

FINAL PROJECT EVALUATION
INTEGRATED COASTAL RESOURCES MANAGEMENT IN
SIHANOUKVILLE (ICRM-SV)

IMPLEMENTED
BY

TRAINING DEPARTMENT
SOUTHEAST ASIAN FISHERIES DEVELOPMENT CENTER
AND
FISHERIES ADMINISTRATION OF CAMBODIA

Conducted
by

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FOREWORD

The Integrated Coastal Resources Management in Sihanoukville (ICRM-SV) Project, Cambodia, is a collaborative project between Southeast Asian Fisheries Development Center (SEAFDEC)/ Training Department (TD) and Fisheries Administration (FiA) Cambodia. The ICRM-SV project is the initial component of the Coastal Resources Management Program, which is based on the adoption of the ASEAN-SEAFDEC Fisheries Consultative Group (FCG) Scheme. ICRM-SV is financially supported by the Japanese Trust Funds, while FiA contribution is supported by the Cambodia Government Fund.

Under the coastal resources management program, TD and FiA Cambodia collaborated in formulating and implementing the collaborative coastal fisheries management project. An aim of the collaborative project is the promotion and achievement of sustainable use of fishery resources. TD and FiA Cambodia agreed to transfer the essence of technologies, accumulated knowledge and lessons learned, which were gained through the implementation of the coastal fisheries management project to other SEAFDEC member countries through the SEAFDEC's information network. This information may help ASEAN-SEAFDEC member countries consider their own policies and formulate new directions for the coastal resources management plan and implementation.

Chumnarn Pongsri, Ph.D
Secretary-General

PREFACE

The first collaborative project in introduction and demonstration of community based fishery resources management was deployed in Chumphon, Thailand, from November 2001 in the wake of decision made at the ASEAN-SEAFDEC Fisheries Consultative Group in 2001. As agreed at this meeting as well, the second sister project began in Langkawi, Malaysia, in August 2003 and the third sister project began in Sihanoukville in November 2005, with the similar project operational framework based on lessons learned and experiences gained through the first and second project in Thailand and Malaysia.

Integrated Coastal Resources Management in Sihanoukville (ICRM-SV) project terminated in December 2009 and the final project evaluation to verify the project achievement consistent with the targeted goals was conducted by an out-sourced project evaluation consultant from July to October 2009. The final project evaluation report was hereto compiled and published.

SEAFDEC/TD

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AN EVALUATION OF THE COLLABORATIVE PROJECT

“INTEGRATED COASTAL RESOURCES MANAGEMENT IN SIHANOUKVILLE (ICRM-SV)”

IMPLEMENTED BY

**TRAINING DEPARTMENT/SOUTHEAST ASIAN FISHERIES DEVELOPMENT CENTER AND
FISHERIES ADMINISTRATION OF CAMBODIA**

I. PROJECT DESCRIPTION

Under the ASEAN-SEAFDEC Fisheries Consultative Group (FCG) collaborative mechanism, it was decided in 2001 that an applicability of the Japanese model of CBRM approach should be tested in Thailand and that similar approaches should also be disseminated to the other SEAFDEC Member Countries if the result is promising. With this understanding, the project Locally Based Coastal Fisheries Management in Pathew District (LBCFM-PL) was initiated in November 2001 in Thailand under the collaborative project framework of the Department of Fisheries (DOF) of Thailand and SEAFDEC/TD. In the wake of the successful deployment of the project, it was proposed to also initiate a similar project in Langkawi, Malaysia, based on the knowledge and experience gained through the project operation in Thailand. Thus, the 2nd project commenced in Langkawi, Malaysia in August 2003 and the 3rd bearing the title Integrated Coastal Resources Management in Sihanoukville (ICRM-SV) took off on 11th November 2005. These LBCFM-oriented projects were financed by the Japanese Trust Fund – I and IV.

The project, Integrated Coastal Resources Management (ICRM-SV), began in Preah Sihanouk Pprovince in collaboration with the Fisheries Administration (FiA) of Cambodia with project tenure of three (3) years. However, the prolonged preparatory stage for almost one year, the project was originally planned to commence its operation in January 2005, the project operationalization was dragged until November 2005. In the meantime, a JICA expert assigned with the FiA Cambodia in his capacity as Fisheries Policy Advisor coordinated in providing some amount of budget from the Grassroots Grant Aid of Japanese Embassy in Phnom Penh which was injected into the project operations especially in the mud crab culture scheme. This component activity was incorporated as part of the regular project activities.

Project objectives:

- 1) Develop capacity of local human resources
- 2) Promote people’s participation in resources management and community development
- 3) Alleviate poverty through creation of job opportunities

Project activities:

- 1) Baseline/ monitoring survey
- 2) Encourage and extend locally-based fishery resources management
- 3) Promotion of local business
- 4) Enhance human resources capacity and participation
- 5) Rehabilitation and enhancement of coastal resources

- 6) Fishing / fish-handling technology improvement
- 7) Project management meetings
- 8) Project evaluation

II. PURPOSE OF THE EVALUATION

The project Integrated Community Resources Management in Sihanoukville (ICRM-SV) commenced its operation in November 2005 and its operation would be terminated in December 2009. The evaluation is intended, as the project draws to a close, to assess the marine biological impacts on the coastal fishery resources and the socio-economic impacts on the fishing communities as well as also provide recommendations to FiA Cambodia and the SEAFDEC/TD as the collaborative project's executing agencies and other donors on the necessary further steps to consolidate the progress and ensure the achievement of the project's objectives.

