELIHOODS FUND

The Tonle Sap Sustainable Livelihoods Project will improve livelihoods by increasing access to assets by communities within the core areas and buffer zone of the Tonle Sap Biosphere Reserve¹. It covers 37 communes, comprising 316 villages with a population of about 300,000. TSSLP operates in the context of the RGC's National Decentralization and De-concentration Program (NDD), which has expanded the role of commune councils. The Project's Executing Agency, the Ministry of Interior has a pivotal role in this program and is expanding its capacity to support and administer strengthened local governance.

TSSLP is part of a larger Tonle Sap Initiative consisting of a series of linked projects with which the Royal Government of Cambodia, the Asian Development Bank, and other donors seek to improve sustainable and productive economic activities based on increased community awareness and local level planning and decision making. The Project consists of two grants, ADB and the Government of Finland as well as counterpart funding from the Royal Government of Cambodia.

The Project is closely allied to the Tonle Sap Environmental Management Project (TSEMP), the first major intervention under the Tonle Sap Initiative, which has assisted communities to establish fisheries organizations and create natural resource

management plans for communities to implement. TSSLP will provide direct grant assistance to fishing communities and others near the Tonle Sap for social infrastructure, local enterprises, and improved fishing and environmental management practices. One component of the project will work with TSBR to examine ways to improve management of fishing lots and improve the network of fish sanctuaries. The Project will also support a program of environmental education for communities and schools around the Tonle Sap.

The main objective of the TSSLP is to support community driven development in which village organizations work through commune councils to create local priorities to address constraints created by poor infrastructure, inadequate investment finance, inappropriate technologies, or limited skills. The small grants to be provided by the Community Livelihood Fund (CLF) will be based on commune council plans and priorities which express local needs. Provincial technical departments of government, NGOs, or other service providers may be asked by commune councils to provide assistance in small project development, mentoring of communities, and technical assistance. The planning and decision process is based on the local government planning processes created under the NDD.

TSSLP is the first of the truly operational development projects undertaken under the TSI. It has adequate resources to bring significant development investments to the communities of the area. Its major constraint is identifying and funding sustainable economic development equitably for potential beneficiaries, with special attention to the poor, women's groups, and environmentally appropriate development. The range of possible investments is wide. It could include improving the quality of post-harvest handling of fish caught in the Tonle Sap, which would provide a significant boost in income without increasing pressure on fish stocks. Support to community management plans that include fish sanctuaries, protection of the flooded forest where fish breed, and investment in non-fisheries skills training and small business are all possible livelihoods investments.

The Project is currently in a phase of procuring technical inputs for setting up the Community Livelihood Fund, preparing improved management plans for the fisheries lots, and improving skills and awareness for commune councils and local residents. It will establish field offices in all five provinces that touch the lake, with expanded technical support offices in Pursat and Siem Reap. Field operations should begin around July 2007 once new government and project staff are in place. Funds are available for disbursement in 2007, but the largest investments will begin in 2008 and be integrated with the local government planning cycle. <<

¹ They are Battambang, Kompong Chhnang, Kompong Thom, Pursat, and Siem Reap.

» IMPACT OF BUILT STRUCTURE ON THE TONLE SAP FISHERIES

BY E. BARAN AND C. MY-SCHOWODA, WORLDFISH CENTER

In the Lower Mekong Basin, economic development and population growth are two factors driving the construction of new infrastructure. New built structures, such as dams, irrigation schemes or roads, alter or oppose water flows. Changes to the hydrology in the Lower Mekong Basin could threaten the Tonle Sap's annual flood pulse, its fish migrations and its floodplain habitats. This would then affect Cambodia's fisheries and the livelihoods of countless people.

To better understand the influence of built structures on the Tonle Sap fisheries, and the trade offs between infrastructure developments and fisheries livelihoods, the Asian Development Bank (ADB) and the Government of Finland funded a one-year technical assistance project that started in May 2006. The executing agency for this project was the Cambodia National Mekong Committee (CNMC), and the study was implemented by the WorldFish Center, together with national experts and Finnish scientists. The final results of this study have been presented to the public on the 2nd of May 2007.

The analysis took place on three scales: the entire Mekong Basin, then the Tonle Sap tributaries, and the Tonle

Sap floodplains. Hydrological scenarios were modelled and analysed to forecast the effects of upstream and local developments.

At the basin level, analyses show that 60% of the Tonle Sap water originates from the Mekong system; subsequently upstream damming is the factor that would have the most influence on the Tonle Sap hydrological system and could cause major changes to water flow and flood levels.

Upstream damming could reduce inflows to the lake by 10 to 25% in dry years. Between 13 and 38% of the fish caught in the Tonle Sap is made of species sensitive to migration triggers. Therefore a reduction in overall flood levels, as well as a later start of the annual flood due to upstream development might result in significant perturbations and losses in fisheries. By expanding the edge of the lake by between 300 and 900 square kilometres in the dry season, upstream dams could also cause the Tonle Sap flooded forest to become permanently inundated, and to disappear. Upstream damming is also expected to trap massive amounts of sediment, which would be a loss of fertility for the fisheries and for farmers.

At the Tonle Sap level, the study considered land structures such as roads, hydrological structures such as irrigation schemes or

fishing structures such as fishing lots fences.

Roads have socioeconomic advantages that include better access to public services and markets, increased trade in fish and other products, and overall livelihood diversification. While the impact of these structures on hydrological regimes tends to be limited due to the low velocity of water flows in the floodplains, the design and management of roads plays a key role in their ultimate impact on fisheries.

Irrigation schemes, including reservoirs on the Tonle Sap floodplain, offer a range of opportunities for economic development. In the Tonle Sap floodplains, these structures have a small impact on water flows and water quality due to the small volume of water they are able to trap. However in the future their cumulative impact might become more significant. Furthermore, villages downstream from irrigation schemes on Tonle Sap tributaries are concerned about impaired fish migrations.

Finally, fishing structures such as bamboo fences have no impact on hydrology, but are essential to the catch. Yet, these large-scale fishing gears also raise several important social issues, such as access rights and the concentration of fisheries' related wealth in the hands of few people. Community fisheries are an alternative to fishing lots, but the respective advantages of each option from a biological sustainability viewpoint remain to be determined.

