

Biannual Project Progress Report

- Project title** : **Integrated Coastal Resources Management in Shihanoukville (ICRM – SV)**
- Program Categories** : Program under the ASEAN-SEAFDEC FCG Mechanism
- Program Title** : Capacity Building of Human Resources and Participation in Integrated Coastal Resources Management
- Duration of Project** : 3 years and 2 months from November 2005 to December 2008
- Executing Agency** : SEAFDEC/TD in collaboration with The Fisheries Administration (FiA), Ministry of Agriculture, Forestry and Fisheries, Cambodia
- Funding Agency** : The Japanese Trust Fund (FCG Scheme and Special 5-year Program)
FiA Cambodia (Co-financing)
Japanese Grassroots Level Aid (Japanese Embassy)
- Proposed Budget (2008 only)** : USD 41,460 (Under the Japanese Trust Fund IV)
USD ? (FiA Cambodia Input)
- Reporting period** : **January to June 2008**

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1. GENERAL ACCOUNT

In general, the project has progressed on the right track in line with the project document.

The FiA Cambodia changed its governing structure with the creation of the new division called “Inspectorate Division”, which is responsible for fisheries development at the provincial level. In line with this restructuring, Kampong Som FiA Cantonment (KSFC) was created in place of the old Fisheries Office of Sihanoukville Municipality.

The Community Fisheries Area Management Plan (CFAMP) was submitted to KSFC and the approval was pending subject to the amendment of the Community Fishing Ground Map.

Fish landing survey had been continued. The fish landing data in 2006/2007 was published.

The patrolling activity by LEU was limited due to the mechanical troubles of the patrol boat.

The study tour to Stung Hao to observe Crab Bank activity was conducted on 5th April 2008.

The study tour to Kompot Province to observe mud-crab culturing activity was conducted on 8th April 2008.

The Mushroom Producers Group (MPG) was established. The pace of mushroom production was sluggish toward the end of 2007, but it has been improving in 2008.

The 2nd trial of mud-crab fattening was completed in February 2008 with a disappointing outcome.

The Blood Cockle Fishing Group (BCFG) was established within the framework of fish refugia.

The Crab Bank Group (CBG) was organized and releasing of gravid crab commenced.

The Fish Cage Culturing Group (FCCG) was organized and the feasibility study on sea-bass culture was conducted.

The 5th SC Meeting was held on 20th February 2008.

The 6th ICC Meeting was convened on 20th June 2008.

2. ACTIVITIES

The project has progressed on the right track as seen in the project activity monitoring sheet (Annex 1).

2.1 Baseline/monitoring survey

Fish landing data collection

The fish landing data collection has been regularly conducted everyday by designated enumerators in fish landing stations. The data collected were sent to SEAFDEC/TD for analysis and compilation.

The data obtained from February 2006 through September 2007 were analyzed and compiled in December 2007, and published in June 2008. The findings indicated some important trends of the fishery resources dynamics in 2006 and 2007, although the data collected seemed incomplete and insufficient.

2.2 Encourage and extend locally based fishery resources management

Community Fisheries Area Management Plan (CFAMP)

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). However, its formal endorsement has been pending until the amendment of zoning map is completed. The current scale of the zoning map is 1/60,000, which should have been 1/50,000 to be consistent with the guideline. Prior to the formal promulgation, the implementation of CFAMP could be put in practice on ad-hoc base.

The formation of Community Fisheries Coordination Committee (CFCC) was discussed at the 3rd SC meeting held in March 2007. Consistent with the provisions in the Sub-Decree of Community Fisheries, the CFCC should be formed to pursue fisheries resources management matters. Although there was certain confusion among the SC members in the past on the expected roles of CFCC and the Community Fisheries Committee (CFC), after the clarification made by the officers of CFDO of the FiA, it was understood that the timely formation of a CFCC was necessary. It was further agreed that for the time being the ICC meeting of the project would perform the functions of the CFCC instead. This issue was not further clarified at the 4th SC meeting and the formation of the CFCC was still left pending.

Local Enforcement Unit (LEU)

Patrolling by the LEU has been suspended from time to time due to the mechanical troubles of the patrol boat. To improve the situation, it was proposed at the 5th ICC meeting held on 20 June 2008 that the FiA should provide a new engine. The representative of the FiA agreed to this proposal, as it is expected to regularize the patrolling activity particularly against illegal fishing. This is more vital at this particular occasion when the project has established the fish refugia for blood cockle and with the increasing numbers of illegal fishing boats observed with their dredges in the demarcated zone. The self-motivated spirit among the fishermen in protecting their fishery resources is so high that the project and FiA should give more support.

During the reporting period, the result of patrolling by LEU is listed in Table 1.

Table 1: Result of Patrolling by LEU from Jan. to June 2008

<u>Violation</u>	<u>Cases</u>	<u>Punishment for violators</u>
1. Illegal fishing gear		
- Blood cockle dredge	8	Confiscation of dredges and catches Receiving lecture on law abiding
- Push net	14	Arrest
2. Mangrove felling	8	Write pledges not to do again
3. Digging ponds in mangrove forest	2	Write pledges not to do again

Establishment of the fish refugia

To follow up the recommendation made in the preliminary survey to establish fish refugia, the 8th Fishers Workshop was held on 19 February 2008 at the project site, which was participated by 25 blood cockle fishers and middlemen, mostly women. In this workshop, the outcome of the preliminary survey was briefly described and the objective to establish fish refugia was explained. The Blood Cockle Fishers Group (BCFG) was organized during this workshop, under the Community Fisheries Prey Nup II. The leader, 2 vice-leaders and the secretary were also elected. The number of members reached 25 at that time. However, it is reckoned that 60 fishers and 10 middlemen are engaged in blood cockle fishing in the project area and it is expected that more numbers would join to become members.

In the 2nd meeting held on 2nd April 2008, the self-regulatory measures to control blood cockle fishing were discussed in detail which would be subsequently incorporated into the Community Fisheries Area Management Plan (CFAMP). The essence of the controlling measures is the harvestable size limitation through the use of sieves and protection of fertile (gravid) shells during spawning season within the demarcated zone as fish refugia.

The self-regulatory measure was further discussed again for its practical application in the subsequent meeting held on 19th June 2008 in which the responsible officer of FiA for fish refugia was also present. A consensus among the members was reached during the meeting on the self-regulatory measure and the draft was submitted to the Cantonment for consultation toward the end of June for endorsement.

As to the zoning, there was an argument during the subsequent meetings of the BCFG on determining the size of the demarcated dimensions. The project initially suggested that the area covered should be 196 ha, while the FiA recommended 48.9 ha. Discussions with the members of BCFG were repeated over the months on the delineated location map. They insisted to initiate with a limited dimension of 20 ha based on their practical managerial capacity. Respecting their opinion, it was decided to demarcate the zone for fish refugia as shown in Annex 2. The draft of the self-regulatory measure for blood cockle fishing is also shown in this annex. The serial progress in the establishment of the Blood Cockle Group and formulation of the self-regulatory measures are described at length in the travel reports (Annex 3, 4 and 5).

An attempt to establish the *fish refugia* was partly consorted with the regional movement led by the regional project on Establishing a Regional System of Fisheries Refugia, being deployed under the regional project of the UNEP/GEF. As envisaged, this project would establish several fish refugia in the coastal zones from Cambodia to Vietnam.

Crab bank

Aimed at establishing a crab bank scheme, a consultation with relevant stakeholders was held at the 7th Fishers Workshop on 5 December 2007. During the workshop, three possible crab bank approaches were discussed, i.e. the Japanese model, Chumphon model and Langkawi model, which were demonstrated to the fishers prior to the commencement of the discussion. After the deliberation, they finally decided to employ the Chumphon model, which involves the stocking of gravid crab in a cage during the calm seasons until the eggs are hatched, while during the monsoon seasons gravid crabs are released directly into the water after being marked on their carapaces. The Crab Bank Group was established with 11 crab fishermen, and elected their leader, the sub-leader and the cashier. In the wake of the decision made and the group established as above, a follow-up

meeting was held on 18 February 2008. In this meeting, the practical preparatory work including the distribution of respective responsibilities and roles to each member was discussed. Also, the position of the cages for hatching gravid crab was mapped out in the sea. The detailed description of this workshop is included in Annex 3.

Meantime, the FiA Cambodia had shown keen interest to introduce the crab bank system along the coast line in Cambodia and, to begin with, the scheme was initiated in the sites; Stung Hao and Prey Nup in March 2008. They also submitted a proposal to FAO for expansion of the scheme including the study tour to Chumphon, Thailand.

The 2nd follow-up meeting was held with 16 members including new comers and an immediate action plan to start a crab bank operation was discussed, which included a study tour to Stung Hao, preparation of cages, procurement of necessary materials, installation of cages, etc. In addition, training on how to fill the logbook and maintain the accounting book – the general ledger was also conducted.

The study tour to Stung Hao was conducted to inspect the crab bank scheme initiated by FiA on 5th April 2008, with 16 members of Crab Bank Group participating in this study tour. The Stung Hao Crab Bank was initiated in March 2008 based on the model in Chumphon, Thailand. The cages were installed at the top of a jetty which makes easy access for feeding and stocking. The findings and observation results were presented by the leader and the vice leader at the 3rd meeting of the Crab Bank held on 19 June 2008 at the project site. The detailed description is included in Annex 5.

After returning back from the study tour, the members started constructing the cages to stock gravid crabs, with 12 members actively participating in the construction and the facilities were completed on 28 April 2008. The stocking of gravid crabs was initiated 16 May 2008 with 10 crabs released in a cage and 8 crabs were sold after hatching until 20th June 2008. The number of gravid crabs collected was relatively small which was beyond our expectation. However, it is similarly reported from the crab banks in Stung Hao and Pery Nup that the total numbers of gravid crab collected in May and June have noticeably reduced. It is not sure whether this was due to the natural phenomenon in these areas during this period or due to other causes.

Further, it could be suspected that the small number of gravid crabs collected is because the bank cages are installed near the village of Prey Sangke where crab gill net fishing is predominant and majority of the members are from this village. The survival rate of gravid crabs caught in the gill-net is extremely low compared with those caught by crab traps. Most of the members, 16 out of 22 (the total number of members increased to 22 towards the end of June 2008), are engaged in crab gill-net fishing. In this sense, more crab trap fishermen should be encouraged to join the scheme. With this implication in mind, the discussion was initiated with other crab trap fishermen in the village of Prey Pros to sound off the possibility of increasing the number of members.

2.3 Promotion of local business

2.3.1 Women's Group Activity

Mushroom production

The project had purchased required materials for mushroom production until April 2007 and coordinated a group purchasing until December 2007. However, toward the end of 2007 all

women's groups started the joint purchasing of necessary materials for mushroom production, as initiated through the coordination of the project extension officer. Since then, the groups had been encouraged to manage the procurement of necessary production materials and marketing of their products by themselves. In this sense, it was considered more beneficial and practical to organize an association under which joint procurement and marketing are coordinated in the same manner as that of a commercial venture. This matter was suggested during the 2nd Local Seminar held on 6 December 2007. Hence, all of them basically agreed to form a mushroom processors' association. In the wake of this movement, the meeting among the potential members of the association was held on 18 February 2008 to discuss the context of the proposed Internal Rules of the Association as well as its function and structure. The discussion was made on the basis of the draft rules prepared in Khmer and finalized as shown in Annex 6: Internal Rules of Mushroom Producers Group. They were of the view that the title of the group as "Association" was not appropriate and agreed to use "Group" instead. The official title of the group was eventually named as the "Mushroom Producers Group under Community Fisheries Prey Nup II (MPG)".

In the wake of the above preparatory meeting, the first general assembly of MPG was convened on 2nd April 2008. In this meeting, the provisions of the Internal Rules of the Group were unanimously endorsed by over two-thirds of the members present. Thus, the Rules of the MPG was adopted, after which the Leader, the vice-reader and the committee members including one from the CF were also elected consistent with the Rules.

Taking advantage of the occasion, a review of mushroom production in 2007 also took place. The production level in 2007 was comparatively sluggish and as seen in Fig. 1 and Table 2, the production had dwindled towards the end of 2007. Explanations for this inactive production were made by each group leaders, including (1) production rate of mushroom had been gradually slowing down, (2) low quality of spores as most new packets were spoilt or poorly produced, (3) strong windy days in November and December that caused mushroom spores to perish, and (4) no self-reliance in the procurement of necessary materials and equipment had been established as done by SEAFDEC in 2006. It is obvious that the monthly production rate had been reduced from 110.7 kg in 2006 to 72.6 kg in 2007. It is incredible that the average production rate per month in Kampong Chin, for instance, was 169.1 kg in 2006 but dwindled to only 80.9 kg in 2007. The average sale price also decreased from 2,667 Riel in 2006 to 2,251 Riel in 2007. This may be caused by the increased supply in the limited market. There were many other points that could be learned by the women's group based on the practical lessons from the operation in 2007. Particularly in terms of financial management, e.g. in Kampong Chin the gross income reduced from 1,498,000 Riel in 2006 to 690,000 Riel in 2007 but the amount shared increased from 500,000 Riel in 2006 to 1,047,100 Riel in 2007 which ended up with a deficit. Similar mismanagement was seen in the case of Prey Pros, i.e. 1,480,400 Riel shared against a gross income of 86,000 Riel in 2007, which makes a huge deficit in its account. All these were thoroughly discussed among the members and making best use of such experiences, they were convinced to resume the production level as that of 2006. In fact, as seen in Fig. 1, the production level from the beginning of 2008 has been increasing again. The course of discussion is described at length in Annex 4. The financial status is analyzed in Annex 7, which includes (1) Calculated Profit and Loss Analysis in Mushroom Production, (2) Summary of Cash Flow, (3) Summary of Saving Account Record, and (4) Summary of Monthly Account. As seen in the account summaries, the groups have practiced maintaining their bookkeeping and accounting functions to a greater extent and accuracy in the recording has been noticeably improved.

Fig. 1: Mushroom production in 2006 - 2008

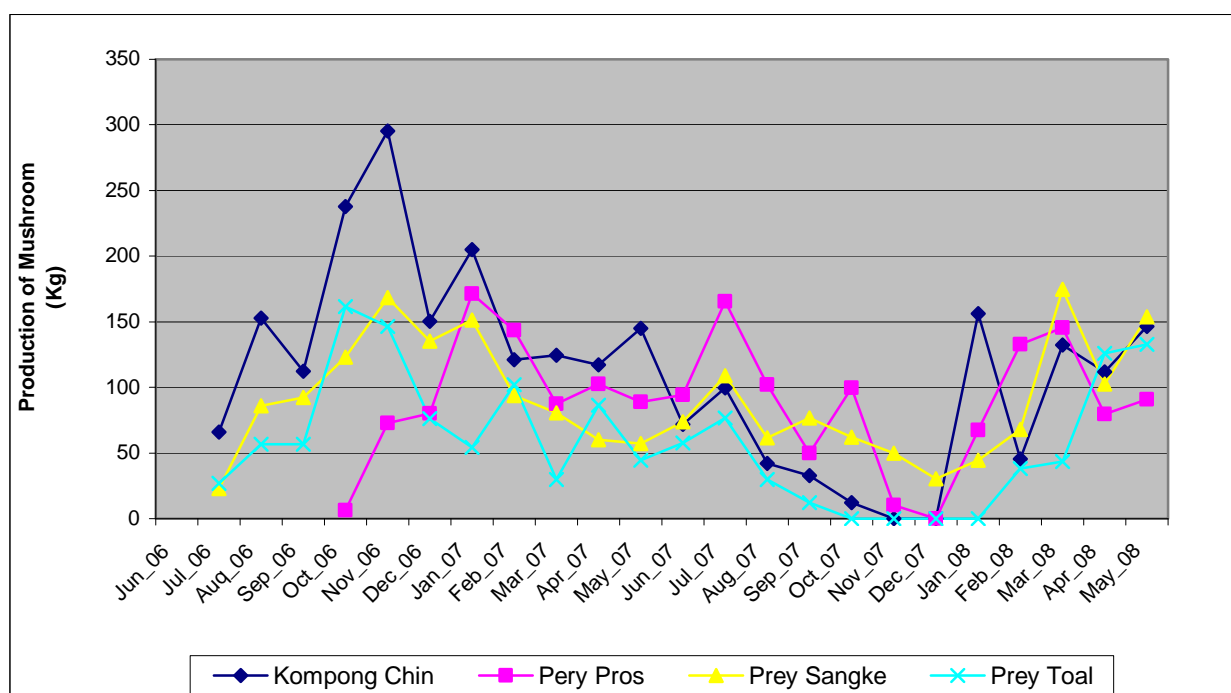


Table 2: Production of mushroom in 2006 and 2007

2006

No.	Item	Village				Total	
		Kampong C.	P. Sangke	P. Pros	P. Toal	(in Riel/Kg)	(in USD)
1	Production in 2006 (Kg)	1,014.8	627.4	159.0	523.9	2,325.1	-
	Production months in 2006	6	6	3	6	21	-
	Average production per month (Kg)	169.1	104.6	53.0	87.3	110.7	-
2	Sale('000 Riel)	2,750.0	1,646.0	395.4	1,409.9	6,201.3	1,550.3
3	Incurred variable expenses ('000 Riel)	1,252.0	1,528.0	292.0	1,337.0	4,409.0	1,102.3
4	Gross income ('000 Riel)	1,498.0	118.0	103.4	72.9	1,792.3	448.1
5	Share distributed ('000 Riel)	500.0	820.0	0.0	800.0	2,120.0	530.0
6	Net income without fixed cost ('000 Riel)	998.0	-702.0	103.4	-727.1	-327.7	-81.9

Note: Production by Prey Pros I is not included.