III. THE RESULT OF EVALUATION

3.1 Relevance of the project to development priorities and needs

The results of socio-economic survey conducted before the project commencement indicated that the fishers' income from fishing was insufficient to support their families, the fishermen were concerned about the dwindling fisheries resources and environmental degradation, and the fishers also felt that the authority has put little effort in preventing illegal fishing. To deal with these problems, the project set up very practical objectives including poverty alleviation, people's participation (fishermen and concern agencies) in fisheries management, and human capacity building.

As indicated in the socio-economic report, several needs were mentioned by the fishermen, for instance procuring large fishing boat, receiving public credit scheme, building common house for CF and reinforcement of patrolling unit. Among these needs, only the last one was incorporated in the project activities. Such decision is reasonable because procuring large fishing gear may accelerate resources degradation. Furthermore, public credit scheme was not necessary for the project considering that the fishermen can access some current financial institutions such as the ACLEDA, etc.

In general, the designated project activities reflected the real situation of the fishermen's problems and needs. However, fishing technology improvement may not be appropriate to be introduced in the current fishing ground because the current law does not allow new fishing gear to be operated in such fishing ground.

3.2 Clarity and realism of the project's development and immediate objectives, including specification of targets, identification of beneficiaries, and prospects for sustainability

3.2.1 Project's development

The report dated 15 June 2005 pointed out that after the proposal of ICRM-SV was endorsed during the 27th PCM meeting held on 6th – 9th December 2004, the SEAFDEC/TD team conducted meetings and discussions with the Fisheries Administration at all levels in order to get the real situation at the proposed site. Results of discussions were used to formulate the project document. The team also visited and inspected the fishing villages to verify the viability of the

project operation. Moreover, the SEAFDECT/TD team visited the FAO Representative Office to seek advice and clarification on the status of similar FAO project in the coastal areas, and to exchange views on the coastal fisheries development in Cambodia.

The project document could therefore be considered as the result of good collaboration works between SEAFDEC/TD, the Fisheries Administration (FiA) and Community Fisheries (CF) leaders. The strong participation and commitment from concerned agencies and the CF were the key success factors in natural resources management which SEAFDEC/TD took into consideration. Even the project document was designed in a systematic way where the some weak points were explored and addressed, for instance the local authorities which were not in the list of the discussion meetings and only CF leaders were invited.

3.2.2 *Immediate objectives*

The three objectives are well prepared, reasonable and practicable because the project was able to solve the problems and needs of the community fisheries members.

Based on the results of socio-economic survey, most fishermen were interested in having training in various aspects such as starting a business, tailoring, putting up barber shop, cooking, etc. So, building the capacity of community fisheries members is very important to help the fishermen in managing the fisheries resources in the right track, improving businesses practices, and diversifying occupations in their villages. Teaching people how to catch fish is better than giving them fish to eat.

For the second objective, development of people's participation in resources management and community development can solve the problem on lack of people's participation in community fisheries organization. The fishers felt that the authority has put little effort in preventing illegal fishing (socio-economic survey), so the project objective therefore was able to encourage the concerned agencies especially the fisheries officers to prevent illegal fishing in CFs fishing grounds.

The income from fishing is insufficient to support fisher's families. Alleviation of poverty through creation of job opportunities is therefore very important because everybody needs food in order to live. Without enough food, it is very difficult to encourage people to participate in natural resources management.

3.2.3 *Specification of targets*

The target area, Toeuk Tla commune, was selected carefully by concerned parties (SEAFDEC /TD, fisheries officers, and CFs) based on clear and practical reasons that include:

- Fisheries resources were declining
- Illegal fishing was operating in this area and fishermen conducted patrolling voluntarily to protect the fisheries resources themselves.
- Community fisheries structure was available

3.2.4 Identification of beneficiaries

All 1,683 fishermen (37% of total population in the commune) in Toeuk Tla commune are the direct beneficiaries of this project. They have been operating the crab trap, fish trap, crab gill net, gill net, hook, hand push net, blood cockle collection, etc. Besides the direct beneficiaries, additional 2,816 villagers were the indirect beneficiaries because they are the fishermen's family members, middlemen and local traders, and services providers in the commune.

3.2.5 Prospects for sustainability

Based on the project structure, all concerned agencies were involved in managing and operating the project such as the Fisheries Administration, Provincial Department of Agriculture, Fisheries Administration Cantonment Kompong Som, Commune Council, JICA fisheries project and Community Fisheries. Such structure has made it conducive for the future prospect of sustainability when the project is terminated. For example, if the project fisheries office and Commune Council can assist the CFs through the integration of CF activities into the annual commune plan to be financed by other donors especially DANIDA. For fishing issues, the FiA can take over all fisheries project activities implemented by the project such as mangrove plantation, crab bank, fisheries resources protection from illegal fishing and aquaculture activities. For local business related to agriculture, the Department of Agriculture would be able to continue the activities.