Ultimately, the study showed that the effects of built structures do not depend solely on technical and engineering factors; they also depend significantly on the way structures are managed and operated; in particular the nature of these effects is highly dependent on institutional decision making. Interaction between users and decision-makers is necessary in order to maximise the advantages and minimise the disadvantages of new infrastructure. <<

▼ Built structures lead to development



▼ Example of Built structure changing flows



NGO NEWS

» WILDLIFE CONSERVATION SOCIETY

An assessment of exotic species in the Tonle Sap Biosphere Reserve and Associated threats to biodiversity in Cambodia

BY ROBERT VAN ZALINGE
WCS – CAMBODIA

Introduction

In the past, invasive alien species have often been underestimated as a threat to biodiversity. It is now recognized that invasive alien species are one of the leading threats to biodiversity worldwide, second only to habitat destruction (Williams, 2002), and their presence and impact also imposes enormous costs on agriculture, forestry, fisheries, and other human enterprises, as well as human health (Wittenberg and Cock, 2001).

Recognizing this potential threat to biodiversity and livelihoods, the Tonle Sap Conservation Project and WCS initiated a study that would assess which exotic species are (or could potentially be) present in the Tonle Sap Biosphere Reserve (TSBR) and identify priority issues for the control of those exotic species that can be considered invasive. An invasive species refers to an exotic species whose introduction has led to or is likely to cause economic or environmental harm or harm to human health. From June to December 2006 an assessment was made of exotic species occurring in the TSBR. Through examination of the literature from recent biological surveys (1996 to present) and interviews with key informants currently working in the TSBR, as well as with fishermen living on the Tonle Sap Lake a list of confirmed species occurring in the TSBR was prepared and their status, trends, biological and socio-economic impacts assessed. Through this assessment and a study of control methods applied elsewhere, recommendations were formulated that applied best to the local situation in the TSBR.

Findings

Of the slightly more than 50 species treated in this report only 18 have actually



been confirmed as occurring in the TSBR. However, the remaining species do occur in the Mekong Basin and can potentially spread to the TSBR. Of the exotic species that have been confirmed as having established populations in the TSBR, there are two mammals, four species of fish and 12 plants. The two species of mammal are both rats, *Rattus rattus* and *Rattus norvegicus*, and are long established and largely commensally to man, but have also been known to establish populations in natural habitats. Their impact on other fauna in the TSBR is unknown. No feral populations of cats, dogs or pigs have been reported. Apple Snails are known to occur in wetlands in other parts of Cambodia and within the South-East Asian region, but the reports from the TSBR still need to be confirmed.

Other exotic animals that could potentially occur are: Red-eared Sliders (*Trachemys scripta elegans*) as young turtles are often released during Buddhist release ceremonies along the Tonle Sap river in Phnom Penh; Chinese Soft-shell Turtles (*Pelodiscus sinensis*), which were

farmed in the past within the TSBR, but there have been no records of any individuals encountered since then; North-American Bullfrogs (*Rana catesbeiana*) which were introduced for trade in the region and have formed naturalized populations elsewhere, but are not reported from Cambodia as yet; and hybrid crocodiles, grown on farms where Siamese Crocodiles (*Crocodylus siamensis*) are cross-bred with Cuban Crocodiles (*C. rhombifer*) and Estuarine Crocodiles (*C. porosus*). These hybrid crocodiles if introduced into the lake could pose a threat to the genetic integrity of local populations of the Siamese Crocodile, a critically endangered species.

Four species of exotic fish are known to occur, though the real number could be much higher. Common Carp (*Cyprinus carpio*), Silver Carp (*Hypophthalmichthys molitrix*) and Rohu (*Labeo rohita*) are regularly caught in small quantities from fishing lots on the Tonle Sap lake and river, and along the Mekong. While in the last year, especially from the southern end of the lake, fishermen have been reporting the catch of a type of

Pacu, quite likely to be the Red-bellied Pacu (*Piaractus brachyomus*) a species that has been banned for cultivation in Cambodia and recently also in Viet Nam. Populations of all exotic fish species at present seem to be low. However, trends in their numbers and impacts as a result of their establishment are unknown. A further 27 species of exotic fish are found in the Mekong and its' tributaries.

Naturalized exotic plants occurring in the TSBR are: Giant Mimosa (*Mimosa pigra*), Giant Sensitive Mimosa (*Mimosa invisa*), Sensitive Mimosa (*Mimosa pudica*), Water Hyacinth (*Eichhornia crassipes*), Water Lettuce (*Pistia stratiotes*), Seedbox (*Ludwigia hyssopifolia*), Para Grass (*Brachiaria mutica*), Hippo Grass (*Echinochloa stagnina*) and Cut Grass (*Leersia hexandra*). Most of the exotic plants confirmed from the TSBR seem to be long established already. Giant Mimosa is the only relatively new arrival having first been reported in Cambodia around the early 1980's, yet it is increasing at a tremendous rate along the Mekong, Bassac and Tonle Sap river systems and causing large economic and environmental damage.

The extreme flooding and recession around the Tonle Sap lake may have a

Giant Mimosa has sharp thorns up to 7 mm long. Fish (and many other animals) tend to avoid the plant, thereby causing a negative impact on fishery production and fishing in general. Fires and burning of the natural vegetation cover stimulates the spread of Giant Mimosa, by stimulating seed germination and reducing competition. Conservation of the original floodplain vegetation and a reduction in the incidence of fires would prevent Giant Mimosa from spreading rapidly throughout the TSBR.

moderating influence on the potential of several exotic plants to spread. However, the Giant Mimosa is well suited to cope with conditions in most of the floodplain and can invade all areas of the TSBR if there has been some disturbance of the natural vegetation cover, reducing competition and especially light source, and allowing seedlings to mature into established plants. Giant Mimosa plants were also reported as increasing in number by 61% of the people interviewed and 83% would like to see it removed from their area. Researchers have already estimated that Giant Mimosa could potentially spread over 20% of the maximum inundation zone (Hellsten et al., 2003).

Giant Mimosa can be clearly identified as a major threat to native biodiversity in the TSBR. It is also a well known invasive alien species in other countries where it has occupied vast areas of productive

wetland by forming dense mono-specific stands of very little to no value for wildlife and people alike. The only way to prevent it from establishing itself is through efforts at population control and by conserving the natural vegetation cover, which prevents the seedlings germinating.