2007

No.	Item	Village				Total	
		Kampong C.	P. Sangke	P. Pros	P. Toal	(in Riel/Kg)	(in USD)
1	Production in 2007 (Kg)	970.8	904.8	1,115.2	493.1	3,483.9	-
	Production months in 2006	12	12	12	12	48	-
	Average production per month (Kg)	80.9	75.4	92.9	41.1	72.6	-
2	Sale('000 Riel)	2,355.2	2,012.9	2,385.6	1,089.9	7,843.6	1,960.9
3	Incurred variable expenses ('000 Riel)	1,665.2	1,616.2	2,299.6	1,525.1	7,106.1	1,776.5
4	Gross income ('000 Riel)	690.0	396.7	86.0	-435.2	737.5	184.4
5	Share distributed ('000 Riel)	1,047.1	0.0	1,480.4	0.0	2,527.5	631.9
6	Net income without fixed cost('000 Riel)	-357.1	396.7	-1,394.4	-435.2	-1,790.0	-447.5

Other business

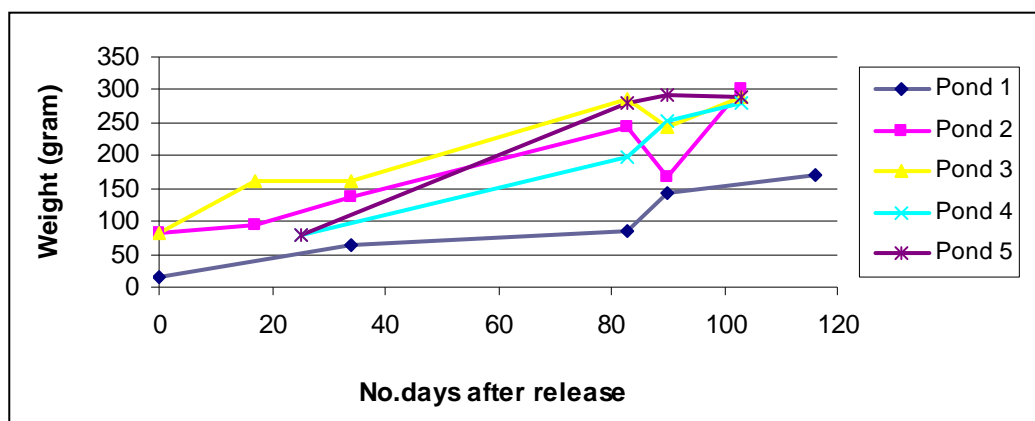
For the maximum utilization of the funds derived from the savings from mushroom production, the women's groups commenced diversifying to other local business ventures such as rice trading and animal raising. In addition, the group in Kampong Chin initiated a mini-credit scheme using the saved funds as capital and some incomes generated from the interests. The usage of the saving account for the mini-credit scheme was discussed in the 5th ICC meeting in June 2008. As an outcome from the discussion, the meeting agreed in principle to leave this initiative to the groups' discretion subject to maintaining transparency in the account.

2.3.2 Mud Crab Culture Group Activity

Mud crab fattening

Based on lessons and knowledge learned and experiences gained through the experimental mud-crab culture in early 2007, the second trial began on 17th November 2007 using 847 pcs of juvenile mud crabs confiscated by Kampong Som FiA Cantonment (KSFC) and brought to the project site. Later, 574 pcs female and 698 pcs male crabs were purchased from the local suppliers from 19 to 25 November 2007 and stocked in pond No. 2 and 3, respectively. Further, 450 pcs female and 619 pcs male crabs were procured from 10 to 14 December 2008 and stocked in Pond No. 4 and 5, respectively. Since then, the crab fattening exercise had been practiced together with monitoring and measurement of the salinity and water temperature which were recorded daily in the logbook. Growth in sizes and weights, and DO were also periodically monitored in collaboration with the JICA Expert. The amount of daily feeding was controlled by observation the remaining feed on the feeding trays. The weight growth monitoring result showed a satisfactory progress as seen in Fig.2.

Fig.2: Growth in weight of crabs



Most crabs reached to marketable size (200 g/pc) toward the end of February 2008 and were harvested from 28 February 2008 until 14 March 2008 when all the remained crabs were harvested. However, the harvest result was very disappointing, as the average survival rate was only 2.4% and the gross income turned to a deficit at only 6,609,300 Riel equivalent to USD 1,652. The detailed report of the second experiment in Annex 8, explains the whole process and outcome of the 2nd experiment.

After completion of the 2nd experiment, the 9th Fishers Workshop was held on 1 April 2008 in a bid to review the outcome of the 2nd experiment and also to determine the future course of operation including an option for withdrawal. All members were so eager to continue the trial once more with the reason that the low survival rate was primarily due to high tide in November and

December 2007 when the ponds were covered with tidal water and many crabs escaped. The JICA expert also explained the technical points which should be incorporated in the next operation as remedial measures. He also committed additional JICA support to the scheme for the continuous monitoring system of DO, salinity and water temperature, which will cost around at USD 5,000. All members realized correctly the cause of low returns and committed to exert their full efforts in the future operation. Similarly, the Chief of Community Fisheries Prey Nup II strongly requested to continue the experiment once more, and he committed himself to support in an attentive way, the next experiment with full strength of the CF Prey NupII. Considering the above proposal, it was eventually decided to repeat the third and the final experiment. During this workshop, thorough discussions were also made on any remedial measures in order to improve the survival rate. As a result, it was decided to employ the crab fattening system with maximum 4 weeks stocking for growing crabs from 3rd grade (under 200 g per crab) to 2nd grad (over 200 g). A detailed discussion on the preparatory work prior to the commencement of the 3rd trial was also made. All the points raised were discussed in the 5th ICC meeting and endorsed. In this meeting, the FiA committed to assign a field officer (an additional extension officer) attached to the crab fattening activity particularly aimed at protecting mud crab from being stolen. It was planned to make the ponds ready by the end of June and start the mud crab fattening in early July depending on when the rainy season would set in.

Meantime, in order to further study the commercially-based mud-crab fattening operation, a study tour to Kompot Province was conducted for the members of Mud-Crab Culturing Group and the project national staff on 8 April 2008 under the financial auspices of JICA. A number of findings after observing the private farm were very useful for the members. Their findings were demonstrated at the 10th Fishers Workshop of Mud-crab Culture Group on 18 June 2008 to share the information with the other members. Thus, the members decided to apply some modifications in the ponds, e.g. installation of PVC pipes for water circulation and preparation of fish feeding platforms.

The Japanese Grassroots Fund disbursed by the Embassy of Japan (EOJ) in Phnom Penh amounting to USD 11,402.00 was audited in July 2007 by an outsourced consultant agency and the auditing report was released on 15 August 2007. However, since the format employed by the auditor was not consistent with the expected report, this was revised for submission to the Fisheries Office of Sihanoukville on 4 December 2007. Together with the auditor's report, the project completion report was prepared and submitted to the EOJ on 1st February 2008 by FO/SNV. The EOJ approved the report and the process was eventually finalized as a consequence.

Fish Cage culture

Since the members of the fishermen group in Kampong Chin are far from the mud crab culture ponds, therefore fish cage culture of grouper or sea bass was suggested to be tried out as an alternative livelihood, as proposed during the 2nd Local Seminar on 6th December 2007. Thus, the suitable space in the Prey Nup Estuary has been earmarked for this activity. The preliminary inspection of the proposed site was conducted on 19 February by the project team. Located near the mouth of canal with minimum depth of 150 cm at the lowest tide, the site seemed suitable for fish cage culture.

The Fish Cage Culturing Group (FCCG) was then organized as a sub-group of the CF Prey NupII in April 2008 with 6 members to promote a cage culture venture. Sea bass (*Lates calcarifer*) was selected as the species of fish to be cultured for a number of advantages in the area, knowing that there might be some technical constraints like parasites, skin disease, etc. that should be tackled.

As the next step prior to planning, an economic feasibility study was carried out and the outcome

was thoroughly discussed with all the members on 18 June 2008 incorporating their local knowledge. The financial feasibility was concluded as positive as seen in the table of Annex 9. As shown in the table, culture will commence in September for a period of 6 months and conducted once a year. It is reckoned that the net profit to be distributed to the members should reach 1,918,000 Riel equivalent to USD 480 per 6 month operation. The economic return against the capital investment should be around 45.3 %. In the wake of such convincing economic feasibility study, preparation work will begin in August in order to commence the experimental culture operation in September.

2.4. Enhance human resources capacity and participation

Throughout the project operation, main emphasis was given to human as well as institutional capacity building especially for the Community Fisheries Prey Nup II, and further for the sub-groups such as the Mud-crab Culture Group, Blood Cockle Fishers Group, Mushroom Producers Group, Crab Bank Group, and Fish Cage Culture Group. A series of workshops and study tours were conducted during this reporting period. In each workshop, relevant handouts in Khmer were distributed as discussion and extension materials. Also, more chances were given for all members to participate actively in the discussions and presentations in the workshops so that they would be convinced to take part in the activities.

Study tour

As aforementioned, the following study tours took place during the reporting period.

- Study tour to Stung Hao to inspect the Crab Bank activity with the participation of 16 members of the Crab Bank Group and the national project staff on 5th April 2008.
- Study tour to Kompot Province to inspect mud-crab culture with the participation of 2 members of the Mud-crab Culture Group, the national project staff and the FiA staff on 8th April 2008.

Workshop

Various workshops also took place during this reporting period as listed in Table 3.

Table 3: List of Fishers Workshops held from Jan. to June 2008

<u>No.</u>	<u>Date</u>	<u>Title of Workshop</u>	<u>Particulars of the workshop</u>	<u>No. of participants</u>
1.	18.02.08	Women's Group	Establishment of Mushroom Producers Group	22
2.	18.02.08	Crab Bank Workshop	Application of Crab Bank scheme in the area	26
3.	19.02.08	8 th Fishers Workshop	Application of fish refugia scheme in the area	35
4.	19.02.08	Cage culture Group	Preliminary discussion on cage culturing	8
5.	01.04.08	9 th Fishers Workshop	Monitoring mud-crab culturing outcome	22
6.	01.04.08	2 nd Crab Bank W/S	Establishment of Crab Bank Group and action plan	25
7.	02.04.08	2 nd Fish Refugia W/S	Establishment of Blood Cockle Fishers Group	39
8.	03.04.08	2 nd Cage Culture W/S	Establishment of Cage Culture Group	11
9.	18.06.08	10 th Fishers Workshop	Action plan on 3 rd experiment of mud-crab fattening	27
10.	18.06.08	3 rd Cage Culture W/S	Practical and economic feasibility on sea-bass culture	13
11.	19.06.08	3 rd Crab Bank W/S	Debriefing on the outcome of study tour / monitoring gravid crab stocking	31
12.	19.06.08	3 rd Fish Refugia W/S	Formulation of Self-regulatory Regulation for blood cockle fishing	22

Training

During the reporting period, more emphasis was placed on site training especially in the improvement of bookkeeping and accounting technologies for Mushroom Producers Group, Crab

Bank Group and Mud-Crab Culturing Group. Through such efforts, the preciseness of the records entered in the accounting books has noticeably been reckoned as having considerably improved.

2.5 Rehabilitate and enhance coastal resources

Establishment of the fish refugia

As dealt at length in 2.2: “Encourage and extend locally based fishery resources management”, the fish refugia targeting blood cockle fishing was established in the project area, and the self-regulatory measures have been formulated by the participating fishers themselves. The zoning map was drawn up for endorsement by the FiA. The fish refugia established in the project area was the first one which is practically functional in Cambodia and is expected to be disseminated to other areas following this model depending on its outcome in future.

Mangrove reforestation

The first mangrove plantation day was set on 5 December 2007 which included an educational session for school children who are 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 Khos Angkor taking into account the environmental requirements and the inhabitants' views. Since then, the condition of the mangroves has been monitored occasionally. It was observed that over 30% of mangroves planted had survived.

2.6 Fishing/fish handling technologies development

This activity has been put in lower priority and no specific activity has been pursued during this reporting period.

2.7 Project management meeting

Steering Committee (SC) meeting

The 4th SC meeting was convened on 20th February 2008 at the Conference Room of the Agricultural Department, Sihanoukville Municipality, attended by the Secretary-General of SEAFDEC in addition to the regular members. One of the featured agenda in this meeting focused on the change of the Project Management and Operational Regime in conjunction with the recent administrative restructuring of the FiA. The meeting agreed that the representative of the newly created Inspectorate Office in the FiA should be present in the SC meetings as the vice-chairman while the representative of the Agriculture Department of Sihanoukville should remain as the alternate vice-chairman of the SC meeting. In the meeting, the project activity in 2008 was discussed in depth after which an endorsement was reached. The detailed description on this meeting is shown in Annex 10: The minutes of 4th SC meeting.

Implementation Coordinating Committee (ICC) meeting

The 6th ICC meeting was convened on 20 June 2008 in Sihanoukville. There had been a long interval since the 5th ICC meeting which was held on 20 October 2007. At this meeting, the progress made since the last ICC meeting was reported and pertinent issues were raised to seek solutions at the local level. Also, the immediate action plan for the succeeding four months was discussed in detail. The major issues raised at this meeting included: the establishment of fish refugia by the blood cockle fishers group, establishment of the Mushroom Producers Group and

the particular concern on how to use the saved funds was discussed, the outcome of the 2nd mud-crab culture and its future action plan, establishment of the Cage Culture Group and initiation of the Crab Bank activity. The detailed results of the discussions at this meeting are shown in Annex 11: Minutes of the 6th ICC Meeting, prepared in both Khmer and English languages for distribution.

2.8 Other activities / events

Changing the structure of FiA

The FiA Cambodia changed its governing structure with creation of the new division called “Inspectorate Division”, which is responsible for fisheries development at the provincial level. In line with this restructuring, Kampong Som FiA Cantonment (KSFC) was created in place of the former Fisheries Office of Sihanoukville Municipality. The project has since then been practically operated at the local level in collaboration with the newly created KSFC.

3. OUTCOMES

The major outcomes of the project activities during this reporting period include:

Baseline/monitoring survey

- The regular fish landing data collection exercises produced the monthly data.
- The data obtained in 2006 and 2007 were compiled and published.

Encourage and extend locally-based fishery resources management

- The final draft of CFAMP was endorsed subject to amendment of the zoning map.
- The Local Enforcement Unit continued patrolling the activity area, although the Unit was a bit handicapped with the engine troubles of its patrol boats.
- The Blood Cockle Fishers Group was organized to promote the concept of fish refugia and the self-regulatory measure was formulated and submitted to the KSFC for endorsement.
- The Crab Bank Group was established and releasing of gravid crabs commenced.

Promotion of local business

- The Mushroom Producers Group was established and the Internal Rule was formulated and signed by the committee members. Mushroom production had been sluggish towards the end of 2007, but it has shown a revamp during this reporting period.
- The project continued to monitor the practices in bookkeeping and accounting monthly for the women’s activity so that transparency in money transaction is promoted and business management reinforced.
- The 2nd trial of mud-crab fattening was completed with disappointing outputs.
- The feasibility study in sea-bass cage culture was conducted showing promising results.

Enhance human resources capacity and participation

- Various training courses and workshops were conducted.
- The study tour to Stung Hao was conducted to observe a crab bank activity. The participants disseminated to the community the findings and the lessons learned during the study tour in the subsequent fishers’ workshop.
- The study tour to Kompot Province was conducted to observe mud-crab culture practices. The findings were disseminated to the other members of MCCG in the subsequent fishers’ workshop.

Rehabilitate and enhance coastal resources

- Monitoring the growth of mangrove trees planted in December 2007 has been continued.
- A fish refugia for blood cockle was established.

Project management meeting

- The 4th SC meeting was held on 20 February 2008.
- The 6th ICC meeting was convened on 20 June 2008.

4. MAJOR CONSTRAINTS

The project initiated various activities from the beginning and some have already produced tangible outcomes while some are still on-going. The project tenure is until December 2008 and the major activities have to be completed by that time except for some follow-up activities to be carried out in 2009. Under the current progress of the activities, there is a vital need to continue the project operation with the involvement by SEAFDEC. It is still considered premature at this stage to transfer all the activities to the FiA. Although the FiA had proposed to SEAFDEC to extend the project tenure further, but no clear decision on the extension has been made to date. The project extension beyond the end of 2008 or termination as originally scheduled, should be decided as soon as possible so that it can be ensured for the project to go on the right course of immediate action.

5. WORK PLAN FOR THE NEXT REPORTING PERIOD

Consistent with the proposed activity plan in 2008, the immediate action plan, covering the next 4 months from July to October 2008 is described as follows.

Baseline / monitoring survey

- Continue fish landing data collection
- Continue marine biological survey for blood cockle

Encourage and extend locally-based fishery resources management

- Following the provisions of CFAMP, the resources management measures should be implemented; i.e. management of fish refugia for blood cockle
- Reinforcement of the structure and capacity of Local Enforcement Unit (LEU)
- Management of Crab Bank

Promotion of local business

- Monitoring the activities of the Mushroom Producers' Group and assisting them when necessary
- Studying the better utilization of the saving account
- Commencement of the 3rd mud-crab fattening experiment
- Commencement of sea-bass culture by the newly organized Fish Cage Culturing Group

Enhance human resources capacity and participation

- Reinforcement of the structure and capacity of CFPN2
- Identify the community based volunteer work
- Publication of reports, manuals and PR materials
- Organizing fishers' workshops, training courses and study tours as required

Rehabilitate and enhance coastal resources

- Promotion of management of the fish refugia
- Implement mangrove reforestation through voluntary participation
- Study the possibility of ARs installation

Project management meeting

- Preparation of the 7th ICC meeting to be held in October 2008

Final project evaluation

Identification of a relevant outsourced consultant

6. REPORTS PREPARED

Reports and documents prepared under the project during this reporting period are listed below.