3.3 Efficiency and adequacy of the project implementation could include:

3.3.1 Availability of funds as compared with budget from both the donors (Japanese Trust Fund through SEAFDEC/TD and the Grassroots Grant Aid through the Japanese Embassy) and national components (FiA Cambodia through Kompong Som FiA Cantonment)

The audit report concerning budget disbursement of the Grassroots Grant Aid indicated that \$11,402 was used only for facilities and equipment such as crab pond, small house for guarding, kitchen equipment, batteries, pump engine, pump hose, nets, traps, wooden boat, and water container, among others. All equipments are considered good enough to run the mud crab culture in Community Fisheries Prey Nup II. According to the team's observation, all equipments have been used until the period of evaluation. It was also indicated that all equipments provided by the Japanese Embassy were fully used.

For the SEAFDEC side, according to the annual report, the annual budget of SEAFDEC for year 2005, 2006, 2007, 2008 were \$46,380, \$27,735, \$33,574 and \$41,460, respectively. The annual budget was adequate to operate the project in an efficient way.

For FiA, the official data of its budget contribution could not be found in the annual reports. But based on estimation, FiA contributed around \$5000 to \$6000.

3.3.2 The quality and timeliness of input and output delivery by SEAFDEC/TD, Japanese Embassy, FiA Cambodia and FD Sihanoukville

Most activities of this project are well planned and achieved the objectives. The input and output agreed by SEAFDEC and Japanese Embassy are almost consistent and delivered within the specific time agreed. On the part of FiA, although some input and output were delayed, delivering had only a small deviation from the specific time frame. Generally, all concerned parties cooperate well to implement the project.

3.3.3 Managerial and work efficiency of the project team

Based on the results of interview with the community leaders and all key persons involved in mushroom production, mud crab culture, fish culture, and crab bank, they indicated that the national project team worked hard in coordinating and managing the project activities. They expressed their appreciation to the national project team who always work very closely and friendly with CFs members to guide them in implementing the activities of the projects. However, the mud crab and sea bass culture groups complained that the national project team did not have enough capability to assist them on the technical aspects of aquaculture, fish diseases management and non-drug administration.

The minutes of the ICC and SC meetings indicated that the national project team leader did not fulfil some suggestions made by SEAFDEC and the Fisheries Administration such as lack of communication with SEAFDEC and delaying some activities (posters, video spot and reporting actual activities to the project leader).

For the SEAFDEC team, all the interviewees expressed their appreciation on the strict control of budget management using a simple accounting system. All groups including the mushroom and mud crab groups realized and understood the need to spend the funds in a transparent way and with economic orientation. Based on the results of the interview with local authorities, they indicated that SEAFDEC always works very closely with local authorities in terms of decision making on the project activities at local level. As mentioned by the Sangkat Chief, he has never seen other NGOs requesting his sangkat to participate in their project activities, except SEAFDEC.

Based the ICC and SC meeting reports, SEAFDEC has been using a very good way for checking the progress of the project activities and the commitments by all members as indicated in the reports of the previous meetings. The problems raised during the project implementation were always discussed and solutions are suggested.

3.3.4 implementation difficulties at the national, provincial and local levels

- a) National level
 - Limitation of budget
 - Some activities planned by SEAFDEC were not reflected in the fiscal budget, so that these activities were pending until the next fiscal year.

- b) Provincial level
 - Project site is far from the fisheries office, so it is very difficult to intervene on time such as the aspect on illegal fishing
 - Limitation of budget

- c) Local level
- Illegal fishing still operates in the community fishing ground
 - Community fisheries members are so busy in fishing, it is difficult for them to participate in the project activities
 - Lack of full cooperation from community fisheries members
 - Lack of responsibility of the community fisheries leader
 - Community fisheries did not have any budget so it depended completely on the project budget
 - Lack of unity among the group members (mud crab, sea bass, mushroom)

3.3.5 Adequacy of monitoring and reporting

Reporting:

Generally, the project prepared 6-month and annual reports which cover all activities implemented during the six months and one year periods. These reports were considered as adequate documents for managing the project in a very good condition. The reports were written in simple format, logic, practical works, adequate contents and consistent to immediate and annual work plans.

The minutes of the ICC and SC meetings reflected all the comments and suggestions from the participants. The matters arising from the minutes of previous meetings are raised and the progress made since the previous meetings are discussed so that the problems are identified and solved in an efficient way. So the conduct of the ICC and SC meetings has been very efficient.

Trip reports were also prepared after every trip and the contents of the reports are clear and adequate.

Scientific reports were also produced such as mud crab culture monitoring, mushroom growing, blood cockle survey, socio economic survey, and fish landing survey. These reports were prepared in a scientific manner with illustration charts, tables and descriptions. These documents would be useful for students conducting thesis research and could also be used by fisheries staff to improve their knowledge and skills on various fisheries issues.

Generally, the reports prepared by the project were adequate but during the evaluation period, only the English versions of the reports were found except the socio-economic report and the project document. According to the results of the interview with the national project team leader, he acknowledged that the Fisheries Administration and SEAFDEC assigned the national team to translate all documents into the Khmer language but this has not been accomplished due to the present workload of the team. In spite of the reported heavy workload as mentioned by the national project team leader, translation of the reports into the Khmer language is very important and should be taken into account.