Water Hyacinth can be considered a problematic species mostly due to the impact it is having on people by clogging up waterways and hindering movement. There is also likely to be an ecological impact due to its abundance, but this has not been documented and still needs to be properly assessed. However, when questioned, most people would prefer to have it available for them to use, although they admitted that they would like to see it somewhat reduced in quantity. People collect it in small quantities as food for pigs and caged fish as well as themselves, and for making hammocks and string. It is also used in fisheries as a fish attractant, as it is reported that fish feed off aquatic insects attracted to the plant and use the mats as shelter.

Recommendations

Recommendations are to immediately start a programme aimed at the eradication of Giant Mimosa infestations and establishing a sharp reduction in the number of Water Hyacinth within the TSBR. In Viet Nam researchers have applied a low-cost, simple but labour intensive method to combat the spread and ultimately reduce the amount of Giant Mimosa in National Parks in the Mekong Delta. By cutting the stems

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In shallow water Water Hyacinth mats can block the light to the degree whereby the reduced dissolved oxygen levels can be damaging to fish production. The plant grows extremely fast: and can double its biomass every 6-18 days. Besides being considered a problematic weed, Water Hyacinth can be used for economic purposes: as a fish attractant as it also offers shelter and a microhabitat for fish, the production of handicrafts, biogas, compost and fodder, and as floating vegetable gardens through special preparation techniques.

below the water level at the beginning of the flood season, 75-90% of plants had died when floodwaters had receded five months later (Nguyen Thi Lan Thi et al., 2004). As the hydrological conditions are similar this method could also be effective in the TSBR. However, though the results from Viet Nam are promising, application of this method in the TSBR will be a major undertaking requiring substantial funding and political commitment. Besides direct control, there also needs to be a strong effort at reducing the incidence of fire in the TSBR and conserving the original vegetation cover.

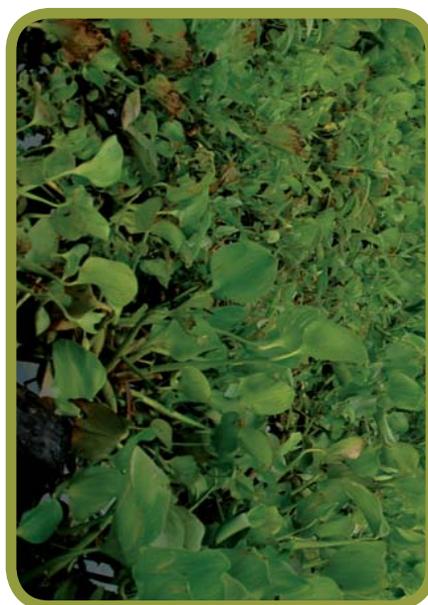
The growth of Water Hyacinth in the TSBR may perhaps best be limited by encouraging small scale manufacturing of Water Hyacinth products on the lake (e.g. paper, compost, briquettes, biogas, fibre boards, and furniture). Communities can also be encouraged to gather plants for preparing hydroponic vegetable gardens. Although the use of exotic species is not considered to be effective in invasive species control, such a strategy, together with a high natural mortality from "beached" plants left by receding floodwaters may at least offset the plants prolific growth potential to some degree and provide people with a cheap and environmentally friendly alternative as a fuel source and the possibility of income generating activities.

More attention needs to be given to exotic species and the potential threat they pose to biodiversity and livelihoods in the TSBR fully appreciated. As the TSBR is part of the Mekong Basin and

most exotic species found in the TSBR occur throughout the Mekong, a basin-wide approach is ultimately needed to reduce the risk of further introductions and establishment of exotic species. **

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» OSMOSE

Creating harmony between local communities' livelihoods and conservation

BY NICK BUTLER

OSMOSE aims to create harmony between the local communities and their sustainable livelihoods in the villages adjacent to the Prek Toal core conservation area and the unique flooded forests. These host the breeding colonies of seven globally threatened species of water birds: Oriental Darter, Spot-billed Pelican, Greater & Lesser Adjutant, Painted & Milky Stork and the Black-headed Ibis. OSMOSE works on simultaneous projects; providing environmental education to the village children, teaching them the value of the flooded forests and the birds that nest there and alternative livelihoods connected with the sustainability of the environment, eco-tourism and water hyacinth handicraft production. OSMOSE also sponsors a level of health-care to the children and food security to the poorest families in the three villages of Prek Toal, Peak Konteil and Kbal Toal.

One of the grants received by OSMOSE comes from the Japanese Fund for Poverty Reduction under the project called "Improving the access of poor floating communities on the Tonle Sap to social infrastructure and livelihoods resources". This project aims to demonstrate innovative and effective ways of improving the access of poor communities living in floating villages on the Tonle Sap, to critical social support services, and resources for livelihood improvement. The project has five components: improved livelihood activities, microfinance, improving health and nutrition, functional literacy and vocational training, project management. OSMOSE operates under component one, three and four.

Ecotourism

OSMOSE aims to use eco-tourism to demonstrate the potential value of the flooded forest and the biodiversity found there, in particular the birds, in providing alternative incomes for those families involved; protecting and monitoring the birds, guiding the visitors on community based village tour (CBVT), providing meals and accommodation, water hyacinth handicrafts and visits to local houses.

In 2006 ecotourism in Prek Toal concerned twenty families offering a paddle boat service and CBVT involved ten families. OSMOSE received twelve applications and resumes of villagers willing to become local guides. The organisation conducted a selection process to select a few of them, on the basis of their socio-economic situation, their level of education and their motivation.

Last year also saw the introduction of ecotourism to Peak Konteil village, approximately 15km south of Prek Toal, as a joint exercise with the Environmental Research Station in Prek Toal. Peak Konteil offers easier access to the core bird reserve as the water levels in the lake start to fall. The village is also picturesque and great to visit via a community based village tour. A local development program was started in May 2006 with fifteen of the poorest families. The women selected for cooking were chosen as a priority from poor women that are the head of households.

Water hyacinth production

Water hyacinth has been introduced on the lake from South America. This aquatic plant became a pest on the Tonle Sap as it grows extremely rapidly and paralyzes the navigation in some areas of the lake during the dry season. Interviews with local families showed that some women had used dried water hyacinth stems to



▲ Activity to increase monthly with water hyacinth production.