<u>No.</u>	<u>Title of the report</u>	<u>Name of author</u>	<u>Date of issue</u>
01.	Minutes of the 4 th SC Meeting	Sumitra R. & Chanthana	Feb. 2008
02.	Travel Report to Cambodia (31 March – 3 April 2008)	Sumitra R.	Apr. 2008
03.	Travel Report to Kampot on 9 April	Longdy V.	Apr. 2008
04.	Report on the 2 nd Experiment on Mud-crab Culturing in Sihanoukville	Etoh S.	Jun. 2008
05.	Travel Report to Cambodia on 17 – 20 August	Sumitra R.	Jun. 2008
06.	Monthly Progress Report – April & May	Chanthana Y.	Jun. 2008
07.	Monthly Progress Report – June	Chanthana Y.	Jun. 2008

Annex 1

Project Activity Implementation Chart for ICRM – SV in 2008

(as of 30 June 2008)

Revision : "0"

Activity	2008												Remarks	
	1	2	3	4	5	6	7	8	9	10	11	12		
1. Baseline / monitoring survey														
1.1. Fish landing survey at the project site														
1.1.1. Regular collection of fish landing data	←	←	←	←	←	←	←	←	←	←	←	←	←	Continued activity
1.1.2. Analysis and compilation of data and information			←	←	←	←	←	←	←	←	←	←	←	Data in 2007
2. Encourage and extend locally-based fishery resources management														
2.1. Community Fisheries Area Agreement (CFAA)														
2.1.1. Promulgation of CFAA	←	←	←	←	←	←	←	←	←	←	←	←	←	Pending
2.1.2. Formation of Community Fisheries Coordination Committee (CFCC)										←	←	←	←	
2.1.3. Practical application of CFAMP			←	←	←	←	←	←	←	←	←	←	←	Continued activity
2.2. Local enforcement unit (LEU)														
2.2.1. Strengthening the capacity of LEU	←	←	←	←	←	←	←	←	←	←	←	←	←	Continued activity
3. Promotion of local business														
3.1. Cottage scale industry by women's groups														
3.1.1. Monitoring mushroom production	←	←	←	←	←	←	←	←	←	←	←	←	←	Continued activity
3.1.2. Identify the second local business	←	←	←	←	←	←	←	←	←	←	←	←	←	Continued activity
3.2. Aquaculture business														
3.2.1. Running mud-crab culturing business	←	←	←	←	←	←	←	←	←	←	←	←	←	During dry seasons
3.2.2. Running tilapia / sea-bass culturing business	←	←	←	←	←	←	←	←	←	←	←	←	←	Under study
3.2.3 Evaluation of the above business				←	←	←	←	←	←	←	←	←	←	
4. Enhance human resources capacity and participation														
4.1. Reinforcement of structure and capacity of existing Prey Nup II CF (PN2CF)														
4.1.1. Increase awareness on implementation of CFAMP	←	←	←	←	←	←	←	←	←	←	←	←	←	Continued activity
4.1.2. Study tour to inspect a model case on CBRM or community Development						←	←	←	←	←	←	←	←	
4.2. Participation in community development work														
4.2.1. Identify and implement relevant volunteer works for community development and environmental improvement	←	←	←	←	←	←	←	←	←	←	←	←	←	
4.3. Local seminar														
4.3.1 Organize and conduct local or national seminar										←	←	←	←	
4.4. Publication and PR materials														
4.4.1. Publication of reports and manuals	←	←	←	←	←	←	←	←	←	←	←	←	←	As required
	←	←	←	←	←	←	←	←	←	←	←	←	←	On-going
4.4.2. Distribution of PR materials	←	←	←	←	←	←	←	←	←	←	←	←	←	As required
	←	←	←	←	←	←	←	←	←	←	←	←	←	Under way

Activity	2008												Remarks			
	1	2	3	4	5	6	7	8	9	10	11	12				
5. Rehabilitate and enhance coastal resources																
5.1. Fish refugia / Marine protected area																
5.1.1. Establish and manage fish refugia	←.....→												Continued activity			
5.1.2. Marine biological survey in fish refugia				←.....→												
5.2. Crab Bank scheme																
5.2.1. Establish and manage Crab Bank	←.....→												Continued activity			
5.3. Mangrove reforestation																
5.3.1. Mangrove plantation											←.....→					
5.4. Fish Enhancement Devices (FEDs)																
5.4.1 Study on possibility to install FEDs				←.....→												
6. Fishing / fish handling technologies improvement																
6.1. Fishing and fishhandling technologies improvement														Placed on lower priority		
6.1.1 Identify improvement needs	←.....→															
6.1.2. Technical application for improvement if found necessary	←.....→															
7. Project management meeting																
7.1. Steering Committee (SC) meeting																
7.1.1. Organize and convene SC meeting		↔														
		↔														
7.2. Implementation Coordination Committee meeting																
7.2.1. Organize and convene ICC meeting				↔			↔				↔					
					↔											
8. Project evaluation																
8.1. Mid-term project evaluation														Pending from 2007		
8.1.1. Identify a relevant outsourced consultant	↔															
8.1.2. Conduct a project mid-term evaluation		←.....→														
8.1.3. Publication of the project evaluation report				←.....→												

Annex 2

SELF-REGULATORY MEASURES FOR BLOOD COCKLE FISHING

(Community Fisheries Prey Nup II)

1. Demarcated fishing area

- Name of the demarcated zone: Khos Angkok
- Spatial description:

A.	103_53.304 E	10_38.352 N
B.	103_53.016 E	10_38.022 N
C.	103_53.424 E	10_37.662 N
D.	103_53.712 E	10_37.992 N
E.	103_53.364 E	10_38.007 N

(Note: A, B, C and D indicate the corner points of the rectangle shape, while E indicates the center point.)

- Area of coverage: 20ha encompassed with dimensions of 400m x 500m in a rectangle shape as indicated above
- Area mark: The above zoning area was marked with the corner posts with flags characterized by the Blood Cockle Fishers Group symbol and the center post.
- Area map: as attached

2. Limitation of fishing seasons

- All round the year

3. Limitation of fishing hours

- No limitation

4. Restriction of harvestable size

- Less than 100pcs per kg or over 10gr per pc in weight or over 32mm x 22mm (L x T) in size all the year round
- Over 70pcs per Kg or over 14.3gr per pc in weight or over 36mm x 26mm (L x T) in size during one month in spawning season (the period of spawning season is under study and until the season is scientifically identified this regulation is not applicable).

5. Tool for size selection

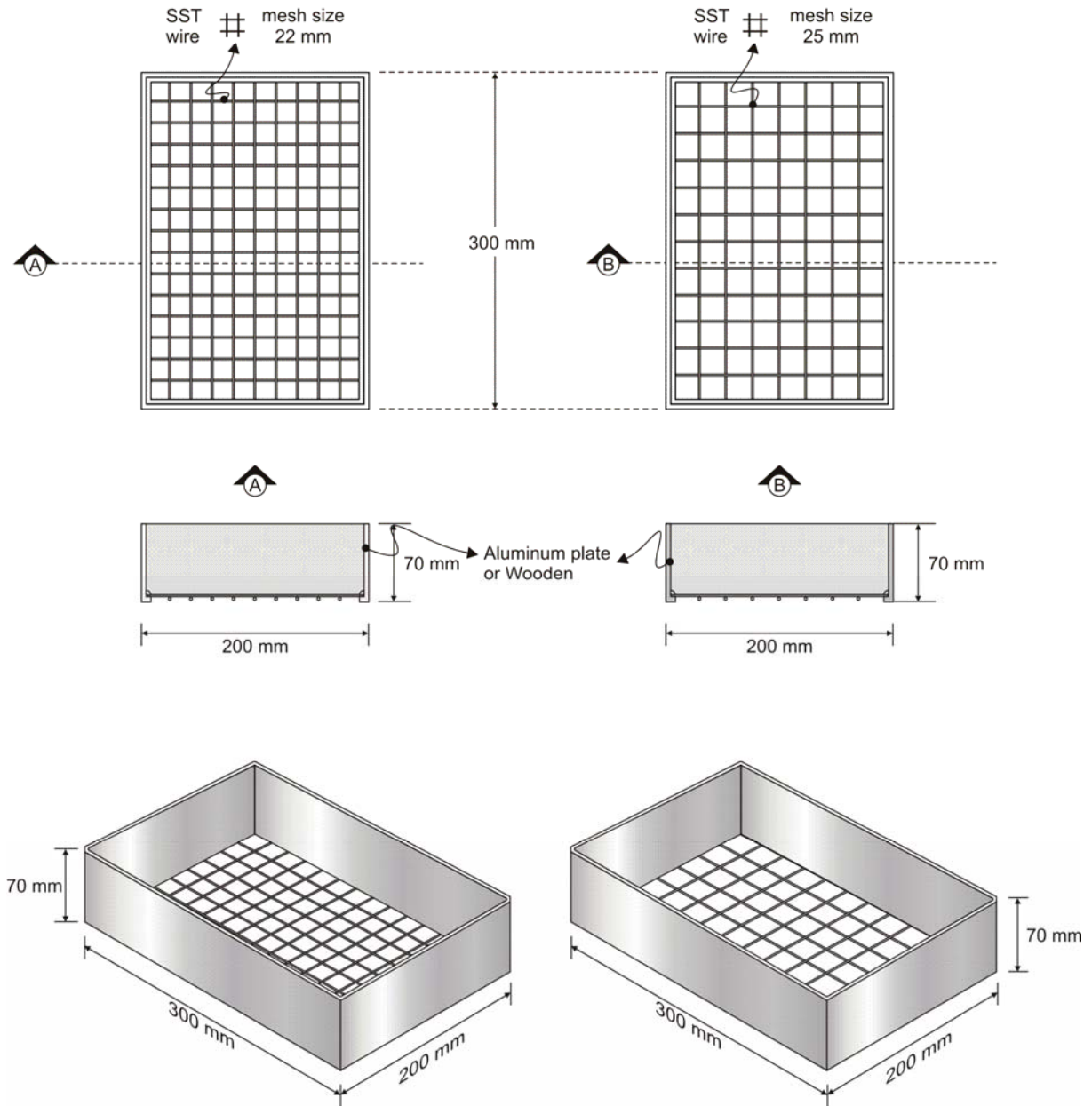
- Filtering with a sieve with mesh size 22mm x 22mm (any blood cockle sifted through this sieve is not permitted for harvesting.)
- During one month in August, in addition to the above tool, another sieve with mesh size 25mm x 25mm is used for filtering gravid blood cockle (any blood cockle not sifted through this sieve is not permitted for harvesting.)

6. Restriction of fishing entry

- Not only members of Blood Cockle Fishers Group but also any outsiders are allowed to catch blood cockle in the demarcated self-resources management zone, provided that those are bound to abide by the above regulation strictly.

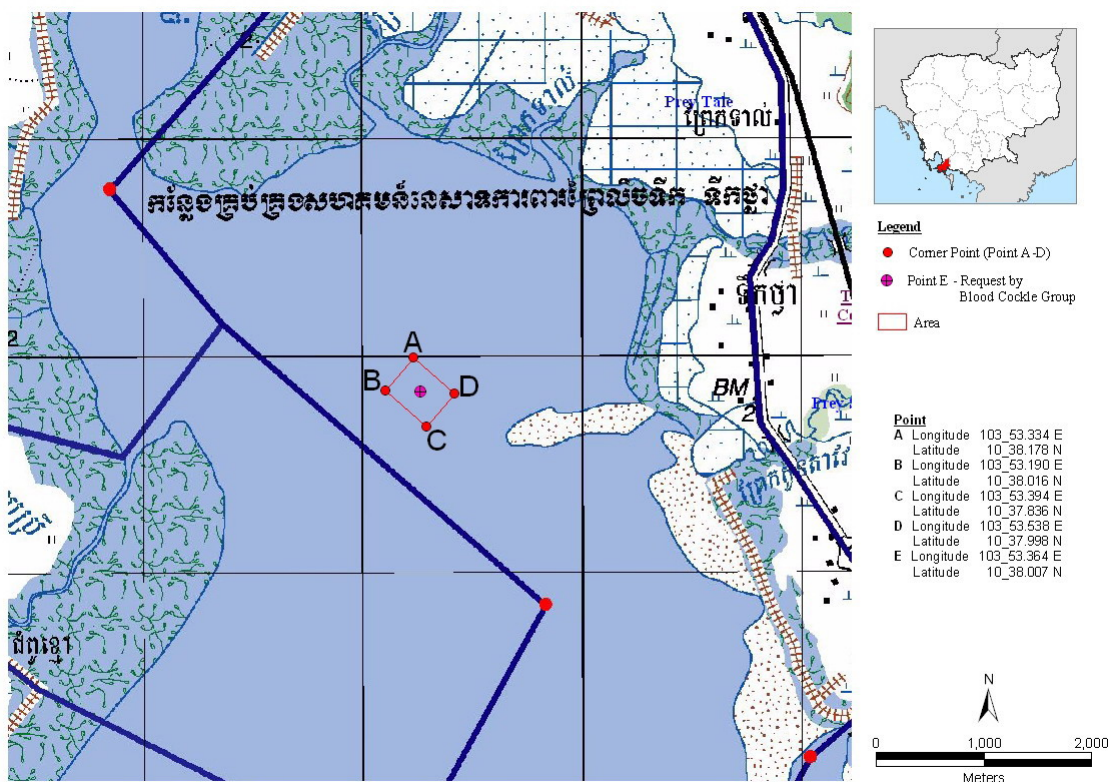
(19.06.2008)

SIEVE FOR BLOOD COCKLE



Map of zoning area for Fish Refugia for blood cockle

ID	Lon	Lat	Lonc	Latc	East	North	Zone	Hemi	Spatial Area
A	103_53.304 E	10_38.352 N	103.888	10.639	378413	1176304	48	N	400mx500m= 200,000m ² =20ha
B	103_53.016 E	10_38.022 N	103.884	10.634	377885	1175698	48	N	
C	103_53.424 E	10_37.662 N	103.890	10.628	378626	1175031	48	N	
D	103_53.712 E	10_37.992 N	103.895	10.633	379154	1175638	48	N	
E	103_53.364 E	10_38.007 N	103.889	10.633	378520	1175668	48	N	



Annex 3

TRAVEL REPORT TO CAMBODIA 17-20 February 2008

Sumitra Ruangsivakul
29 February 2008

1. Objectives

The project team visited the project site in Sihanoukville, Cambodia, on 17 – 20 February 2008 to pursue various activities as listed below.

1. Women's Group meeting – establishment of Mushroom Producers Association
2. Crab Bank Group meeting – commencement of Crab bank scheme
3. Blood Cockle Fishers Meeting – establishment of fish refugia for blood cockle
4. Inspection of the proposed site for cage culturing for sea bass
5. Measurement of mud crab – monitoring growth rate of culturing mud crab and sea bass
6. Account checking for Mushroom Production Groups
7. Account checking for Mud crab culturing
8. Inspection of the growing status of mangrove seedlings – monitoring the status of growth of Mangrove tree.
9. The 4th Steering Committee Meeting

Women's Group meeting

The mushroom production was commenced in June 2006 and it has been already put on the commercial scale operation by now. They are capable to manage the production line themselves and revolve funds within the money saved. In the past, the management in both finance and operation has been controlled by the Project, but now they should be independent from the project and manage themselves. Under these circumstances, it was suggested in the 2nd Local Seminar that the four groups should form a sort of association under which all groups would perform the joint procurement for necessary raw materials as well as joint marketing. The proposal was positively accepted by all groups, and hence the establishment of the Mushroom Producers Association in Prey Nup II is coordinated.

Crab Bank Group meeting

There are a few practically conceivable ways in promotion of the crab bank in Sihanoukville learning after the prevailing models in Japan, Chumphon (Thailand) and Langkawi (Malaysia). The detailed description for each approach was given at the 7th Fishers Workshop held on 5 December 2007 in the project site and the concerning fishermen were well aware of its characteristics, advantages and disadvantages. After thorough consultation among them, it was decided to take advantage of the Chumphon model; i.e. during calm seasons gravid crabs are protected in cages until being hatched, while during monsoon seasons those are returned to the water directly after marking on carapaces. After completion of the workshop, the leader, the vice-leader and the cashier were elected among 11 members.

Blood Cockle Fishers Meeting

Establishment and management of the fish refugia is a vital component of the framework of the community-based fishery resources management concept in the project. The preliminary survey on establishment of the fish refugia was conducted in June 2007 and an establishment of the fish refugia for blood cockle was included in the recommendations. Further, it was

agreed in the 5th ICC Meeting held on 18 October 2007 that an establishment of fish refugia for blood cockle should be promoted in parallel with an effort to conduct the scientific research. Following to this decision, it is envisaged to organize a blood-cockle fishers group and explain and consult the justification for establishment of the fish refugia for the blood-cockle. Then, the proposed self-regulated measures to protect blood-cockle resources are presented and discussed for obtaining their consensus. The area encompassing as the fish refugia should be inspected thereafter.