Monitoring:

Monitoring works were conducted by the community fisheries, project extension worker, national team leader and SEAFDEC. The community fisheries (mud crab culture group, mushroom group, and crab bank group) were requested by the project to record all daily activities in each

group including budget transaction. Monitoring sheets were prepared in Khmer language and distributed to all groups such as production ledger, general ledger, stocking, etc.

One extension worker has been assigned to monitor all the group activities every day to make sure that all activities are smoothly implemented. Every week, the national project team leader monitors all the progress reported by the extension worker. Any discrepancy between the report and the real work would be settled by the team leader. The team leader must report all activities to SEAFDEC every month.

The SEAFDEC team also visits the project site 3 or 4 times a year to monitor and verify the progress submitted by the team leader, the budget and expenditures, and the accounting by all groups. Generally, the monitoring system applied by the project is very strict and it is useful for managing the project in the proper and transparent way, and it will also encourage the community members to take into consideration such business orientation (changing spending practices as in the past).

However, the evaluation team found some problems such as:

- Sea bass culture group did not record the daily activities, they record only the transactions
- Data from the fish landing survey were not well recorded
- No summary of monitoring sheet was found

3.3.6 Extent of national support and commitment, and quality and quantity of administrative and technical supports by the national government and the local government offices

All concerned agencies provide enough support to the CF:

- JICA expert provided technical assistance on aquaculture
- FiA supported some part of the budget and human resources to help CFs in implementing fisheries management. FiA commits to follow up the activities conducted by SEAFDEC after SEAFDEC terminates its involvement in the project
- Local authority has expressed supporting the project activities and promised to find opportunity to integrate CFAMP into the commune council development program

3.4 Project results

3.4.1 Regular fish landing and marine resources monitoring surveys

a) Regular fish landing:

The fish landing data collection system in Community Fisheries (Sangkat) Teuk Thla had been developed by the cooperative work among DOF/Cambodia staff, SEAFDEC/TD staff and middle man in the project site starting February 2006 with the objective of monitoring the fishery resources in the fishing ground of Community Fisheries Teuk Thla. The reports were published in December 2007 and distributed to relevant agencies.

Recording system

Sampling method is reasonable because 4 enumerators were chosen from the main middlemen that represent the fishing characteristics of each village. This method has

achieved acceptable accuracy with low cost. Recording system used was very simple, using two types of simple logbooks: crab trap logbook and catch logbook (for other types of fishing gear). All enumerators were trained by SEAFDEC specialist, so that they had enough capacity to record daily the fish catch sold by fishermen.

Report publication and application

The essences of the report were described in statistical way with scientific values which can be used for understanding and managing the current status of marine fisheries in the fishing area of the community fisheries in Prey Nup II. Based on the results, the fisheries administration and community fisheries Prey Nup II receive enough information on the current situation of the marine fisheries that would enable them to find the correct and efficient solutions to the problems. Moreover, the report format can also be used for further study by fisheries officers and university students.

However, the publications are too small without colored diagrams and pictures, so it is difficult for readers to comprehend. This report should be printed in color and the size should be large enough for easy reading and making it attractive. Moreover, only the English version of the report was found, so most of the national fisheries staff could not fully understand the English version. Based on the interview with fisheries staff, they could not understand the essence in the report because everything was written in English. So translating this report and printing in the Khmer language is necessary.

b) Baseline survey

A preliminary socio-economic survey was conducted on 14th – 17th March 2005 in Commune Teuk Tla consistent with the tentative project work-plan, in order to understand the socio-economic conditions in the project operational area. The rapid survey that was employed this time is essential and conducive for outsiders to learn, in a short period, about a community, an area or an activity or possibly specific problems they knew little about and, therefore, it constitutes an essential step for the commencement of any project involving community development.

It is very necessary that the project conducted this survey because its result serves as milestone for the project to measure the degree of achievement based on the period of the project operation.

Data collection

In general, the indicators used in the survey are considered as strong enough to analyze the socio-economic status of community fisheries Prey Nup II. The national staff designated to conduct this survey came from fisheries offices (local and central staff) so that they have sufficient capacity to get information from the fishermen in an accurate way. SEAFDEC staff also came along with national staff in interviewing the fishermen making it more convenient for them to compile and analyze the data.

Regarding the sampling method, 112 samples (13% of total population in the commune) is considered high enough to represent the characteristics of the total

population in community Prey Nub II. Additionally, the number of respondents was distributed proportionately for each village.

Report publication and application

The report was published in English and Khmer, so national and international readers can use the report easily. All indicators were analyzed using very clear graphics, tables and descriptions. The analysis model is quite simple so that fisheries staff can understand well the essence of the report.

The report is very useful for socio-economic researchers, fisheries staff and other concerned workers to be used as reference. It can also be used as a standard of socio-economic report for fisheries.

However, the essence of the report was based only on the data collected at the field through questionnaire survey. Other sources of information such as group discussions, key informant interviews were not found in this report. Normally, the information collected from only one source may not be enough to prove the reality of the socio-economic status of the fishermen.

The survey used only the fisheries staff, but the fishermen were not invited to participate in the survey and be trained on the procedures. Local or indigenous knowledge were ignored, so it may affect the future capacity in supporting the Integrated Coastal Resources Management. Local people should be involved in the research activities in order to enhance their capacity and ownership in resources management.

c) Monitoring survey

The socio-economic monitoring survey was conducted, but report was not found. So SEAFDEC should finish this report on time because it is very important to inform the fishermen if their living standard has improved after the project termination.