▼ Ecotourism Activity with CBVT Activity to increase monthly income.



produce hammocks. So the following steps were undertaken by OSMOSE to start production of handicrafts:

- OSMOSE obtained some funds from the Belgium Technical Cooperation Training Facility and the Asian Development Bank to train twenty-eight women on three main topics: treatment of water hyacinth to get rid of fungi, improvement of the quality of the products, and increase of the range of products.
- The activity enabled the women to increase their monthly income by fifty percent (+ 20 \$ per month) during the five months of the tourist season 2005/2006. The sixteen women fulfilled the orders (mainly mats) made by hotels and Spas from Siem Reap and Phnom Penh.
- Osmose will now additionally sell the water hyacinth products via a Night Market recently opened in

Siem Reap to promote genuine Khmer handicrafts.

Future activities

Thanks to funding from several donors, among which the Tonle Sap Conservation Project (TSCP) and the British Embassy, OSMOSE can continue and extend its projects. Activities in 2007 include projects in livelihood support in development and strengthening of water hyacinth handicraft, development and strengthening of community-based ecotourism, and mushroom production. Environmental education will be delivered to more children (currently working with over 1200) in Prek Toal, Peak Konteil and Kbal Toal. Also funding has been received to support the building of eight houses in Prek Konteil. ✨

Contact address:
PO Box 93045 – Siem Reap
Tel. 012 832 812
E-mail osmose@online.com.kh

NGO NEWS

»» LIVE AND LEARN ENVIRONMENT EDUCATION

Community and School Environmental Awareness Flipchart

BY LIVE AND LEARN

Local NGO Live and Learn Environmental Education has been developing school and community environmental education resources as part of the National Environmental Education and Awareness Campaign (NEEAC) and the Tonle Sap Environmental

Management Project (TSEMP). Live and Learn have developed two comprehensive education resource kits aimed at promoting environmental awareness and action in 10 communes and 5 pilot schools in provinces surrounding Tonle Sap Lake.

The final stages of the NEEAC project

have recently been completed. Live and Learn Environmental Education professionals, Mr Keat Bunthan and Ms Pich Sokdany completed a hectic 2 month schedule of community and school visits. During these visits Bunthan and Dany introduced the resource kits to commune members and to the PIU staff involved in implementing the kits throughout the TSBR. As well, the Live and Learn team introduced the schools kits and provided training in their use to teachers and school staff.

The Community Environmental Awareness Flip Chart, facilitators guide and training video

The Community Environmental Awareness Flip Chart provides a comprehensive overview of some of the environmental issues facing communities in the region. The Flip Chart deals with a diverse range of environmental and personal/community health issues. It is designed to enable community members to identify how current practices can contribute to environmental degradation, which in turn can affect the health of the TSBR and the health of the people who live within the region. The Community Flip Chart is divided into 5 modules covering: Introduction, Water, Waste, Natural Resource Management, Protected Areas and Community Actions. These modules cover a number of environmental elements (water, air, soil) which, if degraded, can affect the health of the population. The Community Flip Chart helps to draw links between the health of the environment and the health of the people.

The Community Environmental Awareness Flip Chart is designed to empower the communities of the TSBR by enabling them to identify environ-



mental problems and the practices which lead to those problems, to see the link between environmental degradation and the health of the people and other living things, and to identify alternative practices which will reduce the negative impacts on the environment and at the same time help to reduce the negative effects on the health of the people. By raising awareness of harmful environmental practices and developing alternative, safer practices, we can expect to see improvements in the health of both the environment and the people.

The Community Environmental Awareness Flip Chart is accompanied by a facilitators' guide, a training video and high quality durable carry bag. The facilitators guide and training video provide detailed advice and explanation on how to get maximum benefit from the flipchart. The flipchart carry bag was especially developed to enable storage and protection of the flipchart when taken to the field. The bag was produced by disabled workers at Watthan Artisans workshop, Wat Than in Phnom Penh.

The School environmental awareness and practical teaching kit: Practical Tools for Schools

This resource kit is specifically for use in schools. It is a teaching and learning resource which consists of a teachers flip chart providing background scientific theory for each of four environmental topics:- Water, weather, waste and energy. The kit includes all the necessary resources to teach those topics and to conduct practical activities which will reinforce the learning and help to develop deeper understanding about the environment.

The practical kits are comprehensive. They include background scientific information, examples of low and appropriate technology resources, such as a hand powered torches,



▲ Bunthan presenting the Community Environmental Awareness Flipchart

solar panel kits, water testing kits, and a comprehensive and yet simple weather monitoring station which will enable the school students to monitor, record and display daily temperature, rainfall, and wind speed and direction. Each school has established an eco-club. The eco-club provides specific environmental education through activities and resources. The activities have been designed to raise awareness and develop understandings of the importance of a healthy environment, and to provide stimulating, practical experiences for the students. These activities will assist their learning and lead to a better environment in the future.

Reaction to the Community and School environmental education resources

So far community and school response to the flip charts has been very positive. Community members, teachers, PIUs and government and non government staff have all given universal approval of the resource. Feedback usually mentions the innovative approach, high quality illustrations, practical activities and easy



▲ Schools have installed weather monitoring kits to check temperature, rainfall, wind direction and speed

to use format as particular advantages of the flipchart. Following the successful trial of the flipcharts in the Tonle Sap region, staffs of government departments and NGOs have requested help to incorporate the flipchart into their community development activities. Recently 40 NGO and government staff received implementation training and copies of the flipchart resource. These will be used in locations throughout Cambodia. **

NGO NEWS

» GTZ-RDP KAMPONG THOM

Recent land dynamics in the Tonle Sap Flood Plain and its impacts on the local communities

BY DR. DIEPART JEAN-CHRISTOPHE.RDP KAMPONG THOM

In Kampong Thom the ongoing and widespread construction of dry season rice perimeters is resulting in a complete reshaping of local agro-ecosystems in the transition zone of the Tonle Sap Biosphere Reserve. The present article aims at exploring some of its impacts on the local communities.