Inspection of the proposed site for cage culturing for sea-bass

Given the fact that the location of Kampong Chin is remote from the site of Mud-crab culturing and they are unable to participate in this operation, it was proposed in the 2nd Local Seminar that they envisaged trying out the venture of cage fish culture with sea-bass or grouper within the local business development framework of the project. The proposed site has been identified and it should be inspected in this trip. If it will be found suitable, the scheme is to be taken up as a project activity.

Measurement of mud-crab

In the 2nd trial of mud-crab culturing (fattening), the regular measurement of size and weight for mud-crab has been conducted once every fortnight since inception of the culturing. Taking advantage of the site visit, this regular measurement is taken place together with the project staff. It is anticipated that the JICA Expert may join this measurement exercise.

Account checking for Mushroom Production Groups

Entering into various accounting books like General Ledger, Daily Production and Sales Record, Daily Labour Record and Saving Account Record has been properly made by the women's groups and the project has been regularly conducting its scrutiny and verification. This exercise is conducted during this trip by the project staff.

Account checking for Mud-crab culturing

Similarly, the account checking for the Mud-crab venture has been carried out regularly since its inception. This exercise includes scrutiny and verification for Logbook, General Ledger and Daily Labour Record. Based on the figures on these books, the Stock Record and Feeding Record are compiled by the project staff.

Inspection of the growing status of mangrove seedlings

The 1,000 mangrove seedlings were planted on the day of mangrove reforestation on 5 December 2007 and the status of growth is to be inspected during this site visit.

The 4th Steering Committee (SC) meeting

The project ICRM-SV officially took off in the wake of the Project Opening Ceremony held on 11 November 2005 at the project site in Sihanoukville. Since then, the project has deployed its activity in line with the project orientation. The 3rd project Steering Committee (SC) meeting was held in Sihanoukville on 1st March 2007 and the work plan for the year 2007 was approved. Based on it, the project executed various activities in 2007. It is now proposed to convene the 4th project SC meeting in a bid to review the project progress taken place in 2007 and discuss other central issues on 20th February 2008 in Sihanoukville as detailed in the following.

2. Travelers

- | | |
|------------------------------|-----------------------------|
| 1. Mr. Siri Ekmaharaj, Ph.D. | SG/TDC, SEAFDEC |
| 2. Mr. Seiichi Etoh | Project Leader |
| 3. Ms. Sumitra Ruangsivakul | Socio-economic Section Head |
| 4. Ms. Jariya Sornkliang | Researcher |
| 5. Ms. Thanyalak Suasi | Researcher |

3. Work schedule

17 February 2008 (Sunday)

- | | |
|-------------|---------------------------------------|
| 0750 – 0910 | Leave BKK and arrive Phnom Penh (PNH) |
| 1000 – 1300 | Move to the project site |
| 1400 – 1500 | Inspect the project site |
| 1500 – 1600 | Move to Sihanoukville (SNV) |
| 1700 – 1800 | Project internal meeting |

18 February 2008 (Monday)

- | | |
|-------------|---|
| 0730 – 0830 | Move to the project site |
| 0900 – 1200 | Measurement of Mud crab and account checking for Mud-crab culture |
| 0900 – 1100 | Women's Group meeting |
| 1300 – 1630 | Crab Bank Group meeting |
| 1300 – 1630 | Account checking for mushroom production |
| 1630 – 1730 | Move to Sihanoukville |

19 February 2008 (Tuesday)

- | | |
|-------------|---|
| 0730 – 0830 | Move to the project site |
| 0900 – 1200 | Blood Cackle Fishers meeting |
| 1300 – 1500 | Inspection of the Fish Refugia zone, the site for the Crab Bank and the mangrove reforestation site |
| 1500 – 1630 | Inspection of the site for cage culturing in Kampong Chin |
| 1630 – 1730 | Move to Sihanoukville |

20 February 2008 (Wednesday)

- | | |
|-------------|---|
| 0830 – 1130 | SC meeting |
| 1130 – 1230 | Lunch |
| 1230 - 1630 | Move to PNH |
| 1630 – 1730 | Courtesy call to DG of FiA by SG of SEAFDEC |
| 1730 – 1830 | Move to PNH Airport |
| 2025 | Leave PNH for BKK |

4. The results

4.1 Women's group meeting

- The women's group meeting hold on 18 February 2008, composed 17 members of 4 women's groups. The objective of this meeting was established mushroom producers association under 4 women's groups.
- Dr. Siri, Secretary-General, SEAFDEC was speech that, SEAFDEC can be help your activities on technical and discussion, and appreciated your activities, your work will be done and successful, depend on member's participation and group management.

- Mr. Etoh explained background and objectives that, this activity have started and continued one and half year, the result of the 2nd Local Seminar, all groups have profits, but a lot of effort to be produce by each group, like order material and marketing. For accounting, SEAFDEC was still follow-up to monitoring, and the accounting system of each group was transparency and good. Mr. Kaila, extension worker, will help women's group to order material, like spore. This point is problem, every women's group may be establish association to discuss together (cooperative work).
- Discussion on "Association" and "Group" which one will be used for this cooperation, The wording is "association", women's group must be registration with government. The meeting agreed to use Group, the new of cooperation group is name "Mushroom Producers Group of Community Fisheries Prey Nop II".
- Some member has comment on budget of each group that, after this group establishment, each group must merge the budget together or not. Mr. Etoh explained that, the budget will separate in each group, only work must be cooperated.
- Mr. Etoh informed more that, the next plan, project will call all members to the first assembly, and donated T-shirt with logo (Khmer and English wording) to all members.

4.2 Crab Bank group meeting

- There were 21 participants in crab bank meeting, the list of participants with fishing gear was as follow as;
 1. Yak KubCrab trap
 2. Ham Mat Crab trap/crab gill net
 3. Lim Crab gill net
 4. W Sen Crab gill net
 5. Abdoloss Crab gill net
 6. Ro kic Crab gill net
 7. Ry Crab trap
 8. Soul Crab trap
 9. Yan Crab gill net
 10. Ham Mat Crab trap
 11. Ya Rub Crab gill net
 12. So less Crab gill net
 13. Deat Annouse Crab gill net
 14. Meat hamat Crab trap
 15. Less hamsass Crab gill net
 16. Saav Dause Crab gill net
 17. Ab DauseCrab gill net
 18. Kim san
 19. Loss Keut
 20. Mom Sen
 21. Sen sak
- Crab bank group had 6 members, which used crab trap and 12 members, which used crab gill net.
- Mr. Etoh informed that, the gravid crab must collect from crab trap better than gill net, if member from gill net fishing would like to donated gravid crab, please chose strong crab to crab bank. The last meeting (5 December 2007) have explained and presented 3 models of crab bank, Chumphon, Langkawi and Japan, and this area choose Chumphon model, which operate in clam season, and in monsoon season will operate Japanese model.
- Mr. Etoh given question to member that, please explained Chumphon model and Japanese

model. Fishermen explained that, Chumphon model used cage, and Japanese model did not use cage, by marking on carapace and release at sea.

- Mr. Etoh explained more on Chumphon model that, crab bank in Chumphon was successful, because chairman was high volunteer, to give feed and take care everything. In Cambodia site, who will be follow up on feeding and take care this activity, please discuss on this duty in your group.
- The last of meeting, member of crab bank group confirmed and try to operate crab bank activity, by marking on carapace of gravid crab before release in cage. The summary of discussion was list below.
 1. The location is Long 103° 54.2034 E, Lat 10° 37.7514 N, where installed 2 cages (2mx2mx2.5m of size), this activity will be experiment one year, if it is work, project will continue and make the permanent cage.
 2. Each member will bring gravid crab to leader, and leader will bring crab to release at cage with marking, which way do you want?
 3. Feeding, about 1 kg/day for feeding, SEAFDEC will support until this group have income from crab selling.
 4. Logbook, Leader will record on how much received and how much expenditure in one day.
 5. How to record, about selling crab will be record only money (no need the weight or no. of crab)
 6. Cage cleaning, there are 2 ways, cleaning at sea or bring cage to clean at land.
- The next meeting will call all members to agreement on regulation at above.

4.3 Blood cockle fishing group meeting

- Dr. Siri Ekmaharaj, Secretary-General, SEAFDEC was opening address and speech on the important of resources management, especially the main species in each area must be conservation and management plan.
- Mr. Ing Try given information that, the general main objective of project, they don't bring money directly to people, but project will be given the knowledge and technical to develop human resource in community. The problem in fisheries, like fishing gear increase and the catching is decreasing. People must be participation to Community Fisheries, because this group will encourage you to conserve and rehabilitate resources. How to manage the blood cockle resource, this is principle, if we catch small size, the next generation will be small.
- Mr. Ing Try informed more that, all of you know and inform the size and egg stage of blood cockle in your site, especially on spawning season. The last, I am very glad to attend this meeting.
- Mr. Etoh informed on background and objective of this meeting that, why did project held this meeting? because blood cockle at the last 10 years was very big size, but now the size was small, if we still continue to fishing without management plan, the abundance of blood cockle will be decline and smaller. Now FiA try to establish fish refugia, and blood cockle is the main specie in this area.
- Mr. Etoh explained more that, the regulation of blood cockle group must be follow Fisheries Guideline, but fish refugia area will be used by you, so the regulation will be made by you. SEAFDEC have draft self-regulation on blood cockle fishing, and need to discuss with you, the final of regulation will be submit to FiA later.
- The end of meeting may be established Blood Cockle group, and target member in this meeting will be a core group. After one month, project will call all blood cockle fishers to the 1st assembly, the objective of assembly is presented regulation.
- Mr. Etoh informed and confirmed on regulation that, today we must make and prepare the fisheries management on blood cockle fishing, and submit to FiA, SV. He confirmed size of blood cockle, if you catch small size, you will lose income, and blood cockle don't

- chance to mature size.
- Map of fish refugia will be submit to FiA and give to you later. In Cambodia, small size of blood cockle started on November to February, if FiA would like to close season on August, the regulation will be confirm by Scientific data and some year will be change depend on rainy season.
 - Mr. Ing Try informed on the close season that, one month is enough, and used one sieve to selection.
 - Mr. Etoh suggested that, he worry on fishermen can not get income one month, if used 2 sieves for selection, fishermen can get income.
 - The summary of meeting was that;
 1. Fishermen agree 135 pieces/kg, smaller than this size did not catch.
 2. Fishing hours, usually they collect at low tide, about 3 hrs., average income is 3,000 Riels per person.
 3. This regulation will be test one year to improvement.
 - The election committee and leader of group, list of Blood cockle group committee was that;

Ms. Kop Mari Yah	Chaiman
Ms. Mat Mary	Vice Chairman
Ms. Soeun Tes Ros	Second Vice Chairman
Ms. Soeun May Stos	Secretary
 - This group have established and under CF Prey Nop II, activity and regulation will be under CF.
 - Mr. Ing Try informed to Dr. Siri that, please find biology of blood cockle. This group will be held meeting every month with CF, Ms. Ponley will prepare report and problem of this group, sent to FiA, PNH and SEAFDEC. Mr. Kailah will coordinate between CF and report to FiA, SV and cc to PNH.

4.4 Inspection of the proposed site for cage culturing for sea-bass_



The location of cage culture for sea bass



4.5 Measurement of mud-crab



4.6 Inspection of the growing status of mangrove seedlings



Location of Mangrove reforestation

4.7 The 4th Steering Committee (SC) meeting

The minutes of the 4th SC meeting is described at length separately.

Annex 4

TRAVEL REPORT TO CAMBODIA 31 March – 3 April 2008

Sumitra Ruangsivakul
18 April 2008

1. Objectives

The project team visited the project site in Sihanoukville, Cambodia, on 31 March – 3 April 2008 to pursue various activities as listed below.

1. Women's Group meeting – establishment of Mushroom Producers Group and General Assembly
2. Crab Bank Group meeting – construction of the facilities of Crab bank
3. Blood Cockle Fishers Meeting – embodiment of blood cockle fishers group with self-regulatory system
4. Fish cage culturing for sea-bass – establishment of the fish cage culturing group
5. Mud-crab culturing group – monitoring and self-evaluation on the 2nd experiment result
6. Account checking for Mushroom Production Groups
7. Account checking for Mud-crab culturing

2. Travelers

- | | |
|-----------------------------|-----------------------------|
| 1. Mr. Seiichi Etoh | Project Leader |
| 2. Ms. Sumitra Ruangsivakul | Socio-economic Section Head |
| 3. Ms. Jariya Sornkliang | Researcher |
| 4. Ms. Thanyalak Suasi | Researcher |

3. Work schedule

31 March 2008 (Monday)

- | | |
|---------------|--|
| 07.50 – 09.10 | Leave BKK and arrive Phnom Penh (PNH) |
| 10.00 – 13.00 | Move to the project site |
| 13.00 – 14.00 | Lunch |
| 14.00 – 15.00 | Inspect the project site |
| 15.00 – 17.00 | Visited crab bank at Strung Hao, Sihanoukville |
| 17.00 – 18.00 | Move to Sihanoukville (SNV) |

1 April 2008 (Tuesday)

- | | |
|---------------|---|
| 07.30 – 08.30 | Move to the project site |
| 09.00 – 12.00 | Mud crab Culturing Group meeting and account checking for mushroom production and Mud-crab culturing groups |
| 12.00 – 13.00 | Lunch at the site |
| 13.00 – 16.00 | Crab bank Group meeting |
| 16.00 – 17.00 | Move to Sihanoukville |

2 April 2008 (Wednesday)

- | | |
|---------------|--------------------------|
| 07.30 – 08.30 | Move to the project site |
|---------------|--------------------------|

- 09.00 – 12.00 Mushroom Producers Group meeting
- 12.00 – 13.00 Lunch at the site
- 13.00 – 16.00 Blood Cockle Fishers meeting
- 17.30 – 18.30 Move to Sihanoukville

3 April 2008 (Thursday)

- 08.30 – 11.00 Marking the positions of Fish Refugia zone, inspection of the construction site for the Crab Bank and collected sample of blood cockle in 2 m² of fish refugia area.
- 11.00 -12.00 Lunch at the project site
- 12.00 – 14.00 Meeting with the Cage culture group
- 14.00 – 18.00 Move to PNH airport
- 19.45 Leave PNH for BKK

4. The results

4.1 Mud crab culture group meeting

- 17 participants came to mud crab culture group meeting, 12 members and 5 of CF committee and leader of village.
- Mr. Mok Sen, Leader of mud crab culture group informed the progress of activity that, this group had 12 member in earlier, and now this group had still 12 members, but 6 old members had resigned, and 6 new young member came to this group, because 6 old member did not work and active on duty. List of members have changed today, and new members will start to work at the next operation of mud crab culture.
- Mr. Etoh informed the objective of this meeting that, the first experiment was not good result, and try to operate the second experiment, this experiment had expert from JICA to be consultant. The result of this experiment was still not good result, only 2.1% and 6.4% of survival rate.
- Mr. Etoh comment more that, the condition of the 1st experiment was not good, the condition of the 2nd experiment was good, but the survival rate was only 6.4%, it was different from the Philippines case, which was 70-80% of survival rate, please explain on this result.
- Mr. Etoh explained the results more that,

o income from sale mud crab	302,000 Riels
o Expenditure	6,225,000 Riels
o Loss	5,923,000 Riels

This experiment have compared with Mushroom producer group, the result was different. The scientific result will present by Mr. Hatori, JICA expert. After that, all of you can decide to continue or did not continue on the next mud crab culture.

- Mr. Etoh comment on the 2nd report of mud crab culture experiment that, the 1st experiment have failed and reported to Japanese Embassy. The 2nd experiment is still fail, how to report to Japanese Embassy, please given the good reason to us for reporting.
- Mr. Hatori explained the important information that, there were two information for improve your skill,
 1. Mortality will be high, if the sea water was high salinity, the value of DO will be less than standard value.
 2. Full moon or new moon, mud crab will be molting, you must give more feed to crab.

- Mr. Mok Sen given his observation from two experiments that, the 1st experiment, we released too small mud crab and high temperature and salinity. The 2nd experiment, we agreed on full moon and new moon, we met a lot of crab dead, and some crab escaped at the high flooding. There was high tide 5 days in December, the water was over edge of pond every time.
- Mr. Etoh informed that, mud crab in pond no. 1, the mortality is good, because crabs were smaller than other ponds, because all crab was confiscated, and short transportation.
- Mr. Kailah, extension worker of project site, suggested more that, when he met some crab dead, he will stop to feed, he did not meet crab dead at the next day. Mr. Hatori agreed on this, but will reduce the feed, not stop to feed at the next day, when meet crab dead.
- Mr. Kailah given the reason on mud crab culture fail that, there were 3 reasons;
 1. Escape at the high tide
 2. Over feeding in each day
 3. Poor management, member did not full responsibility, and met some trap at the pond.
- Mr. Moza, CF's Chairman, given more information that, he did not joy this activity, in case of thief, if some body stolen crab, we can check with middlemen, because the crab from natural and culture was different on color and body.
- Mr. Nen Chamroen mentioned more on next experiment that, need more labour to take care and used CF member to assist this activity, he share the opinion to management that;
 1. divided group to response each pond
 2. the same system, by divided group to take care every pond.
- Members was discussion and given more information that, the next experiment will be given feed 3 times per week, Mr. Hatori comment that, feeding must compare with crab weighing.
- CF's member informed more that, the new member of mud crab culture group is active, and would like to find the new option to continue the next culture.
- Mr. Etoh given more information that, he had discuss with commercial crab culture in Thailand, farmer introduced new culture by fattening, the culture timing was 2-4 weeks. The important thing to consider on crab culture, please check flow water around pond, if meet water flow out, please try to find point and repair, because this point will be crab escape.
- Mr. Etoh mentioned on the next operation that, the next culture will be started on June or July, before raining season. The program to do at the next operation was below respectively,
 1. Pumping water
 2. Counting crab dead, after pumping
 3. Repair edge of pond
 4. Used lime (treat one month), this activity will start early of May
 5. Taken water from bottom to outside by siphon
 6. Responsibility on management, each pond will be response each team (2 members per team)
 7. Feeding, how many times per week, and what time is the best to feed?
- Mr. Etoh informed more that, the important thing to do in the next operation, how to stop stealth. He hope that, the survival rate may be 70%. SEAFDEC will arrange workshop on mud crab culture on June 2008, and start pond maintenance and all schedule at the early of May.