3.4.2 Community-based resources management (CBRM)

a) Community Fisheries Management Plan

Formulation

Community Fisheries Area Management Plan (CFAMP) and other related documents like Internal Law (I/L), By-Laws (B/L), Community Fisheries Zoning Map (CFZM) were completed and endorsed by the Governor of Sihanoukville (now Preah Sihanouk Province). However, following the Guideline of the Community Fisheries amended in 2007, the related documents such as the Internal Law (I/L) and By-law (B/L), List of CF members, structure of the Community Fisheries Committee, Community Fisheries Area Management Plan (CFAMP), and Community Fishing Area Agreement (CFAA) were finalized and submitted to the newly reorganized office, the Kampong Som FiA Cantonment (KSFC). This document was signed by KSFS, but it still needs formal endorsement from the Ministry of Agriculture, Forestry and Fisheries.

The current scale of the zoning map is 1/60,000, which should have been 1/50,000 to be consistent with the guideline.

The formulation of CFAMP passed through very long discussion and consultation among the concerned parties including the Community Fisheries members, Sangkat, District Fisheries and Agriculture Department, and the Provincial Governor. This process is quite long but it is very good that all parties concerned participate in drafting, discussing and endorsing the CFAMP. It also reflects the concept of integrated coastal resources management and makes it more convenient for the CF in implementing the CFAMP. Based on the draft provided by a fisheries officer, many amendments were found before getting the approval from the Governor of Preah Sihanouk Province.

Implementation

After the CFAMP was endorsed by the Governor of Preah Sihanouk Province since 2007, various activities were implemented well such as law enforcement, mangrove plantation, and local business. However, the level of achievement is still limited. Based on the internal rule, CF members have the obligation to contribute small amount into the CF cashier. But until now, the CF cashier is still empty. Practically, CF budget is very important to sustain their activities after the project termination.

Most CF committee members complained about the lack responsibility of the CF leader who always forgets his duty. Based on the results of the interview, most CF members expressed pessimism about the membership fee collection because of some reasons that include:

- Lack of confidence in the CF leader in spending the CF budget
- Illegal fishing activities from outside are still operating in the CF fishing ground
- Limitation of members' awareness on fee collection

b) Local enforcement unit

Local enforcement unit works hard to protect the mangrove forests and the fisheries resources. Great achievements have been made, such as maintaining the mangrove forests in good condition and confiscating large amount of produce from illegal fishing.

Mangrove protection

According to the result of the interview, mangrove forest in Community Fisheries Prey Nup II has been protected well. Local authority also acknowledges the achievement of CF members in protecting the mangrove forest because of some reasons that include:

- CF members understand well the importance of mangrove forest for their livelihood
- CF members frequently conduct patrolling of their fishing ground
- Strong support from local authority and fisheries officers

Fishing ground protection

With support from SEAFDEC (gasoline 25 liters/month) and the Fisheries Administration, the enforcement unit confiscated many fishing gears such as clam drag net by engine, and engine push net. The results of the local enforcement unit indicated the high spirit of the CF members in participating voluntarily in fisheries resources management. It had also demonstrated the good collaboration between CF members and the fisheries officers.

Based on the result of interview with local authority, illegal fishing had strongly decreased compared with the period before the project implementation. In term of fish catch, most of the interviewers expressed optimistic on daily catch because now they can get a very stable income from fishing and their living standard is slightly increasing. Evidentially, now most of fishermen are changing from rowing boat to engine boat base on their saving budget from fishing.

Based on the results of the landing survey, it was found that the fishing ground for small number crab trap fisherman shows good signs of increasing swimming crab resources while the number of fishermen owning 100- 250 traps remained stable. For Marsh clams, the CPUE of Marsh clams collected by hand also shows good signs. However, the blood cockle resources show a negative trend which need to be taken into consideration.

Both data based on the fishermen's perception and landing survey indicated improvement of the fisheries resources

Besides the good achievement motioned above, some weak points were also noted, such as:

- Fisheries resources are still under threat because of illegal fishing activities from outsiders
- The level of cooperation between CFs and Fisheries Administration Division Prey Nup is still limited
- Lack of intervention from Fisheries Administration Division Prey Nup on illegal fishing activities
- Local enforcement unit totally depends on gasoline provided by SEAFDEC for patrolling, so when the involvement of SEAFDEC in the project is terminated, the LEU may face some difficulties or even stop their activities

c) Resource enhancement activities

For resource enhancement, the project conducted 3 activities such as mangrove reforestation, fish refugia establishment and crab bank system.

Mangrove reforestation:

Mangrove plantation conducted by the project is a very good activity aimed at encouraging fishermen and children to understand more about the importance of natural resources for their livelihood. This activity can motivate people to participate in the efforts of protecting the mangrove forest.

Khoh Angko

The first mangrove plantation day was set on 5 December 2007 which included an educational session for school children who would be responsible for environmental protection in the future. On that day, about 200 school students and 50 fishermen participated in the event and 1,000 mangrove seedlings *Rhizophora* were planted in Khos Angko.