Background

This article is based on the experiences of the multi-sectoral Rural Development Program (RDP) supported by German Technical Cooperation and the Ministry of Rural Development. Amongst other activities¹, RDP supports the Fisheries Administration and the Department of Environment in the implementation of Community-Based Natural Resources Management (CB-NRM) activities in Stoung district (Samprouch and Msar Krang communes). The approach consisted initially of a village-based holistic approach in the sense that it aimed at integrating fisheries and forestry management with environmental protection measures. These principles were integrated in a village NRM regulation endorsed by a village NRM committee. Whereas the activities turned out to be successful at the local level, their institutional recognition by the fisheries administration was weak. Seeking official recognition, the village-based approach was transformed into a commune-based community fisheries (CFi) approach in 2005, as this approach will more likely be in line with the newly approved sub-decree on Cfi. The activities are now an integral part of Tonle Sap Environmental Management Project comprehensive support to Cfi in

the Tonle Sap flood plain.

Traditional land use patterns in the Tonle Sap Flood Plain

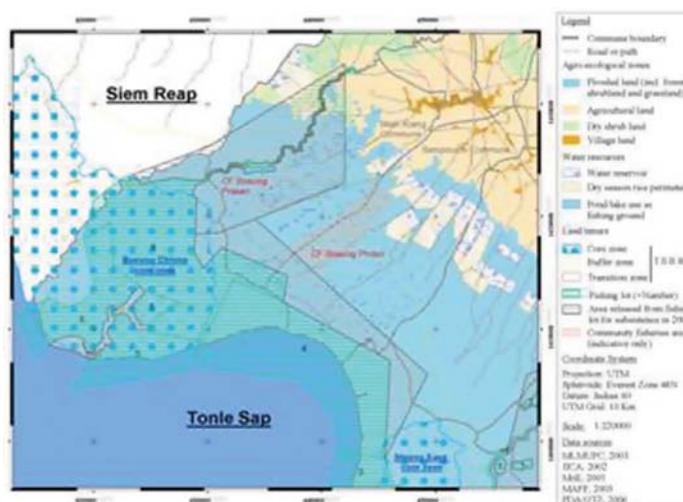
The map displayed below shows the agro-ecological zoning of the area. It stretches from the Tonle Sap flood plain (consisting of a sequence of flooded forest, shrub and grassland) to the agricultural zone where the villages are located and then to the dry shrub land.

At the edge of the agricultural zone, the flood plain is characterized by continually changing land use patterns ranging from rice cultivation, grassland grazed by cattle and shrub land where a variety of non timber forest products can be collected (Evans and al, 2003, Diepart, 2007). This diversity of land use is maintained through a variety of practices such as fire, ploughing, fallowing or grazing with the objective to ensure a flexible and diverse supply of natural products of crucial importance to the local livelihoods, while maintaining the fertility of the overall agro-ecosystem. The system is rational. The different rice

cropping systems are adapted in different water depths and encompass a very important aquatic biodiversity (Balzer and al, 2002). The grass is crucial as fodder for the cattle that generate a predominant part in the farming income portfolio (Diepart, 2007) and the shrubs are also important for the energy supply of the households. Fishing in the recession ponds of the flood plain is part and parcel of this logic aiming at maintaining multi-functional agro-ecosystems.

The recent land dynamics and its impacts

In 2001, the removal of fishing lot boundaries released a so-called subsistence area where local communities were allowed and encouraged to establish community fisheries schemes. In line with this dynamic, RDP has been supporting different villages in establishing two community fisheries organizations, partly located in the buffer and the transition zones of the Tonle Sap Biosphere Reserve: the Cfi of Boeung Phdao in Samprouch commune and the Cfi Boeung Prasan in



▲ Map : Afro-Ecology and tenure management in the area.

¹ The Rural Development Program Kampot/Kampong Thom is an integrated, multi-sectoral rural program working in close cooperation with the IFAD funded Community Based Rural Development Program (CB-RDP). Besides natural resources management, the key areas of GTZ/DED's program activities comprise: agriculture development, rural infrastructure creation, community development and decentralized development management

Msar Krang commune (see map).

Since 2005, at the edge of the agricultural zone, private entrepreneurs have started to build structures consisting of one water reservoir and one dry season rice perimeter each. The flood water is stocked in the upper reservoirs in the rainy season and flows by gravity from the reservoirs to the lower irrigated dry season rice perimeters (see map).

An early agreement signed by the provincial governor stipulates that the dry season rice perimeters are to be operated in close cooperation with local people who are meant to provide the labor force needed for the construction and agriculture related work arising from these dry season rice perimeters. The modalities of this cooperation, however, are not yet clearly stated. The vision of the initiative is to develop this so-called “unoccupied” land at the edge of the agricultural zone and to offer new employment opportunities to the local people, particularly during the dry season. In addition to those hoped-for benefits, however, the dry season rice perimeters also upset the traditional land use patterns, fish and human migration patterns, biodiversity and the water control in the area.

The impacts on peasants’ production systems

The traditional use of the area described above is directly threatened by the new dry season rice perimeters. First, the dramatic consumption of land by the perimeters reduces the grassland area and leads to a shorter fallow period thus affecting negatively both the fertility and biodiversity of the system. Second, access to grazing areas and fishing ponds is more difficult because of the mere existence of the massive perimeters within the same territory.

It is worth stressing that both of these impacts are even more acute for the most vulnerable households as the Common Property Resources constitute,



▲ A view on a construction site of one of these structures.

in relative terms, a more important part of their cash and in-kind income portfolio (Diepart, 2007). Furthermore, the envisioned benefits the farmers were supposed to get from the dry season rice perimeters are still questionable at this stage: Most of the local people interviewed in the area (Msar Krang and Samprouch communes) said that so far they were neither recruited for the construction nor as wage laborers inside the cultivated area. The entrepreneurs investigated stated that this was because they want to make sure the system can run without local peasants’ involvement during the first years.

The impacts on seasonal migrations and water control

In the area, fishing is a pivotal activity for the vast majority of households, both as a source of income in the dry season and as an input for small-scale units of fish processing (Mom, 2006). Fish is also a major source of protein in the daily diet of rural households. The destruction of shrub land by the establishment of the huge structures threatens the reproduction of certain fish species, especially those using the flood plain as their main spawning grounds (GTZ, NRM Component, 2005). Moreover, a significant number of fish fingerlings are being caught inside the reservoirs resulting in a decrease of the fisheries’ productivity, especially in the recession ponds located in the vicinity of the reservoirs. The fishermen are already experiencing this loss. During a meeting,

a group of villagers in Doun L’a claimed: “before these reservoirs, we were selling fish and other aquatic organisms. Now, these reservoirs are converting us to fish buyers from local entrepreneurs operating the reservoirs”.