- Mr. Mozar, CF's Chairman said that, we will bring all members of mud crab culture group to a mosque, before this activity start on July.
- Mr. Hatori informed more that, this trip he will bring sea water from canal to check DO and pH. JICA would like to bring FiA's staff and member of mud crab culture group to study trip on mud crab culture at Kampot Province, this program will arrange the end of April.



Fig. 1. Mr. Hatori Tatsuya, JICA expert, explain the result of mud crab culture to member of mud crab culture group

4.2 Crab Bank group meeting

- The objective of this meeting was marking the position to construction crab bank, and discussion on group management.
- Mr. Etoh informed that, Crab Bank in Cambodia have started at Strung Hao, Sihanoukville on March 2008, and Tuk Tha Commune will start in May with 2 cages, 22.5 x 2.5 x 2 meter of size, before crab bank construct in this area, we must be discussion together on group management, which system will be used in this area. For Chumphon model, there were 2 systems, release in cage at calm season and release to sea at monsoon season, leader of group will take care and feed in calm season, and marking and recording crab release for member in monsoon season.
- Member mentions that, what time is available for feed, Mr. Etoh replied that, please feed at 6 pm, or when you go to fishing.
- Mr. Etoh suggested more that, SEAFDEC need to bring all member of crab bank group to study trip on crab bank at Strung Hao, this study trip will get some skill on group management and cage structure. The committee of crab bank group was that;
 - Mr. Hak Eseu Chairman
 - Mr. Lay Him Vice Chairman
 - Mr. Deat Yony Secretary
 - Mr. Mat Aumeut Accountant
 The total of member is 16.
- Mr. Etoh explained more that, SEAFDEC will support material for crab bank construction, but group must be construction by yourself. These program will prepare before and after crab bank was starting, as below;
 - o Study tour at Strung Hao, the timing is before Songkarn festival
 - o Construction (Net making), after Songkarn festival

- Cage Installation, 26-27 April 2008
 - Crab releasing, 28 April 2008
 - Cage cleaning, every three months (1 time/3 months)
 - Organize member to duty response
 - Control (checking crab to sell), every 3 days
 - Rotate member to feed, everyday
- Mr. Etoh informed more that, please select the center area to operating this activity, like collect and keep crab from member, feed arrangement. The center may be used middleman's house to operating. SEAFDEC will support fund for feed in earlier, after group have income from crab selling, the fund of feed will be paid by group. SEAFDEC have provided logbook for general accounting and crab recording to group, after translation will be given to you.



Fig. 2. Crab bank at Stung Hao (left) and Committee of Crab Bnak group at Prey Nop II (right)

4.3 Mushroom Producers Group of Community Prey Nop II meeting

- Mr. Etoh informed the objective of meeting that, we will final internal regulation of Mushroom Producers Group, selected Chairman and committee of group.
- Ms. Heng Ponley presented the internal regulation in Khmer to member, and every rule has finalized by member.
- Mr. Etoh informed more that, this meeting was general assembly, all participants must put their name with signature at the list of member, total member was 14 and one member of Community Fisheries.
- Mr. Etoh explained more on regulation that, the complement of this regulation was that;
 - Name of group “Mushroom Producers Group Community Fisheries Prey Nup II” (MPG)
 - This group is under Community Fisheries
 - The committee of this group compose 5 members

Ms. Hoc Tean, leader of Kampong Chin Women's Group	Chairman
Ms. Gen Sang, leader of Prey Pros II Women's Group	Vice Chairman
- This committee will take care of this group for 2 years.
- Mr. Etoh explained the production in 2007 that, the production 2007 of each group was come down, the leader of each group must be explained the reason.
 - Prey Pross II explained that, the production was not good, when they have taken long life. The second reason, group was waiting SEAFDEC to come and follow up, like order new material and given comment.

- Prey Sangke explained that, the reason was the same Prey Pros II.
 - Prey Toal explained that, spore was not good, and strong wind in December, about 400 packages were spoil and damage, and waiting SEAFDEC to follow up.
 - Kampong Chin explained that, there was strong wind at the end of year, and waiting SEAFDEC to follow up.
- Mr. Etoh suggested that, group may be produced new package of mushroom every 3 months, this way will be continued the production whole year. Some group had budget to continue, why don't operate by themselves? Committee of MPG can be order material together, this channel may be pass FiA's staff or Extension worker of project.
 - Mr. Etoh explained on transaction of each group and given the result of Prey Pross II to be sample in this meeting that;
 - Prey Pross II have good production, which this group just started too late, the expenditure of this group have more on material and facility. The result was that, income less than expenditure, but group have distributed share to member, this system was not business, group must get profit first, and can distribute share to member.
 - Mr. Etoh explained more on profit and deficit in 2007 that;

	Kampong Chin	Prey Sangke	Prey Pross II	Prey Toal
Cash in hand 12/2006	2,055	687	11	494
Cash in hand 12/2007	1,710	1,747	0	947
Deficit/Profit	-345	1,060	-11	453

- Ms. Hoc Tean mentioned that, Kampong Chin group have bought a lot of equipment and material in 2007, group did not get profit.
- Mr. Etoh explained on how to calculate the transaction for next year that, base way of the end of year, group get profit, group can distribute share to member, this is the base way to calculation as below;
 1. Sale 3,500,000
 2. Expenditure 1,938,150
 3. Gross income 1,561,850
 4. Saving (20%) 312,370
 5. Depreciation (for 3 years) 273,000
 6. Reserve for 2008 561,900 (Repairing the facility 10%)
 7. Net income 414,580 (3-4-5-6)
 8. Share 414,580
 9. Cash in hand 561,900 (6)
 10. Transfer to saving (A/C) 585,370 (4+5)



Fig. 3. Ms. Heng Ponley finalized the internal regulation with member (left), Committee of Mushroom Producers Group of Prey Nop II (MPG)

4.4 Blood cockle fishing group meeting

- Mr. Etoh informed the objective of this meeting that, we will finalized self- regulation and marking the area for blood cockle, the area of blood cockle fishing ground was 1,400m x 1,400m or about 2 km². The self-regulation composed on fishing season, hours for fishing and restriction.
- The restriction of blood cockle collection was less than 100 ps/kg or over 32mm x 22mm (size of blood cockle). Fishermen comment that, they usually collected 50 ps/kg.
- Mr. Etoh informed more that, the self-regulation will be rewrite and submitted to FiA approval, the final self-regulation will make in poster and distribute to project site and neighbor. The next program of this activity, SEAFDEC will be marking the position of fish refugia, and the location of blood cockle map. The map with marking will add at poster of blood cockle. Blood cockle fishing ground was belong community, community must conserve, and informed to enforcement unit, when you met illegal fishing in this area. SEAFDEC have plan to collected blood cockle at site to improve biological survey and catch per unit (CPUE), some data of CPUE will be collected from middleman. 5 middleman will be joy in data collection, SEAFDEC will prepare log book for recording to them with some incentive.
- Mr. Etoh suggested on sieve that, who will be used sieve to select size of blood cockle, by middleman or fishermen. At the meeting agreed that, middleman will be used sieve to select blood cockle, after fishermen sent to him.
- SEAFDEC will support sieve and logbook to middleman, poster to project site and neighbor. Each schedule will be finished at the 1st of May.



Fig. 4. Member of blood cockle fishing group (left), and sieve for select blood cockle (right)

4.5 Fish cage culture group meeting

- Fish cage culture will install at Kampong Chin village, because fishermen in this village can not joy in mud crab culture, it is too far.
- Mr. Etoh given the question to this group that, why did you request fish cage culture in this area, This group had 6 members, Mr. Sau Reth was leader, he given the reason that,
 - o They did not have budget,
 - o no power to order the fingerling and
 - o one member has experience on fish cage culture from Koh Kong.
- Mr. Etoh comment that, how do you order fingerling?, how to culture and manage, and how many cage do you want?
- Leader and member replied that,

- The fingerling will be order at Koh Kong through FiA, Sihanoukville, the price is 3-6 Baht per fish (size 3 – 5 inch), trash fish is 1,000 Riel per kg.
 - The timing of culture is 6-7 months, fish weight is 800-1,000 gm, the price is 4 USD per kg.(in Sihanoukville), survival rate is 70-80 %.
 - 6 cages, 3 x 3 x 2 m.
- Mr. Etoh informed that, SEAFDEC will calculate the budget for this activity and sent request budget to TF, please sent the cost of cage and cost of fingerling to SEAFDEC as soon as, before culture start, we plan to start September 2008.

**TRAVEL REPORT
TO CAMBODIA
17-20 June 2008**

Sumitra Ruangsivakul
23 June 2008

1. Objectives

The project team visited the project site in Sihanoukville, Cambodia, on 17 – 20 June 2008 to pursue various activities as listed below.

1. Women's Group activity – monitoring its progress on mushroom production business and credit scheme with scrutinizing the accounting books
2. Mud-crab Culturing Group - reporting the outcome of study tour, monitor the progress on preparatory works and installation of an automatic recording machine for water temperature, salinity and DO donated by JICA,
3. Blood Cockle Fishers Group – monitoring resources management activity in the fish refugia established and marine biological survey,
4. Fish cage culturing for sea bass – monitoring construction of cages for culturing sea bass by the Fish Cage Culturing Group
5. Crab Bank Group – review the findings on the study tour made to Stung Hao and monitoring its progress on construction of stocking cages and on operation,
6. The 6th ICC Meeting

2. Travelers

- | | |
|-----------------------------|-----------------------------|
| 1. Mr. Seiichi Etoh | Project Leader |
| 2. Ms. Sumitra Ruangsivakul | Socio-economic Section Head |
| 3. Ms. Jariya Sornkliang | Researcher |
| 4. Ms. Thanyalak Suasi | Researcher |

3. Work schedule

17 June 2008 (Tuesday)

- 07.50 – 09.10 Leave BKK and arrive Phnom Penh (PNH)
 10.00 – 13.00 Move to the project site
 13.00 – 14.00 Lunch
 14.00 – 16.00 Inspect the project site
 16.00 – 17.00 Move to Sihanoukville (SNV)

18 June 2008 (Wednesday)

- 07.30 – 08.30 Move to the project site
 09.00 – 12.00 The 10th Fishers Workshop for Mud-crab Culturing Group
 Installation and testing the salinity and temperature recorder by JICA expert
 Account checking for mushroom production and Mud-crab culturing groups
 12.00 – 13.00 Lunch at the site
 13.00 – 16.00 Inspection of cage culturing and its follow-up activity
 Account checking for mushroom production
 16.00 – 17.00 Move to Sihanoukville

19 June 2008 (Thursday)

- 07.30 – 08.30 Move to the project site
- 09.00 – 12.00 Meeting with the Crab Bank members
- 12.00 – 13.00 Lunch at the site
- 13.00 – 14.00 Meeting with the Blood Cockle Fishing Group
- 14.00 – 16.30 Marine biological survey on blood cockle in the zone of fish refugia
Inspection of crab bank stocking
- 16.30 – 17.30 Move to Sihanoukville

20 June 2008 (Friday)

- 08.30 – 12.00 Project ICC meeting in the office of Director of Kampon Som FiA
Cantonment
- 12.00 – 13.30 Lunch
- 13.30 – 15.30 Visit project site
- 15.30 – 18.30 Move to PNH airport
- 19.45 Leave PNH for BKK

4. The results

4.1 Women's Group activity

The Internal Rules of the Group for the Mushroom Producers Group was adopted at the first general meeting on 2nd April 2008 and the organizational function was legitimately commissioned under the structural framework of Community Fisheries Prey Nup II. The project team was expected to monitor its function as the independent cottage scale industrial venture and identify any further assistance needed. Simultaneously, the verification and scrutiny of bookkeeping and accounting records in the four groups is conducted by the project team.

Four women's groups are Kampong Chin, Prey Toal, Prey Sangke and Prey Pross. From February until June 2008, mushroom production of these groups was not so much good after cultivating mushroom only for three months. Each group explained that the spore procured from Sihanoukville was cheaper but the quality was not good compared with the one used to be purchased from Batambang Province. The mushroom bags in use of the latter spore could produce for 8 months.

The project intend to invite the expert from Batambang Province to inspect the mushroom production for technical consultation. The expert will collect data and discuss this problem with the women's groups. This arrangement should be made imminently before the end of June 2008 at latest.

4.2 Meeting with Mud-crab Culturing Group

The 2nd experiment of Mud Crab Culturing exercise was thoroughly reviewed in the 9th Fishers Workshop on 1st April 2008. The cause of low productivity was precisely defined among the members of Mud Crab Culturing Group. The remedial measures were fully discussed and agreed to complete in line with schedule by May 2008. Meantime, the study tour to Kampot was conducted on 8/9 April 2008 to observe mud-crab culturing practices by a private venture under the financial auspices of JICA, in which 2 group members participated.

In an attempt to share their findings to other members in the group and to further discuss the possible ways of improvement of culturing practices, the 10th Fishers Workshop was organized.

The mud crab culture group meeting was convened as the 10th fishermen's workshop. The main objective of this meeting was to address the findings of the study tour, and based on the outcome discuss the future action plan in the group management on mud crab fattening.

Also, SEAFDEC prepared the report of the second experiment of mud crab fattening and the digest was distributed to members as a discussion materials. The expressive points in this report were described by Mr. Etoh as below.

The result and recommendation of report was explained by Mr. Etoh that;

- Survival rate is only 2.4%
- One of the reasons for this low survival rate was the high tide in November and December. During this period many crab escaped.
- The theft was considered as the major cause for loss. The group should discuss on how to protect from being stolen.
- The environmental condition like water temperature, salinity, DO etc. was relatively improved compared with the one in the first experiment.

The chairman of crab culture group gave his findings in study trip that;

- In the next crab culture experiment, the sluice gates of the pond should be replaced with the PVC pipe method.
- Group promised to work well on group management than the last experiment to protect high amount of loss.
- Needs to develop the corner of pond for feeding, preparation of the feeding slope
- The new culture experiment will be take short time, only 2 months, and mud crab to be stocked should not be less than 100 gm per crab.
- They will start to culture on pond no. 3 and 5 first separately by male and female.

It was further suggested among the members and the CF Chief as below.

- The next experiment may be divided members to hold a responsibility in each pond,
- CF (Community Fisheries) can support the scheme, e.g. holding meetings 5 times a month among members to monitor the progress

Mr. Nen Chamroeun, FiA's staff mentioned that the mud crab culture group would like to try to culture soft crab, because the soft crab can be found in the market at cheaper price and will be fattened for short time to the market size.

Mr. Etoh suggested that the soft crab was not strong enough to culture in ponds and the project should concentrate on the normal fattening process first and as the second stage the soft shell crab fattening can be tried out.



Fig. 1 Chairman explained the findings of study trip at Kampot Province (left) and drying ponds by pumping water before starting new mud crab fattening in July (right)

The expected installation of the continuous recording machine for salinity and water temperature which was donated by JICA in a bid to monitor a relationship between water temperature / salinity and crab mortality rate could not be made as the procurement of the machine was delayed.

4.3. Crab Bank Group meeting

In the wake of organization of the crab bank group on 1st April 2008, the study tour to Stung Hao was conducted by the leading members on 5th April 2008. Based on the outcome from the study tour, cages for stocking gravid crab were constructed and the system was commissioned. The project team intended to monitor its activity and discuss implementation issues with the members of Crab Bank Group. Taking advantage of this occasion, presentations was made by the leading members who participated in the study tour to Stung Hao on 5th April 2008 on findings and lessons learned from the study tour.

16 participants of crab bank group visited crab bank at Stung Hao, the findings in the study tour was presented by Mr. Hak Eseu, Chairman of Crab Bank Group as follows.

- Crab bank activity can reserve crab resources and give benefits to fisheries community.
- The crab bank at Stung Hao have separated gravid crab by color of eggs; the crab with black color eggs would hatch in 3 days and the crab with yellow color eggs would hatch in 7 days.
- Every morning at 0800, they give about 3 kg of feed, because the location of crab bank at Stung Hao is near the shore.

Crab bank system in Thek Thla commune (Community Fisheries Prey Nup II) :

- The crab bank of Thek Thla commune started construction of the cages from 25-28 April with 15 members of crab bank group. They began to release 5 gravid crabs on 16 May, all gravid crab supported by FiA, Sihanoukville.
- Chairman gave feed in the morning on the way of his fishing every day.
- The releasing of gravid crab is made on the way back from fishing by members and they inform the number to the leader for recording to the logbook. Chairman checks the number of gravid crab every day in feeding time.