Based on field visit, around 40% of the planted mangroves still survive but the growth rate seems very slow. Some of the reasons were identified as follows:

- Naturally, *Rhizophora* species generally live in inter-tidal areas which are inundated daily by the ocean water. But Khos Ankor is permanently under sea water. So it is not appropriate to plant this species in this area.
- The mangroves have been monitored occasionally.

Prek Pros

The mangrove plantation day was set on 26 December 2008 which included an educational session for school children who would be responsible for environmental protection in the future. On that day, about 200 school students and 50 fishermen participated in the event and 1,000 mangrove seedlings were planted in the swamps of Prey Sangke. All participants were provided with T-shirts showing the campaign logo for mangrove plantation. Prior to this occasion, members of the Community Fisheries Prey Nup II have dedicated their efforts in bringing up for a few months a total of 1,000 mangrove seedlings in plastic bags.

Based on field observation, this area is suitable for planting because it is located in an inter-tidal area. However, most of mangrove seedlings planted disappeared because people pulled out the seedlings. The planting site has been claimed by one family who owns this land long time ago. So choosing this place for planting mangrove may not be appropriate.

Crab Bank Establishment

Crab bank system was conducted in two areas, one in Prek Pros and other in Prek Sangke. The initiative of establishing the crab bank was considered a very good way to maintain the swimming crab stock in a sustainable way.

Based on the results of the interview, positive points were noted such as:

- Fishermen are participating in this program voluntarily. It means that they bring the gravid crabs and put in the cage free of charge. In some places, gravid crabs were bought from fishermen to stock in the cage. In fact, buying system was not successful because the fund for buying was not available. The way that SEAFDEC introduced in Prey Nup II can be sustained because people understand and volunteer to release gravid crabs.
- Crab bank leaders are working hard to encourage all members to release more crabs. Without getting any direct profit from working in the crab bank, they sacrifice their efforts to collect gravid crabs.
- All interviewees expressed their appreciation on the implementation of the crab bank system because after establishing the crab bank they found a lot of baby crabs in their fishing ground. The abundance of small crab makes

fishermen believe on the sustainability of the crab bank system. Moreover, they promised to bring more gravid crabs to be put in the cage.

To conclude the success of the crab bank system in a short period of time may be premature. It needs to be investigated in 2 or 3 years continuously before coming up with any conclusion. However, the progress signaled at the beginning is a good starting point for future work.

Beside positive points, some weak points were also discovered such as:

- Fishermen still collect small crabs to sell to middlemen
- No action from fisheries officers to prohibit buying and selling small crabs
- Level of contribution from fishermen is still limited (small amount of crabs were contributed)
- Crab bank group rely on SEAFDEC to provide the crab feeds. Until now, the group has not found any financial sources for feeding crabs especially after the involvement of SEAFDEC in the project is terminated
- Crab bank management structure is still a new concept

Fish Refugia

Based on the field survey and biannual reports, success points were found, which include:

- The establishment of Fish Refugia was thoroughly discussed among the members and fisheries officers
- Self-regulatory measure was developed and implemented. All middlemen are using sieve provided by the project to screen the size of the bivalves sold by the fishermen. The small sized bivalves were returned to the fishermen.
- Based on the results of interview with middlemen, the fishermen now bring only big size cockles for sale to the middlemen
- Fish refugia posters were distributed to CFs, local authority and fisheries administration
- Fish refugia group members work voluntarily in educating blood cockle collectors to follow the self-regulatory measures
- Dissemination of self-regulatory measures was conducted at five neighboring community fisheries.

However, some weak points were discovered, such as:

- Based on actual visit to the fishing ground, a small number of blood cockle collectors still collect the small size cockles for home consumption since this size is rejected by middlemen
- Demarcation of refugia boundary is still pending making it difficult to fully implement self regulatory measures. Especially, some committee members still have not yet recognized clearly the refugia zone.
- Even if the middlemen refuse to buy the small size cockles, some fishermen may still collect the small ones to sell in the local market especially Trapain Ropov market. In fact, small blood cockles were found in this market and

Veal Renh without any actions taken by the fisheries officers to prohibit such kind of business.

- Clam drag net with engine is still found in the refugia zone, so it is difficult to encourage cockle hand-collectors to follow the self-regulatory measures.

Obstacle objects

Based on the biannual report, in conjunction with establishment of the fish refugia for blood cockle, the main concern of the fishers is on how to protect the area from invasion of illegal fishing boats especially those with mechanical cockle dredgers. The Local Enforcement Unit has been exerting their maximum efforts in arresting a number of dredgers, but invasions by illegal fishers are still rampant. To cope with such situation, it was decided that the most effective way would be the installment of some objects in the demarcated zone that could obstruct the incoming illegal fishing boats.

As a result, 25 pieces of object to serve as obstacles were constructed and being readied for installing in the fishing ground. Based on the group discussion with fishermen, they were very happy to note the planned installation of obstacles in their fishing ground. They hope that illegal fishing will be fully vanished, so they can catch more fish.

However, the installation of obstacle-objects is still pending because the fisheries administration did not plan the installation budget for fiscal year 2009. Prolonging installation of obstacle-objects make the fishermen feel disappointed. Moreover, one 500 kg obstacle object is very heavy to install in muddy fishing ground. To keep this object stay at the bottom is very hard to predict. Generally, in muddy bottom conditions, heavy object sinks into the mud, so it may not be efficient to protect illegal fishing activities in the refugia zone.