A couple of questions still remain unanswered. It is not clear, for instance, how the water regimes of seasonal flooding and recession will be affected by the storage of water in the reservoirs. As the start of the water recession gives the biological signal for the migratory species to start the migration down to the Great Lake, it is also not clear how this storage will affect the lateral migration of fish to the Tonle Sap Lake. One can also assume that the massive presence of irrigated perimeters will push the seasonal migratory flows of fishermen to settle closer to the fishing lots and increase the likelihood of conflicts in these very sensitive areas.

Land governance

The institutional and legal arrangements governing access to and control of the land are critical for the current and future development of the area. The provincial administration gives the authorization to each individual investor for the construction of a perimeter but the documents including agreements made available to us do not clearly state on what legal basis these agreements are made. A written agreement drafted by the provincial governor suggests that they could be land concessions (social or economic) or economic

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concessions, but the legal procedures to identify the land and monitor the processes are clearly not in place. A declaration by the provincial governor includes vague information about the involvement of local people in the process. The newly irrigated lands are supposed to be redistributed to them in an undefined period of time and the establishment of water user group communities is also planned. Yet, at the time being, none of these statements are yet followed by actions. Furthermore, cases of fishing ponds encroachment have already been reported (Ly and Diepart, 2006).

Concluding remarks

Geographically and institutionally, the community fisheries schemes are "in the center" of the multidimensional issues highlighted above. CFI seem indeed an interesting option to avoid or limit the different negative impacts of the new constructions. First, in order to maintain the diversified agro-ecosystem so crucial to local communities, community fisheries areas can integrate different land use patterns including shrub and grass land located in the vicinity of fishing grounds. Second, by defining protected areas inside the CFI schemes (i.e. a fish sanctuary), the CFI areas could also be privileged fish spawning places to limit the decline of fish productivity due to the water retention basins. Eventually, lands under CFI areas might be registered officially as state public lands by the Ministry of Land Management, Urban Planning and Construction. This official

recognition might provide stronger land security to the rural communities because, for one thing, economic land concessions and social concessions, which might be the legal basis for the retention basins, are banned on state public land. This recognition might therefore help the communities to better negotiate with local administrations whenever conflicts or irregularities arise. ***

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» CBNRM-LI

Building Capacity to Sustain the Heart of Cambodia : outputs and Impacts from the Skills and Awareness Buildings project of the Tonle Sap Initiative

BY MR. SIM BUNTHOEUN
DEPUTY PROGRAM COORDINATOR, CBNRM-LI

The ADB contracted the CBNRM Learning Institute in August 2007 to support the Tonle Sap Initiative (TSI) in building skills and awareness. The arrangement aims to (i) provide CBNRM LI with opportunities to disseminate its expertise, and (ii) augment ADB's access to know-how so that ADB may use, or enable its developing member countries to use resources better meet the overall goal of poverty reduction.

Skills and Awareness Building (SAB) project is working under Community Based Natural Resource Management Learning Institute (CBNRM Learning Institute) with the aim to strengthen the managerial and leadership capacity of core groups of motivated and competent change agents associated with the TSI: they are local and provincial level government officers and community leaders and representatives (and other stakeholders if practicable). To achieve the goal, SAB has a five stages

process:

1. Stakeholder Analysis, Needs Assessment, and Team Formation
2. Capacity Building Strategy and Work Plan Development
3. Preparation and Validation of SAB Modules
4. Implementation, Monitoring, and Improvement of SAB Program and;
5. Feedback, Reporting, and Next Steps

SAB training strategy use a mentoring approach that combines in-class workshops (of 3 days in length covering 4 themes/modules) with follow-up support. There are six modules produced for delivering to different levels of participants (Provincial, Commune and Community) such as:

1. Natural Resource Management and Planning (all levels),
2. Leadership and Community Organizing (commune and community levels),

3. Networking and Partnership Building (all levels),
4. Project Management (provincial level),
5. Proposal Writing (provincial level) and
6. Report Writing (commune and community levels).

Based on SAB database, there were 1214 people coming from different levels of understanding who participated in 65 courses: 16 courses delivered to provincial level; 15 courses delivered to commune level; and 34 courses delivered to community level.

By including the 4 extra reflection workshop courses (2 courses for provincial level and 2 courses in commune and community level, conducted in Siem Reap and Pursat province), there were a total of 69 courses delivered to 1310 participants (399 females):

- 146 were relevant department staffs
- 79 district representatives
- 307 commune councilors
- 678 community representatives
- 91 relevant NGO staffs

According to the lessons learned and experience gained for the implementation, SAB project has identified

some impacts from the reflection and monitoring and evaluation as below:

- Applying knowledge and skills: Most SAB participants have applied the knowledge and skills gained from SAB course to their communities (i.e. integrate into monthly meetings in village, commune, disseminate SAB course to others)
- Changing the way of thinking and working: Most of SAB participants have changed their way of their thinking and are working in terms of improved natural resource management.
- Adapting and advancing the training courses: Most of SAB participants are strongly interested in the intermediate SAB training course if it is available.
- Integrating into other programs and projects: TSI unit and Seila Program/ PLG aim to integrate SAB modules into their own modules.
- SAB publications have been widely used by relevant partners and university students (i.e. debates, academic studies, info sharing)
- Better Partnership Building: Partnership and networking among key stakeholders around Tonle Sap have

been built and improved.

Example of success story 1:

“This was my first time receiving training on Natural Resource Management and I now feel confident sharing it with other and I emphasize main ideas in my opening speech at meeting and workshop.”

Example of success story 2:

“We have adapted a training style, method, and modules to be applicable to our audiences and have to date trained 875 community members. We feel the need for CBNRM Learning Institute to provide more advanced training courses to local communities, commune councils, district governors, stakeholders, and NGOs partners in the province.”