Crab trap fishing group from Prey Pros needs to establish crab bank in their village, because the first crab bank have established at Prey Sangke, it is too far from Prey Pros village. The next trip (July) SEAFDEC will establish fishermen's workshop and 2 cages of crab bank to

Prey Pros village, this meeting will establish a new committee of crab bank sub-group and explain the meaning of crab bank, including general account and data recording.



Fig. 2 Chairman explained the finding of study trip at Stung Hao (left) and the crab bank at Prey Sangke village (right)

4.4 Blood Cockle Fish Refugia follow-up work

The draft Self-regulatory Measures for Blood Cockle Fishing in conjunction with establishment of Fish Refugia was thoroughly discussed among the members and reached a consensus at the 8th Fishers Workshop on 19 February 2008. This self-regulatory measures were further discussed with the Blood Cockle Fishing Group on 2 April 2008 in the light of technical applicability. At this workshop, it was agreed that the minimum size of harvestable blood cockle was limited to 100 pcs. per Kg or over 32 x 22mm (L x H). Consistent with this size restriction, the mesh size of filtering sieve was also enlarged to 22 x 22mm (L x W). This amendment was sent to the Kampong Som FiA Cantonment for technical as well as legal consultation, which was expected to be finalized by now (actually no progress was made by the Cantonment). Also, the center point of Fish refugia was marked with the pole and the extent of demarcated area with 2 sq. km was measured. As the next step, the proposal of establishment of Fish Refugia along with the Self-regulatory Measures should be submitted to Kampong Som FiA Cantonment by the Community Fisheries Prey Nup II through the regular channels in accordance with the Prakas on Guidelines of Community Fisheries. Meantime, preparation of establishment of Fish Refugia and implementation of Self-Regulatory Measures should proceed as a provisional base. Meantime, a practical implementation abiding by the self-regulatory measures should be put in place in use of measuring sieves. The project team was to monitor the progress in implementation of the self-regulatory measures.

Mr. Etoh confirmed with the meeting that the self-regulatory measures of blood cockle fishing did not regulate the fishing hours in the demarcated zone but only size control. As to the seasonal fishing ban, it should not be applicable this year as the biological study to identify the spawning seasons is still under way. After discussion, the group agreed the minimum harvestable size of blood cockle with 100 pcs/kg or 32x22=L x H mm/pcs which could be sifted by the sieve with the mesh size of 22 x 22 mm (LxW). The sieve will be used by middlemen and fishermen as well.

Mr. Etoh informed more on spawning season of blood cockle that SEAFDEC is studying on this and after one year of the research work, we will know what month is the spawning season of blood cockle precisely.

The next fishermen's workshop will be organized with participation of the neighbouring blood cockle fishermen to disseminate the context of the self-regulatory measures in the demarcated zone (Fish Refugia). Also, SEAFDEC will provide sieves to 10 middlemen and 70 fishermen.



Fig. 3 Project's staff and fishermen conducted collection of blood cockle sample (left) and SEAFDEC's staff collected and treated sample of blood cockle with formalin (right)

Simultaneously, aimed at monitoring its expected impact on resources dynamics a relevant data collection and analytical system was established in early April 2008 with selected enumerators. The follow up monitoring was conducted with the data recorded. Further, the periodical sample collection in the area of Fish Refugia was also conducted.

4.5 Cage Culture Group Meeting

The Cage Culture Group was established on 3rd April 2008 when the 2nd meeting with potential members was held. The leader was elected among 6 members. The operational and management mode was thoroughly discussed at this meeting and it was agreed to construct the cages by hands of the members. The project team is going to inspect its progress. Meantime, the economic feasibility study was carried out and the result was presented to the members for discussion.



Fig 4: Cage Culture Group Meeting

This group requested fish cage culture on sea bass with 6 cages, but prior to implementation, the project intended to discuss with the member on the economic feasibility of the venture to ensure the profitability on the sea bass culturing. The data shown in the discussion were:

- The structure of cage is the floating cages.
- The cost of one cage is about 6,500 Baht, the total construction cost is 968 USD, the life of cage is 4 years
- Fingerlings will be placed an order to Koh Kong through middlemen in Sihanoukville, the price of fingerling is 900 Riels (3 inch of size)
- This area need to culture only one time per year, because the water has low salinity from June to August. Fish cage culture will start in September to March.
- Feeding is in use of trash fish at 1500 Riel per kg,
- The marketable size of sea bass is 500gm per piece at 4 USD per kg.

- The survival rate is 60%, density is 1,500 fish per cage (2.5x2.5x2.0 m.)

Mr. Etoh mentioned that the project had to study further carefully about the economic feasibility. It will be finalized by the next time before August, he added.

4.6. Implementation Coordination Committee (ICC) meeting

The 6th ICC meeting was organized to discuss a number of tactical issues at local level with the representatives of various institutions, agencies and groups pertinent to the project implementation. Particularly, the meeting is convened in order to:

- ① monitor the project progress since the last ICC meeting,
- ② discuss the proposed project immediate action plan for the next 3 months, from the point of view of practical implementation, and
- ③ identify the constraints in the project implementation at local level and suggest possible solutions.

List to participants

DOF Cambodia & Fisheries Office Sihanoukville

- | | |
|-----------------------|--|
| 1. Mr.Ing Try | Deputy Director General, FiA, PP |
| 2. Mr.Ke Pha | Deputy Director, Agriculture Dept., SV |
| 3. Mr.Duong Samath | Chief Cantonment FiA |
| 4. Mr. Samreth Sambo | Vice chief CFDO, DOF, PP |
| 5. Mr. Kao Manyrith | Deputy chief of Marine Inspectorate of FiA |
| 6. Mr. Chann Sapheap | Deputy of Conservation Division |
| 7. Mr. Va Longdy | FiA |
| 8. Mr.Yos Chanthana | Team leader |
| 9. Ms. Heng Punley | Socio-economist |
| 10. Mr. Nen Chamroeun | Vice Chief of Cantonment FiA |
| 11. Mr. Khin Saravuth | Officer of Cantonment FiA |
| 12. Mr. Sam RithKeila | Extension worker |

CFs

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| 13. Mr. Hak Eseu | Chief of Crab Bank |
| 14. Mr. Seum Sani | Chief of patrol group |
| 15. Ms. Koup Maryass | Chief of Blood cockle fishing group |
| 16. Ms. Mat Maysaross | Vice chief of Blood cockle fishing group |
| 17. Mr. Mok Sen | Chief of mud crab culture group |
| 18. Ms. Kit Nean | Member of Mushroom Producers group |
| 19. Mr. Sou ret | Chief of fish cage culture group |

SEAFDEC/TD

- | | |
|-----------------------------|-----------------------------|
| 20. Mr.Sei Etoh | Project leader |
| 21. Ms.Sumitra Ruangsivakul | Socio-economic Section Head |
| 22. Ms.Jariya Sornkliang | Researcher |
| 23. Ms. Thanyalak Sausi | Researcher |

JICA

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| 24. Mr. Tatsuya Hatori | JICA adviser to FiA |
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The minute of the 6th ICC meeting will be prepared by the Team Leader of the project, FiA,Cambodia.

Annex 6

INTERNAL RULES OF THE GROUP

Mushroom Producers Group, Community Fisheries Prey Nup II (MPG)

Article 1: Name

The group is named the “**Mushroom Producers Group Community Fisheries Prey Nup II**”, and is abbreviated as “**MPG**”.

Article 2: Objectives

The Mushroom Producers Group Community Fisheries Prey Nup II, hereinafter called “**Group**” or “**MPG**”, is formed with the following objectives.

1. To consolidate mutual benefits for those who are engaged in mushroom production in the Community Fisheries Prey Nup II.
2. To facilitate business transaction as a collaborative unit upheld by the village groups, particularly in mushroom production
3. To promote local business development within the organization of the Community Fisheries Prey Nup II.

Article 3: Conditions for membership

Anyone of both sexes who wants to become members of the MPG has the right to join voluntarily, and must fulfill the following conditions:

1. He / she must be a resident in one the villages of the Community Fisheries Prey Nup II;
2. He / she must have a Khmer citizenship;
3. He / she must be at least eighteen years old; and
4. He / she must have been originally or must have the intention to engage in mushroom production or marketing business.

Article 4: Rights of a member

A member of the MPG who meets the conditions in Article 3 above has the following rights:

1. to enjoy the benefits and services rendered by the Group equally;
2. to participate in all activities of the Group;
3. to vote and stand as a candidate for election of committee members; and
4. to resign any time from the membership at his / her own freewill.

Article 5: Duties of a member

A member of the MPG has the following duties to be pursued:

1. Obey the general rules and regulations of the Community Fisheries Prey Nup II;
2. Obey the Internal Rules of the Group;
3. Participate in activities of the Group for the benefit and prosperity of the MPG; and
4. Assist the other members of the Group performing activities in relation to mushroom production and marketing.

Article 6: Dismissal from membership

A member of the MPG may be dismissed from membership under the following conditions. However, the dismissal must be determined by at least two thirds (2/3) vote at the

Committee Meeting.

1. Causing significant impacts on the interests of the MPG or of other members of the Group;
2. Violating the general rules and regulations of the Community Fisheries Prey Nup II; and
3. Violating the Internal Rules of the MPG.

Article 7: Structure of the Group

The MPG is upheld by the village groups who have been or are engaged in mushroom production. Currently, four groups exist: in Campong Chin, Prey Sangke, Prey Pros, and Prey Toal. In case new groups are created in the future, those groups will be incorporated in MPG with equal qualifications.

Article 8: Committee of the Group

The managing and governing institution of MPG is the Committee Meeting which is represented by one (1) representative from each village group plus a representative from the Fisheries Community Prey Nup II. The total number must always be in odd figures. The members of the Committee should be approved at the general assembly. The tenure of the Committee Members is for a period of two years beginning the day of the elections and ending until the new Committee Members have been elected at the general assembly.

In the event that a member of the Committee is absent without cause for six (6) months or asked to resign before the end of his/her term, the next candidate from the same group must be appointed as replacement.

Article 9: Leader and Vice-leader

The Leader and the Vice-leader of the Committee are selected among the Committee members by election. The tenure of the Leader and Vice-leader is two years beginning the day of the elections and ending when a new Leader that has been elected at the general assembly. The Leader of the Group is responsible for leading and managing the entire operation of the MPG. The Vice-leader of MPG serves as assistant to the Leader.

Article 10: Conduct of committee meetings

The Leader must call for Committee meetings whenever considered necessary or as requested by at least two Committee members. The Leader must invite all Committee Members and preside over all Committee meetings. In the event that the Leader of Group is absent, the Vice-leader to whom he/she has delegated the authority must serve as the chairperson of the meeting.

For a meeting of MPG committee to be legitimate, at least two thirds (2/3) of all committee members must be present, and decisions on any issue require approval by at least two thirds (2/3) of the members of the committee who are present.

Immediately after the meeting has finished, the Leader of Group must take the necessary actions in line with the decisions made at the Committee meeting.

Article 11: General Assembly

The general assembly is the highest body for all decision-making in name of the Group. The initial general founding assembly of the MPG must be convened after the groups of

founders have prepared all matters related to the conduct of the general assembly. The initial general founding assembly of the Group ratifies the important decisions and matters that include the following:

- 1. Name of the Group
- 2. The contents of the Internal Rules of the Group
- 3. The initial application for membership
- 4. The Committee Members of the Group

The regular general assembly must be organized once a year in order to summarize the results of activities during the year and approve important matters of the MPG. If necessary, the Group may convene an extraordinary general assembly in response to requests made by at least two villages of the Groups.

For a general assembly to be legitimate, at least two thirds (2/3) of all members of the MPG must be present, and decisions on any issue require approval by at least two thirds (2/3) of the members of MPG who are present.

Article 12: Dissolution of disputes

All disputes within the Group must be resolved as follows:

- 1. TheMPG must mediate and resolve disputes in an amicable way;
- 2. In the event that the Association can not successfully resolve the dispute, the case must be submitted to the Chief of the Community Fisheries Prey Nup II for intervention; and
- 3. In the event that the dispute still can not be solved, the Chief of the Community Fisheries Prey Nup II must submit the case to the Director of the Fisheries Cantonment, Sihanoukville, for intervention.

Article 13: Amendment of the Internal Rules

Amendment of the Internal Rules of the MPG must be approved at the general assembly by 2/3 (two thirds) of the members of MPG who are present.

Article 14: Final provision

The Internal Rules of the MPG have been ratified at the initial general assembly of the Mushroom Producers Group Community Fisheries Prey Nup II on 2nd April 2008 and become effective from the day these are signed by the Leader of the Association.

Signed: _____ , On: _____
Name: _____

Leader of Mushroom Producers Group Community Fisheries Prey Nup II

As a witness (committee members):

- 1. _____ : _____
- 2. _____ : _____
- 3. _____ : _____
- 4. _____ : _____

Annex 7 – 1 Financial status of the Women' Groups

Calculated Profit and Loss Analysis in Mushroom Production in 2007

No.	Item	Group				Total		Remarks
		Kampong Chin	Prey Sangke	Prey Pros II	Prey Toal	(in Riel)	(in USD)	
1	Sales (Riel)	2,355,200	2,012,900	2,385,600	1,089,900	7,843,600	1,960.9	
2	Incurred expenses (Riel)	1,938,150	1,889,200	3,351,600	1,798,050	8,977,000	2,244.3	
	- Depreciation of facilities	273,000	273,000	273,000	273,000	1,092,000	273.0	
	- Variables (materials + social welfare)	1,665,150	1,616,200	3,078,600	1,525,050	7,885,000	1,971.3	
3	Gross income (Riel)	417,050	123,700	-678,500	-708,150	-845,900	-211.5	
4	Saving for investment (Riel)	83,410	24,740	0	0	108,150	27.0	
5	Net income (Riel)	333,640	98,960	-678,500	-708,150	-954,050	-238.5	
6	Reserve for the year of 2008 (Riel)	561,900	561,900	561,900	561,900	2,247,600	561.9	
	- Repair and maintenance of facilities	81,900	81,900	81,900	81,900	327,600	81.9	
	- Revolving fund for 2 months' operation	480,000	480,000	480,000	480,000	1,920,000	480.0	
7	Available share in 2007 (Riel)	-228,260	-462,940	-1,240,400	-1,270,050	-3,201,650	-800.4	
8	Shares already distributed (Riel)	1,047,067	0	1,480,400	0	2,527,467	631.9	
9	Net amount share after deduction of paid amount	-1,275,327	-462,940	-2,720,800	-1,270,050	-5,729,117	-1,432.3	
10	Cash in hand on 31 December 2007(Riel)	979,499	2,225	0	2,211	983,935	246.0	
11	Actual amount to be saved / reserved (Riel)	771,810	679,640	-543,400	131,370	1,039,420	259.9	
12	Balance (yet to be distributed to members)	207,689	-677,415	-543,400	-129,159	-1,142,285	-285.6	
13	Transfer to Saving account	209,910	135,740	0	0	345,650	86.4	
14	Economic return against capital (%)	50.9%	15.1%	-22.8%	-86.5%			

Cash Flow for Mushroom Production in 2007
(Including transaction of Saving account)

Particular	Village (in '000 Riel)				Total	
	Kampong Chin	Prey Sangke	Prey Pros	Prey Toal	in '000Riel	in USD
1. Cash in hand in Dec. 2006	2,055.0	686.6	11.4	493.9	3,246.9	811.7
2. Income in business transaction	3,371.2	2,012.9	2,725.6	1,089.9	9,199.6	2,299.9
3. Expenditure						
- Paid by Group	2,519.2	952.8	1,256.6	636.6	5,365.2	1,341.3
- Paid by Project	894.0	884.4	1,822.0	888.5	4,488.9	1,122.2
4. Share distributed to members	1,197.1	0.0	1,480.4	0.0	2,677.5	669.4
5. Gross profit in 2007	-1,239.1	175.7	-1,833.4	-435.2	-3,332.0	-833.0
6. Cash in hand in Dec. 2007	1,709.9	1,746.7	0.0	947.2	4,403.8	1,101.0
7. Increase of financial asset in cash	-345.1	1,060.1	-11.4	453.3	1,156.9	289.2
8. Required revolving fund for 2008	961.9	961.9	961.9	961.9	3,847.6	961.9
9. Surplus of cash in hand in 2008	748.0	784.8	-961.9	-14.7	556.2	139.1

Saving Account Record in 2007

Particulars	Transaction					
	Kampong Chin			Prey Sangke		
	Received	Paid	Balance	Received	Paid	Balance
B/F	0			0		
- Saving for depeciation for 2006	136,667			111,567		
- Transfer from the main account (20% savir	272,267			1,287		
- SEAFDEC capital saving in 2006	1,057,000			26,806		
Initial fund Sub-total:	1,465,934			139,660		
- Purchase of commodities for investment		1,601,500				
- Purchase of equipment		0			59,000	
- Distributed share to group members		150,000				
Expenditure Sub-total:		1,751,500			59,000	
- Sales of commodities	900,000					
- Interests from mini-credit scheme	116,000					
Income Sub-total:	1,016,000					
Total	2,481,934	1,751,500	730,434	139,660	59,000	80,660
C/F			730,434			80,660
Summary						
Particulars	Original funds	Business Income	Business expenditure	Original funds	Business Income	Business expenditure
Transaction in 2007	1,465,934	1,016,000	1,751,500	139,660	0	59,000
Profit gained in transaction		-735,500			-59,000	