3.4.3 Local business development

a) Mushroom Producer Group

Based on field survey, very successful business operated by the women's group was found:

- Mushroom production is still continuing. New materials and new packages were purchased to produce more mushrooms
- The group did not face any difficulties in selling their products and the price of mushroom is reasonable. It means that their business is going on economically
- The group started to use the income from mushroom to diversify to other business opportunities such as providing loans to non-group members, buying-and-selling rice, raising animals, etc.
- Now the living standard of the group members is improved
- Not only group members get the benefit from mushroom production, children can learn and get income from packaging the mushroom. Based on the result of interview with an authority leader, he expressed his appreciation on the mushroom production

because this business provides additional income for his people especially that around 50 children are also able to produce mushrooms.

In terms of future sustainability, the project established Mushroom Producers' Group (MPG) in order to take responsibility when SEAFDEC's involvement in the project is terminated. Now, MPG is functioning well such as purchasing raw materials, technical and experiences sharing and market information sharing. Furthermore, MPG is playing an important role in distributing good quality of spores to the group members at an acceptable price.

Great successes were found, but some weaknesses were also observed such as:

- MPG is still new and lack of experience
- The group members are still the same as before. It means that production capacity has not expanded yet, so only group members can get direct benefit from mushroom production
- One group member stopped production without giving any acceptable reasons and the money acquired from sale of mushrooms could not be returned to the other members to continue production. SEAFDC did not take any action to claim back the money from those who stopped their production.

3.4.4 Community volunteer work

Community volunteer work was conducted through mangrove reforestation, patrolling, crab bank establishment, and fish refugia. Without voluntarily participation from community members, all activities could not have been implemented successfully.

However, the community volunteer work was not conducted enough, for example environmental awareness programs were found only during the mangrove reforestation campaign. Other activities were not conducted such as waste management, beach cleaning, etc.

3.4.5 Managerial capacity of the CF Prey Nup II in carrying out CBRM and community development

a) Business development

Mushroom producers' group

Mushroom producers' group was capable in managing the business activities efficiently. The evidences show that:

- they have enough capability to record business transactions properly
- they have good working spirit as a group
- they have enough experiences in producing mushrooms and spores
- they know the situation of the competition in the market(mushroom price mechanism)

Mud crab culture

- Enough knowledge and experiences in mud crab culture
- Being able to use technical equipment such as saline meter, pH, NO₂, NO₃, NH₄, H₂S, tidal range measure.
- Being able to record data in the general ledger

Sea bass culture

During the evaluation period, the sea bass group did not show any capacity in running and managing sea bass culture.

b) Community volunteer work

Based on the past volunteer work, the Community Fisheries committee is considered strong enough to conduct any kind of volunteer work. Based on the results of the interview, the committee members expressed confidence in managing volunteer works, but they need strong collaboration from local authority and the fisheries administration.

c) Administration of the CF

After the project started until now, most of the community fisheries committee members are able to:

- Understand all community issues
- Write minutes of meetings, monthly progress reports and meeting reports
- Disseminate their knowledge to other members. Several CF in Cambodia and NGOs came to visit and learn about the experiences in managing the CF Prey Nup II
- Write suggestions to local authority and fisheries administration
- Write a small proposal to other NGOs to conduct training course on CF management
- Suggest inserting community activities in the decentralization program at the sangkat level

3.4.6 Awareness building among beneficiaries on CBRM and total community development

Most of beneficiaries understand well the CBRM concept and total community development, because they are frequently involved in these activities especially that they also participated in the fishers' workshops, local seminars and mangrove plantation and local business development. Comparing the level of understanding about CBRM, CFs in Prek Sangke and Prek Pros were considered having high level of understanding. But for Kampong Chin and Prek Toal this level is still low, because most of the project activities were located in Prek Pros and Prek Sangke. So this is the weak point that the project should consider, i.e. allocating the activities equally among the target areas (Kampong Chin, Prek Toal, Prek Sangke and Prek Pros).

3.4.7 Motivation towards voluntary participation in CBRM and community development work among beneficiaries

Based on the results of the interview, most of beneficiaries are willing to participate in CBRM especially in protecting the mangrove forest and the fishing ground from illegal fishing. If illegal fishing by outsiders is totally eradicated, they expressed their strong willingness to participate in the CBRM.

3.4.8 Public relations

Community Fisheries Prey Nup II has good relationship with the fisheries administration, local authority, other NGOs and academic institution. Every year, visitors came to learn from the experiences of CF Prey Nup II. Several TV program coordinators came to take video spots and show these on TV, especially the Bayon TV (a very famous TV channel).

CFs members were invited by several NGOs to participate in many training courses, field trips, workshops and fisheries forums.

3.4.9 Development of framework and mechanism to ensure the sustainability of CBRM and community development beyond immediate SEAFDEC/TD and FiA support

Development of framework to ensure the sustainability of CBRM was not found, but some mechanism have been introduced by the fisheries administration in the following aspects:

- Contact with local authority to integrate CFAMP into commune council development program with funding from the Royal Government of Cambodia and DANIDA
- Commit to follow up SEAFDEC activities such as crab bank, aquaculture, mushroom production, environmental campaign .etc.
- Department of Community Fisheries Development, FiA will be involved more in the development of CF Prey Nup II.