SAB courses meet the needs of participants to improve their capacity for natural resource management by changing their way of thinking and working. So it is evident that awareness raising and capacity building are keys to contributing to poverty alleviation in Tonle Sap region and Cambodia as a whole. However, there are still some gaps of knowledge among key stakeholders in relation to natural resource management that need to be fulfilled. So the continued capacity building is a key area for intervention of other agencies working around Tonle Sap.

The following recommendations are important for capacity building programs:

- Capacity building should start from the awareness raising activities followed by intermediate or advanced courses
- Community and commune levels should be prioritized for capacity building activities and
- All capacity building projects should coordinate with each other to integrate the training materials. ❄❄



▲ SAB Team facilitation activity



▲ SAB Team Kham Samreub, Vice district governor of Ek Phnom, Battambang

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» VOLUNTARY SERVICE FOR OVERSEAS

VSO Livelihoods Programme Working Through Partnership to Alleviate Poverty and Support Disadvantaged Communities Manage the Natural Resources

BY PISETH VANN, LIVELIHOODS PROGRAMME MANAGER AND JO WHALEY, VSO MANAGEMENT ADVISER, CCD

The VSO Cambodia Livelihoods programme has evolved from a natural resources management programme. The programme focuses on community based natural resources management as means to improving communities' livelihoods in Cambodia. The overall goal of the programme is to improve the livelihoods security of poor and disadvantaged women and men who are dependent on fisheries and forestry resources in the provinces bordering the Tonle Sap Lake and upstream on the Mekong River. More specifically the programme aims to improve the effectiveness and responsiveness of services provided by government, non-government and community based fisheries and forestry organisations to poor and disadvantaged women and men in Cambodia. At the level of the resource user VSO aims for communities to gain more secure and equitable access to natural resources. It also aims to increase the participation of female and male resource users, inclusive of all disadvantaged groups, in natural resource management, development of sustainable alternative livelihoods and the development of communities.

VSO Livelihoods Programme therefore supports national and international NGOs and government institutions which promote community based natural resource management and sustainable livelihoods. International volunteer professionals are placed with partner organisations and institutions to give support in terms of technical capacity, organizational and project management. Work is also supported through small grants for the



▲ Alternatives to fishing and farming in Peam Popech: Saving groups members making grass mats to sell

partners and communities through the international volunteer professionals. There are 86 volunteers in VSO Cambodia, 26 of which are in the Livelihoods Programme, from a wide range of backgrounds. Current Livelihoods placements include project management advisers, organisational management advisers, environment educators, a wetlands specialist, an ecotourism specialist, legal support advisers, livelihoods specialists and a small scale enterprise development adviser. The plan is to increase the number of livelihoods and enterprise development specialists in order to give more direct benefits to disadvantaged families in the target areas.

Results to date include partner organisations and institutions being better able to implement their programmes, improved fundraising activities to increase financial security and organisational sustainability and improved transparency of development through better reporting. Use of VSO



▲ Improving the environment in Peam Popech village: Community fishery members, CCD and the Provincial fishery officers work together to replant the flooded forest

small grants have helped partner organisations become more responsive to the needs of the disadvantaged communities.

Partnership is at the core of all of VSO's work. Through working in partnership VSO believes that it will be able to

contribute to the poverty alleviation and sustainable natural resources management practices. For example, VSO has worked in partnership with the Kompong Chhnang based national NGO Community Capacities for Development, CCD, since 2005.

The VSO Livelihoods Programme has placed a Management Adviser with CCD, who helps them shape their programmes and manage their work more effectively and efficiently, to benefit rural Cambodians in 21 community fisheries on the banks on the Tonle Sap River. CCD has three programmes based in Kompong Chhnang:

- Natural Resource Management and Community Development Programme which aims to develop the role of communities in managing natural resources and self development
- Women's Network Programme which aims to increase the power of women in communities
- Casework Programme which aims to help the poorest people become self-reliant, participate fully in community work and ensure the community serves the interests of the poor.

One community fishery (CFi) is in Peam Popech, a seasonally inundated village, where CCD has worked since 2002. The CFi has established a conservation area to improve the wildlife diversity and increase the fish catch in surrounding areas. Many villagers joined the ceremony, with CCD and the Provincial Office of Fisheries, last year to replant an area of flooded forest. As well as making income from directly from fishing rights, the CFi is planning to establish a community shop to raise further funds for itself. Peam Popech belongs to a federation of five CFis. The federation works together to plan the management of their natural resources, to disseminate information and to solve problems in the CFis.

CCD aims to ensure that women and

the poorest people are involved in community development. CCD has facilitated the establishment of a Women's Network in Kompong Chhnang and the Women Representatives in Peam Popech are very active, taking leadership roles in the CFi. One method CCD uses to get more women involved in community development and to improve livelihoods is through savings groups. In Peam Popech these groups are very popular, there are now three such groups. Members save regularly and can borrow from the fund to invest in livelihoods activities such as buying materials to make grass mats or cakes and process fish to sell. Staffs also work with the poorest people, one to one and in self help groups, to help them improve their livelihoods and get involved in the CFi. CCD's work in Peam Popech is funded by Oxfam Hong Kong, UNDP Small Grants Program and Oxfam Great Britain.

Jo Whaley is the British volunteer VSO has placed with CCD. When asked to describe her experience working for VSO/CCD she said "It is great to be helping CCD to facilitate development in the community fisheries in Kompong Chhnang. In the 18 months I've been here I've seen so much change: the Community Fisheries and Federations getting organised, people working together to enhance the natural resources, women becoming more and more involved and livelihoods



▲ Mushroom growing

improving. It's really exciting to be a part of that."

It is planned that the next VSO Volunteer to be placed with CCD will be a community development specialist with expertise in enterprise development, specifically to assist with the development of alternative livelihoods in this area. Thus the partnership between VSO and CCD will continue and flourish, helping to alleviate poverty in the seasonally inundated community fisheries of Kompong Chhnang and improve the management of these unique natural resources. ***

Contact:

VSO, Cambodia Programmer Office
#19, Street 214, Sangkat Boeung Rang, Phnom Penh
Tel: 855-23 365 380/ 855-12-814 457
Fax: 855-23-216 734
E-mail : Pich.Bunthoerun@vsoint.org

▼ Water buffalo bank VSO funded project in women group



THE ISLAND OF SIBERUT

Biosphere Reserve in Indonesia-Looking back at 25 years Man and Biosphere Reserve

BY GERARD A. PERSOON AND MYRNA EINDHOVEN, INSTITUTE OF ENVIRONMENTAL SCIENCE (CML), LEIDEN UNIVERSITY, THE NETHERLANDS

Introduction

UNESCO's Man-and-Biosphere (MAB) Programme was launched in the early 1970s to target the ecological, social and economic dimensions of biodiversity loss. In this edition the Island of Siberut is highlighted. Siberut is one of Indonesia's six Man-and-Biosphere Reserves and has been for 25 years.