Summary of Monthly Transactions in 2007 – Kampong Chin

	Item	Q'ty	Income (Riel)	Payment (Riel)			Remarks
				by SEAFDEC	by Group	Sub-total	
1	Production of packet (pc)	11,414.0					
2	Production of mushroom (kg)	970.8					
3	Sales (Riel)	970.8	2,355,200				
4	Purchase of equipment						
	- Wood bark (pc)		0	0	0	0	
	- Wood pole (pc)		0	0	0	0	
	- Rope (coil)		0	0	7,000	7,000	
	- Nail (Kg)		0	0	10,000	10,000	
	- Galvanized iron sheet (pc)		0	0	11,000	11,000	
	- Boiling vat (unit)		0	0	90,000	90,000	
	- Plastic sheet (Pc)		0	0	0	0	
	- Roofing material		0	0	22,500	22,500	
	- Steel wire(Kg)	1.0	0	6,000	0	6,000	
	-						
	Sub-total:			6,000	140,500	146,500	
5	Purchase of materials						
	- Saw dust (bag)	70.0		350,000	360,000	710,000	
	- Rice bran (Kg)	245.0		134,400	75,500	209,900	
	- Lime (Kg)	16.0		11,200	19,000	30,200	
	- Spore (bottle)	127.0		214,200	109,200	323,400	
	- Plastic bag (Kg)	15.5		130,500	171,500	302,000	
	- Rubber band (bag)	1.0		17,000	13,000	8,500	
	- Plastic tape (coil)			0	0		
	- Fire wood (bundle)	3.7		16,650	0		
	- PVC (M)	2.0		14,000	0	14,000	
	-			301,250	0		
	Sub-total:			887,950	748,200	1,598,000	
6	Labour contribution (hr)	0.0					
	- Tean	398.0					
	- Noun	352.0					
	- Neav	346.0					
	- Kun	346.0					
	- Leang	148.0					
	- Ret	237.0					
	Sub-total:	1,827					
7	Any other payment						
	- Employed labourer	0.0	0.0	0.0	0		
	- Social welfare	0.0	0.0	0.0	0		
	- Transportation	0.0	0.0	0.0	29,000	29,000	
	Sub-total:				29,000	29,000	
8	Share distributed	0		0	1,047,067	1,047,067	
9	Transfer fund to Saving account	0	0	0	1,465,934	1,465,934	
	Grand Total:		2,355,200	893,950	3,430,701	4,324,651	
	Cash in hand in December 2006						2,055,000
	Cash saved in 2007						-1,075,501
	Cash in hand in December 2007						979,499

Summary of Monthly Transactions in 2007 – Pery Sangke

	Item	Q'ty	Income (Riel)	Payment (Riel)			Remarks
				by SEAFDEC	by Group	Sub-total	
1	Production of packet (pc)						
2	Production of mushroom (kg)	904.8					
3	Sales (Riel)		2,012,900				
4	Purchase of equipment						
	- Wood bark (pc)			0	0	0	
	- Wood pole (pc)			0	0	0	
	- Rope (coil)			0	0	0	
	- Nail (Kg)			0	0	0	
	- Galvanized iron sheet (pc)			0	47,000	47,000	
	- Boiling vat (unit)			0	59,000	59,000	
	- Plastic sheet (Pc)			0	50,000	50,000	
	- Roofing material			0	0	0	
	- Steel wire (Kg)	1.00		6,000	0	6,000	
	-					0	
	Sub-total:			6,000	156,000	162,000	
5	Purchase of materials					0	
	- Saw dust (bag)	180.00		350,000	385,000	735,000	
	- Rice bran (Kg)	168.00		134,400	28,800	163,200	
	- Lime (Kg)	17.00		11,900	25,000	36,900	
	- Spore (bottle)	175.00		212,500	60,000	272,500	
	- Plastic bag (Kg)	14.00		126,000	89,800	215,800	
	- Rubber band (bag)	1.00		17,000	0	17,000	
	- Plastic tape (coil)	0.00		0	0	0	
	- Rope	2.80		12,600	0	12,600	
	- PVC (M)	2.00		14,000	0	14,000	
	- Water	0.00		0	21,000	21,000	
	Sub-total:			878,400	609,600	1,488,000	
6	Labour contribution (hr)						
	- Ngib	278.00					
	- Yab	210.00					
	- Seomat	169.00					
	-						
	-						
	-						
	Sub-total:	657.00					
7	Any other payment						
	- Employed labourer				0	0	
	- Social welfare				0	0	
	- Transportation				128,200	128,200	
	Sub-total:				128,200	128,200	
8	Share distributed				0		
9	Transfer fund to Saving account				139,660		
	Grand Total:		2,012,900	884,400	1,033,460	1,917,860	
	Cash in hand in December 2006						686,600
	Cash saved in 2007						977,440
	Cash in hand in December 2007						1,666,040

Summary of Monthly Transactions in 2007 – Prey Pros

	Item	Q'ty	Income (Riel)	Payment (Riel)			Remarks
				by SEAFDEC	by Group	Sub-total	
1	Production of packet (pc)	6,490					
2	Production of mushroom (kg)	1,115.2					
3	Sales (Riel)		2,385,600				
4	Purchase of equipment						
	- Wood bark (pc)	36		78,000	0	78,000	
	- Wood pole (pc)	440		277,000	0	277,000	
	- Rope (coil)	1		5,000	0	5,000	
	- Nail (Kg)			0	7,000	7,000	
	- Galvanized iron sheet (pc)			0	0	0	
	- Boiling vat (unit)			0	45,000	45,000	
	- Plastic sheet (Pc)			0	35,000	35,000	
	- Roofing material			0	0	0	
	- Steel wire(Kg)	2.0		12,000	0	12,000	
	- Coconut leaves	1,500		315,000	0	315,000	
	- Wire	1		5,000	0	5,000	
	Sub-total:			692,000	87,000	779,000	
5	Purchase of materials						
	- Saw dust (bag)	101.0		505,000	350,000	855,000	
	- Rice bran (Kg)	543.0		202,400	150,000	352,400	
	- Lime (Kg)	53.0		23,900	20,000	43,900	
	- Spore (bottle)	1,188.0		200,600	204,000	404,600	
	- Plastic bag (Kg)	13.5		121,500	85,000	206,500	
	- Rubber band (bag)	2.0		32,000	85,000	117,000	
	- Plastic tape (coil)	0.0		0	2,500	2,500	
	- Fire wood (bundle)	0.0		0	54,000	54,000	
	- Rope	6.8		30,600	0		
	- PVC (M)	2.0		14,000	0	14,000	
	- Zinc	0.0		0	5,000	5,000	
	- Bag	0.0		0	5,200	5,200	
	Sub-total:			1,130,000	960,700	2,054,900	
6	Labour contribution (hr)						
	- Sang	492					
	- Meang	727					
	- Vanny	653					
	- Y-Hu	653					
	-	277					
	Sub-total:	2,802					
7	Any other payment						
	- Employed labourer	0.00	0	0	0	0	
	- Social welfare					0	
	- Transportation				208,900	208,900	
	Sub-total:				208,900	208,900	
8	Share distributed	0.00	0	0	1,480,400	1,480,400	
9	Transfer fund to Saving account	0.00	0	0	0	0	
10	Income from Credit as interest	0.00	340,000	0	0	0	
	Grand Total:		2,725,600	1,822,000	2,737,000	4,523,200	
	Cash in hand in December 2006						11,400
	Cash saved in 2007						-11,400
	Cash in hand in December 2007						0

Summary of Monthly Transactions in 2007 – Prey Toal

	Item	Q'ty	Income (Riel)	Payment (Riel)			Remarks
				by SEAFDEC	by Group	Sub-total	
1	Production of packet (pc)	4,088					
2	Production of mushroom (kg)	493.1					
3	Sales (Riel)		1,089,900				
4	Purchase of equipment						
	- Wood bark (pc)			0	0	0	
	- Wood pole (pc)			0	0	0	
	- Rope (coil)			0	0	0	
	- Nail (Kg)			0	0	0	
	- Galvanized iron sheet (pc)			0	0	0	
	- Boiling vat (unit)			0	0	0	
	- Plastic sheet (Pc)			0	0	0	
	- Roofing material			0	0	0	
	Sub-total:			0	0	0	
5	Purchase of materials						
	- Saw dust (bag)	170.0		350,000	350,000	700,000	
	- Rice bran (Kg)	368.0		134,400	100,000	234,400	
	- Lime (Kg)	17.0		11,900	0	11,900	
	- Spore (bottle)	175.0		212,500	147,000	359,500	
	- Plastic bag (Kg)	24.5		130,500	0	130,500	
	- Rubber band (bag)	1.0		17,000	0	17,000	
	- Plastic tape (coil)	0.0		0	0	0	
	- Fire wood (bundle)	1.0		6,000	0	6,000	
	- PVC (M)	4.7		26,150	0	26,150	
	- Bag	0.0		0	35,000	35,000	
	Sub-total:			888,450	632,000	1,520,450	
6	Labour contribution (hr)						
	- Phas	346					
	- Vau	322					
	- Lam	328					
	- Rakya	319					
	Sub-total:	1,315					
7	Any other payment						
	- Employed labourer		0	0	0	0	
	- Social welfare		0	0	0	0	
	- Transportation		0	0	4,600	4,600	
	Sub-total:			0	4,600	4,600	
8	Share distributed	0	0	0	0	0	
9	Transfer fund to Saving accour	0	0	0	0	0	
	Grand Total:		1,089,900	888,450	636,600	1,525,050	
	Cash in hand in December 2006						493,900
	Cash saved in 2007						453,300
	Cash in hand in December 2007						947,200

Annex 8

Report on The 2nd Experiment on Mud-Crab Culture in Sihanoukville

Project on Integrated Coastal Resources Management in Sihanoukville (ICRM-SV)

Sei Etoh
Project Leader
SEAFDEC/TD
11 June 2008

1. BACKGROUND

As specifically stated in the report on Experimental Mud-Crab Culture in Sihanoukville (Etoh 2007), mud-crab culture experiment was commenced in February 2007 which was envisaged to promote local business development approaches, and constitutes one of the vital components of the project. The first experiment was continued up to the middle of June 2007, and although the result could not produce any promising outcome mainly due to unfavorable climatic conditions, it provided very useful experiences and knowledge to the mud-crab culture group. The technical report addressing the cause of low productivity in this experiment was issued in August 2007, based on which a preliminary meeting was held with the Fisheries Administration of Cambodia (FiA) and SEAFDEC on 30 August 2007 in Phnom Penh in a bid to decide the future course of action for the mud-crab culture activity. A number of identifiable concerns and problems needing remedies were presented at the meeting, after which the meeting finally decided to continue the mud-crab culture scheme, provided the following issues and concerns related to mud crab culture are addressed. Moreover, all were in agreement to exert their utmost efforts toward the successful operation of mud-crab culture under the ICRM-SV project. The issues and concerns that need to be addressed included:

- Deepening of the pond bottom up to 30-50 cm should be immediately carried out by the FO of SNV. Initially, one of the ponds (Pond No. 3) should be renovated as a trial pond and the conditions should be evaluated before moving to the next ponds.
- Renovation of sluice gates should be made using funds from SEAFDEC/TD.
- Since one of the crucial causes of the missing crabs in the previous experiment was due to theft, the FiA should take an effective action to prevent the crabs from being stolen or poached.
- The FO, SNV, should assign one officer permanently to the project site to attentively look after the whole operation of the mud-crab culture.
- Measurements and recording of DO concentration, salinity, water temperature and growth rates should be carried out regularly without fail. As to the operation of a DO meter, Mr. Hatori from JICA should train Mr. Chanthana from FiA and the newly nominated officer from FO on the use of a DO meter.
- In order to ensure technical backstopping, a communication network should be established among the four parties; i.e. the project site, the project office in Sihanoukville, JICA Expert in Phnom Penh, and SEAFDEC/TD in Bangkok. Any irregularities especially those that relate to the parameters measured and monitored in the culture ponds, the newly nominated officer in FO should report to Mr. Chanthana without delay. Then, Mr. Chanthana should contact immediately Mr. Hatori by telephone for technical advice and to follow his instructions. Also, such related incidents should also at the same time, be communicated to SEAFDEC/TD by e-mail.

Based on the outcome of the preliminary meeting as mentioned above, it was decided that the 2nd trial would be conducted starting in November 2007. In the meantime, preparation works like pond deepening and repair of the sluice gates were carried out as agreed upon. A workshop was held on 17 October 2007 participated by all members of the Crab Culturing Sub-group, to review the mud crab culture practices, identify the causes of failure and find out solutions for improvement. At this workshop, lively discussions among the 25 participants resulted in the identification of the causes of high mortality and lost rate, and in finding out effective measures to be undertaken during the next 2nd experiment. Possible solutions were concluded and listed in a table for all workshop participants to see. The summary of the conclusions reached at this workshop is shown in Table 1.

Table 1 . Remedial measures to improve the recovery rate of crab production

Causes of low recovery rate	Physical observations and cases from the experiment	Suggested remedial measures and solutions	Responsible party(ies)
(A) High mortality			
1. High temperature	Hottest climate (March - May)	Cool season (Nov. to March)	All parties
	Shallow depth of ponds	Deepen ponds by 50 cm	FO/SNV
	Leaking water from ponds	Repair sluice gates	SEAFDEC
	No monitoring of the temperature	Regular monitoring of water temperature	MCCG
2. High salinity	End of dry season (March/April)	Before end of dry season (up to Feb.)	MCCG
3. Low DO	No measurement of DO	Regular measurement of DO	MCCG & SEAFDEC
	No technical consultation	Consultation with JICA expert	FiA & SEAFDEC
4. Weak juveniles	Poor acclimation practices	Proper acclimation practices	MCCG
	Bulk purchasing of juveniles	Purchase limited number of juveniles (max. 100 pcs/day)	MCCG & SEAFDEC
	Purchasing of juveniles from a distant area	Purchase juveniles within the vicinity	MCCG & SEAFDEC
(B) Escaping			
5. Feeding	Improper feeding	Measure and monitor feeding	MCCG
	Presence of fish in ponds	Removal of fish in ponds	MCCG
	No regular measurement of growth rate	Regular measurement of growth rate (every 2 weeks)	MCCG
(C) Theft /Poaching			
6. Protection	Free access by thieves or poachers	Installation of a watch hut to prevent entry of thieves	MCCG & SEAFDEC
	Lack of sense of common property of the project by the community	Dissemination of the project roles and peoples' participation in the community	CF & FO/SNV
	No representative from the authority	An officer representing FiA assigned at the project site	FiA

Note:

MCCG: Mud-Crab Culturing Group

FiA: Fisheries Administration

FO/SNV: Fisheries Office, Sihanoukville Municipality

CF: Community Fisheries Prey Nup II

SEAFDEC: Southeast Asian Fisheries Development Center

After completion of all preparatory works, the 2nd experiment was commenced on 17 November 2007, when 847 pcs. of confiscated juvenile mud crabs were released in Pond No.1.

2. THE SECOND MUD-CRAB FATTENING EXPERIMENT

2.1. Juvenile crab releasing

After completing the pond renovation, purchasing and releasing of juvenile mud crab to the ponds commenced in November 2007. The first batch comprised 847 pieces small crabs which were confiscated in Koh Kong Province from an illegal trader who was attempting to smuggle juvenile size mud crabs to Vietnam. The small crabs (ave 13.6 g) were released in Pond No. 1 on 17 November 2007 without sorting them by sex. The 2nd batch (ave 81.1 g) was purchased from 19 to 25 November 2007, of which 574 pcs were female crabs and 698 pcs were male, and stocked in the 2nd and 3rd ponds, respectively. The third batch (ave 79.5 g) was procured from 10 to 14 December 2007 with 450 pcs female crabs and 619 pcs male which were released in Pond No. 4 and 5, respectively. Thus, a total of 3,188 juvenile crabs (total weight of 199.7 kg) were released in November and December 2007. Prior to releasing, the proper acclimation process was carried out by spraying the crabs with the pond water or by dipping them slowly into the ponds, following the instruction of the JICA Expert. Table 2 shows the total stocks in the 2nd experiment.

Table 2: Stocking record in the 2nd experiment

Stocking date	Stock numbers by pond (pcs.)					Total (pc)	Total Wt. (kg)	Average Wt. (g)
	No.1. (Mixed)	No.2 (Female)	No.3 (Male)	No.4 (Female)	No.5 (Male)			
17.11.2007	847	–	–	–	–	847	11.5	13.6
19.11.2007	–	92	117	–	–	209	18.5	88.5
20.11.2007	–	102	130	–	–	232	17.7	76.3
21.11.2007	–	84	144	–	–	228	20.0	87.7
22.11.2007	–	94	92	–	–	186	14.0	75.3
23.11.2007	–	77	97	–	–	174	13.0	74.7
24.11.2007	–	72	71	–	–	143	12.0	83.9
25.11.2007	–	53	47	–	–	100	8.0	80.0
10.12.2007	–	–	–	85	145	230	19.0	82.6
11.12.2007	–	–	–	103	130	233	18.5	79.4
12.12.2007	–	–	–	101	120	221	19.0	86.0
13.12.2007	–	–	–	117	167	284	20.0	70.4
14.12.2007	–	–	–	44	57	101	8.5	84.2
Total	847	574	698	450	619	3,188	199.7	62.6

2.2. Feeding

After the crabs were stocked, feeding was initiated with fresh trash fish which was procured locally at about Riel 1,000/kg. Feeding was made on meshed baskets placed in 4 separate positions and the remaining feeds were checked to control feeding quantity. The quantity and time of feeding were recorded in the logbook daily. About 5 kg feeds on the average, were given to each pond a day. The total feeds given during the 2nd experiment was 1,839 kg.