IV. Conclusion

4.1 Project design

In general, the design of the project activities reflected the real situation of the fishermen's problems and needs. However, fishing technology improvement is not appropriate to be introduced in the current fishing ground because the current law does not allow new fishing gear to be operated in the fishing ground. The project document was considered as a result of good collaboration works between SEAFDEC/TD, the Fisheries Administration and community fisheries leader. The strong participation and commitment from concerned agencies and CF, are the key success factors in the natural resources management which SEAFDEC/TD took into consideration. Even the project document was designed in a systematic way, where some weak points were explored, for instance local authorities were not in the list of discussion meeting and only CFs leader was invited.

4.2 Project results

Most of the activities of this project are well planned and achieved the objectives. The input and output agreed by SEAFDEC and the Japanese Embassy is almost consistent and were delivered within the specific time agreed. For FiA's part, even with some delays in the input and output,

delivery of the results had only a small deviation from the specific time frame. Generally, all concerned parties cooperate well to implement the project.

Generally, the project team works very efficiently in coordinating the project activities as well as adopts strict control on budget expenditures by the local business groups. One weak point should however, be considered especially the national staff which are not strongly prepared in adopting the aquaculture techniques.

Baseline and landing surveys were conducted in a scientific manner which provide baseline for assessing the achievement of the project and also provided the information on the status of the fisheries for decision making especially for the FiA to develop the strategies in fisheries resources management. However, some methodologies used in implementing the activities may need to be adjusted before these are applied in other places.

For local business, the project attains great achievement in sustaining mushroom production. It provides opportunities for CFs to generate additional income, to diversify local jobs, and to increase agriculture production in the community fisheries.

The minutes of the Project Steering Committee and ICC meetings; Biannual Project Progress Reports and travel reports were prepared in very good format, sufficiently clear and adequate. These are very useful to manage the project in a proper way. This kind of minutes and reports can be used as reference for fisheries staff.

The application of CFAMP is still limited and CFs seems not ready yet to implement it if there is no assistance from outside. In this case, FiA's role become more important to assist the CFs in implementing CFAMP successfully.

For local enforcement unit, it is very important and necessary to protect the fisheries resources. The unit has great achievement in protecting the mangrove forest keeping it in very good condition. Practically, illegal fishing activities decreased considerably compared with the status before the project period. However, the existing illegal fishing should be taken into consideration not only by CFs, but by fisheries officers and local authority.

To enhance the fisheries resources, the project carried out very useful activities such as crab bank, fish refugia, mangrove plantation and installation of obstacle-objects. Planting mangroves not only provides habitats for fish but also promotes the people's awareness on resources conservation as well. However, mangrove plantation by the project could not be considered useful because of lack of consideration on the social problems as well as on the technical aspects.

The crab bank system could be considered very successful and can be sustained after the project completion. People's perception acknowledged the impact of crab bank on the swimming crab stock. However, it would need some time to study the impact of the crab bank system.

For fish refugia, it is accepted by local fishermen because it can protect the blood cockle resources for their future livelihood. This activity was well prepared, but it just started. It needs more time to see the impact of the refugia. Moreover, installing obstacle-objects can also reduce illegal fishing, but the design and materials may not suitable for the CFs fishing ground (muddy bottom). So before introducing this kind of obstacles, the sea bottom conditions of the site should be studied clearly.

4.3 Marine biological impact given to coastal fishery resources

Some stocks such as the swimming crabs indicated slight improvement. Clam resources also show good signs in terms of increased CPUE. The people believe that the swimming crab stock has increased after the establishment of crab bank. Mangrove is well protected, so habitat is maintained in good condition for the sustainability of the fisheries resources.

4.4 Socio-economic impact to the fishing communities

It is difficult to quantify the socio-economic changes because no data was made available. However, the people's perception acknowledged the stable income in fisheries. Moreover, community fisheries Prey Nup II has benefited from the overall development in relation to increased awareness in CBRM. Technical skills were improved through mushroom growing and aquaculture development. Leadership and managerial capacity of the CFs leader were improved. Relationship between CFs and fisheries officer as well as local authorities has also been improved.

V. RECOMENDATIONS

- 1) Obstacle-objects should be installed and their impact on fisheries resources should be assessed
- 2) All project documents should be translated in the Khmer language
- 3) CFs should be utilized and involved in any kind of survey
- 4) A study to monitor the effectiveness of the crab bank should be conducted
- 5) FiA should continue supporting the crab bank group in terms of administration as well as in financial aspect
- 6) FiA should assist and strengthen the local enforcement unit
- 7) FiA should prepare the budget in fiscal year 2010 to continue the project's activities
- 8) FiA Division Prey Nup should continue patrolling the fishing ground more frequently to arrest illegal fishers with participation from community fisheries
- 9) Mangrove reforestation should be monitored frequently. Species and site selection should be taken into account before planting the seedlings
- 10) Information dissemination could be further enhanced through the publication of technical papers, non-technical papers, extension documents, flyers, brochures as well as through the electronic media
- 11) Public awareness and education on the community fishery management and resources conservation should be improved and continued
- 12) Community Fisheries Prey Nup II should work very closely with fisheries officers and local authority in order to incorporate CFAMP into the commune council development program
- 13) FiA should find other NGOs to support some activities of the project such as fish refugia