Siberut is the largest in the chain of four Mentawai Islands situated off the west coast of Sumatra. It has been isolated from the Sumatra mainland and the Sunda shelf for at least 500,000 years, resulting in an exceptionally high degree of endemism. Among these, four species of primates: Kloss Gibbon/Dwarf Siamang (*Hylobates klossii*), Mentawai macaque (*Macaca pagensis*), Mentawai leaf monkey (*Presbytis potenziani siberu*), and Pig-tail snub-nosed monkey (*Nasalis concolor siberu*), are only found in this Reserve. Of the 134 bird species found on Siberut, 19 are endemic at some taxonomic level. Siberut flora consists of 131 families, 390 genera and 846 species. It is generally assumed that the list of identified endemic fauna and flora species is incomplete, and that over time new species will be identified. The population is predominately Mentawai. Relatively small groups of people originate from other ethnic groups such as the Minangkabau, Javanese and Batak. Traditionally the people lived in small settlements along the banks of the rivers that cut through the thick forest. People were living from hunting and gathering and the domestication of pigs and chickens. Sago is the



staple food and in addition they practise a form of shifting cultivation characterised by the importance of perennial crops. One of the most remarkable aspects of this system is the lack of fire. The vegetation is not burned after it has been cut. Trees and branches are left in the field. Seeds of fruit trees have been planted prior to the cutting of the trees and gradually the seedlings will find their way through the vegetation. In this way the soil is never directly exposed to wind, sun and rain thereby reducing erosion while the nutrients are released from the vegetation over a considerable period of time.

Logging operations have fundamentally changed the conditions on the island in the past few decades. Even though, in the perception of the local people there is no empty land – even the closed canopy is considered their property – the state has claimed the primary forest resources on the island for granting logging concessions since the early 1970s. In that period almost the entire island was granted to four big logging companies with



the exception of a small game reserve of 6,500 hectares in the middle of the island. During the twenty years of logging serious damage has been done to a large part of the forest on the island. Taxes for reforestation were paid to the Forestry Department in Jakarta, but factual reforestation never took place.

Over the years a number of national, but mainly international organisations have been struggling to “save Siberut” from devastating commercial logging activities and the establishment of oil palm plantation. Around 1980 when logging was in full operation, WWF started to struggle for expansion of

the small reserve area to save the wildlife on the island, the four endemic primate species in particular. The strictly protected area was expanded to about 56,000 hectares and a traditional use zone was proposed to surround this core conservation area. In 1981 UNESCO announced that the whole island was included in its Man-and-Biosphere (MAB) programme. This programme is world wide aiming at the improved relationship between people and their environment, thereby addressing one of the most contemporary issues: how to reconcile conservation of the world's natural resources and its biological diversity with their sustainable use?

Quite unexpectedly in 1993 when renewal of logging concessions was being discussed in Jakarta, the president signed an agreement that all logging concessions on the island were to be terminated and that about half of Siberut (192,000 hectares) became a National Park. The Asian Development Bank (ADB) agreed to fund the multi-million dollar project proposal to implement the management plans for the park, including all kinds of development activities for the indigenous population. However, the introduction of regional autonomy in 1999 has marked a remarkable shift in the position and importance of Mentawai's natural resources. A logging cooperative received a controversial logging permit issued for 46,650 hectares immediately adjacent to the National Park, thereby ignoring earlier agreements as laid down in the ADB funded Siberut Project.

Since 2001 UNESCO has been working on various projects using bottom-up strategies and participatory approaches all aiming at the



empowerment of local communities and their guaranteed involvement in the management of their lands. In this context village management plans were produced and various training courses on alternative (other than logging) income generating activities, several workshops and village meetings and awareness raising campaigns have been organised. Ever since the start of the Siberut Programme, UNESCO advertises the programme as an outstanding example of the interdisciplinary nature of UNESCO's operational procedures. Fact is, however, that many local people do not feel as comfortable with the presence of the Siberut Programme as UNESCO wishes they would do.

The creation of the new Mentawai district marked a power shift in Mentawai. In broader circles it was strongly believed that a transfer in decision making power from the central government to the district level government would form a powerful incentive for both local communities and governments to make use of natural resources on a more sustainable basis. Local autonomy has indeed led to a greater sense of ownership, but unfortunately not to a greater sense of concern and care for local natural resources. The fate of large parts of the remaining forest on Siberut were discussed even before the current head of district was officially installed. Not only was his political campaign financially supported by a logging company (receiving access to the forests as soon as he would become the head of the district), in 2001 nearly half of the island of Siberut already became subject to a logging concession in the hands of the mainland university. Shocking was the message that appeared in Jakarta Post (2005) stating that the Mentawai district government had so far not received any income from the logging activities taking place in the archipelago; the revenues were disappearing in the pockets of government officials. Even though logging companies have to negotiate with local communities about whether and on what terms



they are willing to hand over their lands, negotiations are rarely executed on a fair and equal basis. Limited access to finances, lack of experience on the market and the (seemingly) exuberant bids that are offered, make them trade their land in for abominable prices.

A history of twenty five years of Man-and-Biosphere status did not bring Siberut a great deal of support for conserving the biodiversity and cultural diversity on the island. The Man-and-Biosphere label itself has also not been instrumental in generating support from other parties. Conservation efforts have in general been short lived, and sometimes they were competing for support from the government or the local people. One could argue that inspiring conservation leadership could make a difference in the years to come and in that sense UNESCO, as one of the few organisations in the world that takes the combination of cultural and biological diversity serious, still has a fascinating mission to fulfil on Siberut.

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Contact details authors:

Institute of Environmental Science (CML), Leiden University, The Netherlands