The quantity and the cost of feeds given throughout the experiment are shown in Table 3.

Table 3: Feeding record for mud-crab fattening in the 2nd experiment

Month	Pond 1		Pond 2		Pond 3		Pond 4		Pond 5		Feed total		
	Wt. (Kg)	Cost (Riel)	Wt. (Kg)	Cost (Riel)	Wt. (Kg)	Cost (Riel)	Wt. (Kg)	Cost (Riel)	Wt. (Kg)	Cost (Riel)	Wt. (Kg)	Cost (Riel)	Cost (USD)
Nov. 2007	24.0	22,358	51.0	43,932	53.0	45,532	0.0	0	0.0	0	128.0	111,822	28.0
Dec. 2007	127.5	100,156	146.0	115,735	139.5	110,543	70.0	54,238	77.0	59,638	560.0	440,310	110.1
Jan. 2008	157.0	124,896	126.0	100,224	111.0	88,224	124.0	98,688	138.0	109,824	656.0	521,856	130.5
Feb. 2008	117.0	96,000	92.0	73,600	70.0	56,000	92.0	73,600	92.0	73,600	463.0	372,800	93.2
Mar. 2008	32.0	64,000	0.0	0	0.0	0	0.0	0	0.0	0	32.0	64,000	16.0
Total	457.5	407,410	415.0	333,491	373.5	300,299	286.0	226,526	307.0	243,062	1,839.0	1,510,788	377.7

Note: Feeding in Pond 4 and Pond 5 was initiated on 11 December 2007.

Table 4: Measurement record for mud-crab fattening in the 2nd experiment

Pond No.	Stocking date	Initial stocking			Measurement	Measurement Date						
		No. (pcs.)	Wt. (kg)	Wt./pc(gr.)		Starting	06.12.07	23.12.07	11.02.08	18.02.08	03.03.08	16.03.08
I (Mixed)	17.11.2007	847	11.5	13.6	Ave. size (cm)	-	-	6.6	7.7	8.8	-	-
					Ave. wt. (gr)	13.6	-	65.0	80.5	144.0	-	170.0
II (Female)	19-25.11.20	574	46.5	81.1	Ave. size (cm)	-	8.0	8.5	12.2	9.4	-	-
					Ave. wt. (gr)	81.1	95.0	136.0	239.5	166.0	300.0	-
III (Male)	19-25.11.20	698	56.7	81.1	Ave. size (cm)	-	9.4	9.3	11.3	10.2	-	-
					Ave. wt. (gr)	81.1	161.7	162.0	282.2	245.0	290.0	-
VI (Female)	10-14.12.20	450	35.8	79.5	Ave. size (cm)	-	-	-	10.8	11.1	-	-
					Ave. wt. (gr)	79.5	-	-	198.0	253.0	281.0	-
V (Male)	10-14.12.20	619	49.2	79.5	Ave. size (cm)	-	-	-	10.9	11.1	-	-
					Ave. wt. (gr)	79.5	-	-	279.0	292.0	289.0	-
Total		3,188	199.7									

Note : Weights of female and male crabs in the respective ponds recorded on the starting date are calculated figures.

2.3. Harvesting and marketing

After the stocking of the juvenile crabs from 17 November to 14 December 2007 (Table 2), the crabs were given feeds as described above. Growth rate was periodically monitored by measuring the average sizes and weights in each pond. The changes in growth are shown in Table 4.

When it was observed that most crabs reached marketable sizes after culturing for about 100 days, the crabs were harvested. It was considered more profitable to harvest crabs just after reaching the size of grade II (200 – 400 g) which can fetch a price of Riel 15,000 to 17,000/kg. The harvest result is shown in Table 5.

2.4. Environmental conditions

All throughout the culture period, water temperature and salinity were measured by the members of the group and recorded in the daily log-book. The changes of the water temperature and salinity are shown in Table 6. Changes in water temperature and salinity in every 10 days are also shown in Fig. 1.

2.5. Bookkeeping and accounting

Entering appropriate figures in the log-book and the general ledger was properly practiced after learning the process during the first experiment. Based on these records, the supplemental accounting books such as Monthly Stock Record, Feeding Record and Crab Harvesting Record were compiled monthly. Each book was verified and scrutinized by the project team whenever they visited the site and necessary corrections and guidance in bookkeeping were exerted. The summarized expenditures during the 2nd experiment are shown in Table 7.

3. DISCUSSION

3.1. Environmental conditions

Compared with the 1st experiment conducted from February to June 2007, the climatic condition in the 2nd experiment was favorable for mud crab culture. Table 8 shows the comparative data for such indicators as salinity, water temperature and D.O. concentration monitored during the two experiments. As shown in Table 8, the water temperature was within the optimum range, salinity was on the slightly higher side especially after January 2008 while the DO concentration was within the tolerable range. In general, the environmental condition was not much of a problem in this experiment. Yet, there were some contentious points that remained unclear; such as the temperature and salinity differences between the surface and the bottom of the pond. This needs further attentive investigation especially in ponds where water is hardly circulated. In addition, measurements of DO concentration as well as that of weight and carapace length should be conducted more frequently.

Table 5: Mud-crab harvest record for the 2nd experiment

Date	Pond number																				Total			
	1 (Mixed)				2 (Female)				3 (MALE)				4 (FEMALE)				5 (mALE)				Number (Pc)	Weight (Kg)	Av.U. Price (Riel/Kg)	Sale (Riel)
	Number (Pc)	Weight (Kg)	U. Price (Riel/Kg)	Sale (Riel)	Number (Pc)	Weight (Kg)	U. Price (Riel/Kg)	Sale (Riel)	Number (Pc)	Weight (Kg)	U. Price (Riel/Kg)	Sale (Riel)	Number (Pc)	Weight (Kg)	U. Price (Riel/Kg)	Sale (Riel)	Number (Pc)	Weight (Kg)	U. Price (Riel/Kg)	Sale (Riel)				
28.02.08					1	0.30	27,000	8,100	12	3.70	20,000	74,000	3	0.85	27,000	22,950	8	2.25	20,000	45,000	24	7.10	21,134	150,050
29.02.08									2	0.50	20,000	10,000	2	0.55	20,000	11,000	1	0.25	20,000	5,000	4	1.30	22,962	29,850
01.03.08					1	0.30	27,000	8,100					1	0.30	27,000	8,100	4	1.25	20,000	25,000	5	1.55	21,355	33,100
02.03.08									1	0.40	27,000	10,800	1	0.30	27,000	8,100	2	0.45	20,000	9,000	4	1.05	24,000	25,200
03.03.08									2	0.55	20,000	11,000					2	0.40	20,000	8,000	3	0.80	23,500	18,800
14.03.08	12	2.1	17,000	35,700					2	0.40	17,000	6,800					2	0.60	20,000	12,000	4	1.15	20,000	23,000
16.03.08	5	1.2	20,000	24,000																	5	1.20	20,000	24,000
	3	0.8	10,000	8,000																	3	0.80	10,000	8,000
	7	0.5	6,000	3,000																	7	0.50	6,000	3,000
Total	27	4.6	53,000	70,700	2	0.60		16,200	21	6.10		123,600	8	2.25		55,150	19	5.50		113,850	77	19.05	19,921	379,500

Table 6 : Changes in salinity, water temperature and dissolved oxygen

Month	Period	Average Salinity (PPT)	Average Temperature (°c)	Average D.O. (ppm)
December 2007	21-31 Dec 07	21.8	30.6	5.98
January 2008	1-10 Jan 08	27.2	29.4	-
	11-20 Jan 08	34.2	31.6	-
	21-29 Jan 08	35.1	31.2	-
February 2008	1-10 Feb 08	32.5	30.5	-
	11-20 Feb 08	35.2	30.6	4.23
	21-29 Feb 08	35.2	30.6	-
March 2008	1-3 Mar 08	35.1	31.0	-

Fig.1: Salinity and Temperature changes in every 10 days

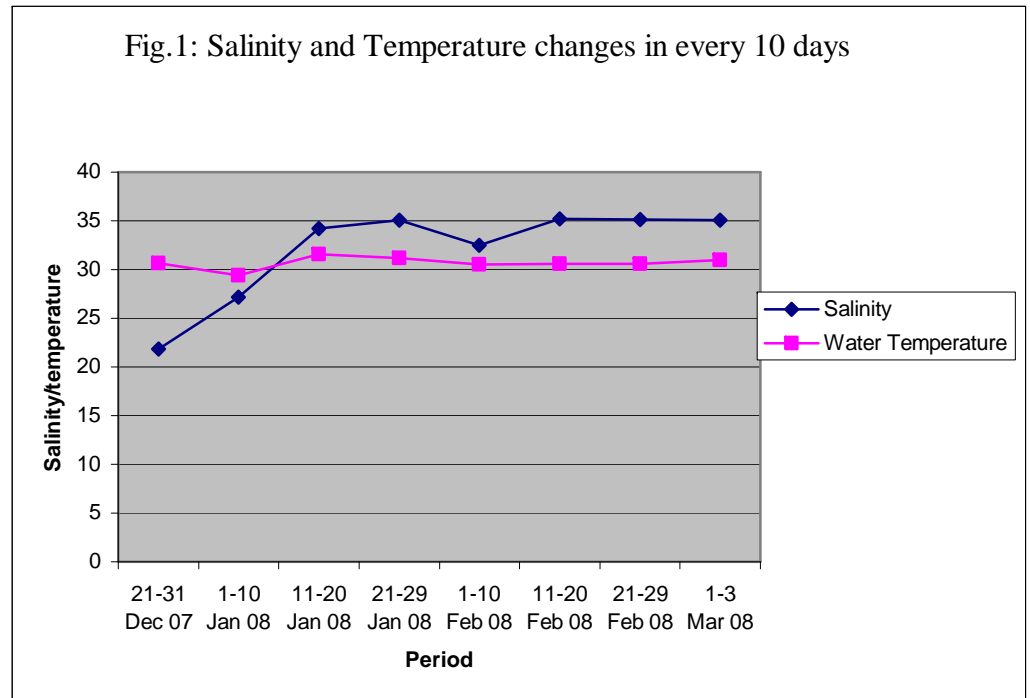


Table 7: Summary of expenditures for the 2nd experiment in mud-crab fattening in 2007/8

Month	B/F	Received	Expenditure										Total expenditure
			crab seed	feed	Bait	labor	phone	fuel	charge battery	ice	transportation	other	
November	401,650	2,300,000	1,341,600	126,200	0	120,000	60,000	0	3,000	16,000	30,000	65,000	1,761,800
December	939,850	2,292,000	1,163,500	487,800	0	415,000	60,000	18,000	7,500	78,000	45,000	457,800	2,732,600
January	499,250	770,000	0	595,200	0	310,000	60,000	33,500	10,200	93,000	0	50,500	1,152,400
February	116,850	1,164,000	0	449,600	48,000	290,000	60,000	0	6,000	76,000	0	10,000	939,600
March	341,250	155,500	0	126,000	34,000	160,000	0	38,400	4,000	0	0	40,000	402,400
Total	94,350	6,681,500	2,505,100	1,784,800	82,000	1,295,000	240,000	89,900	30,700	263,000	75,000	623,300	6,988,800
Percent			35.8%	25.5%	1.2%	18.5%	3.4%	1.3%	0.4%	3.8%	1.1%	8.9%	100.0%

Remark: 1. other: including equipment pipeline,rope,torch, repair pump machine
2. labor include labor for construction

Table 8: Salinity, water temperature and D.O in 1st and 2nd experiments

Experiment	Season	Water temperature (°C)	Salinity (ppt)	DO concentration (ppm)
1st Experiment	Feb. – Jun. 07	32 – 33	20.5 – 37.0	–
2nd Experiment	Nov. 07 – Mar. 08	29.4 – 31.6	21.8 – 35.2	4.23 – 5.98
Optimum figures	–	23 – 32	15 – 30	≥4.0

Note: 1. Water temperature in the 1st experiment was measured only in April.

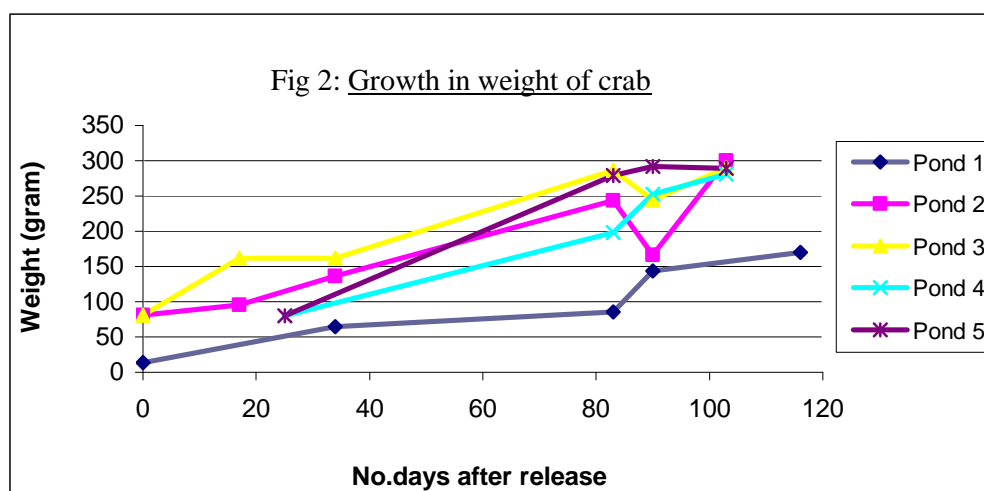
2. Optimum figures are as presented in the Aquaculture Extension Manual No.27 issued by AQD in March 1999.

3.2. Growth rate and FCR

As indicated in Table 9 and Fig 2, the growth rate during the experiment showed a normal pattern although there were some uncertain figures due to lack of samples, e.g. crab in Pond No. 2 on 18.02.2008. The results further showed no significant difference in growth rate of the crabs except in Pond No.1 (stocked with confiscated baby crabs) as well as between female and male crabs. Fig. 2 shows that crabs can grow from 80 g to marketable size of 200 g within 55 – 60 days of culture. This should be taken into consideration in conducting the most economical crab fattening operation. The FCR could not be calculated precisely with the available data as the exact mortality rate in each period could not be traced.

Table 9: Calculated figures of growth rate (weight) of mud-crab

Pond No.	Stocking date	Harvesting date	Average stocking day	Change of weight (g)		Average wt. increase (g)		Rate of wt. gain per day (%)
				Initial	Harvesting	W. period	per day	
I (Mixed)	17.11.2007	14–16.03.08	120	13.6	170.0	156.4	1.3	9.6
II (Female)	19–25.11.2007	28.02.–01.03.08	100	81.1	300.0	218.9	2.2	2.7
III (Male)	19–25.11.2007	28.02.–14.03.08	102	81.1	290.0	208.9	2.0	2.5
VI (Female)	10–14.12.2007	28.02.–01.03.08	80	79.5	281.0	201.5	2.5	3.2
V (Male)	10–14.12.2007	28.02.–03.03.08	81	79.5	289.0	209.5	2.6	3.3



3.3. Productivity and survival rate

As shown in Table 10, survival rate as a whole in the 2nd experiment was merely 2.4%, which deteriorated further compared with the survival in the 1st experiment, i.e. 6.4%. This is beyond comprehension taking into account the fact that the environmental conditions in this experiment have been relatively improved. This needs thorough investigation by the members of the Mud-crab Culturing Group, specifically in determining the causes of the deteriorating mortality.

At first glance, it could be suspected that higher mortality rate was due to the high density of the juveniles at stocking. The manual of mud crab fattening published by AQD suggested that the optimum density of crab juveniles (ave 20 g) should be 1.5 pc/m². In the 2nd experiment of the project, the density of crab was 1.6 pcs/m² with an average size of 62.6 g which could be high.

Table 10: Monthly stock record of the Mud-crab fattening in 2007/2008

Month: November 2007

Pond No.	Remains (Pc)	In (Pc)	Out (Pc)		Stock (Pc)			Feed (Kg)	Remarks	Cumulative S.R. (%) *
			Sold	Transfd	Total	Dead	survived			
I	0	847	0	0	847	0	847	24.0	Mixed	100.0
II	0	574	0	0	574	2	572	51.0	Female	99.7
III	0	698	0	0	698	1	697	53.0	Male	99.9
IV	0	0	0	0	0	0	0	0.0		
V	0	0	0	0	0	0	0	0.0		
Total	0	2,119	0	0	2,119	3	2,116	128.0		99.8

* Expected

Month: December 2007

Pond No.	Remains (Pc)	In (Pc)	Out (Pc)		Stock (Pc)			Feed (Kg)	Remarks	Cumulative S.R. (%) *
			Sold	Transfd	Total	Dead	survived			
I	847	0	0	0	847	0	847	127.5	Mixed	100.0
II	572	0	0	0	572	37	535	146.0	Female	93.2
III	697	0	0	0	697	52	645	139.5	Male	92.4
IV	0	450	0	0	450	20	430	70.0	Female	95.6
V	0	619	0	0	619	9	610	77.0	Male	98.5
Total	2,116	1,069	0	0	3,185	118	3,067	560.0		95.9

* Expected

Month: January 2008

Pond No.	Remains (Pc)	In (Pc)	Out (Pc)		Stock (Pc)			Feed (Kg)	Remarks (MR)	Cumulative S.R. (%) *
			Sold	Transfd	Total	Dead	survived			
I	847	0	0	0	847	26	821	157.0	Mixed	96.9
II	535	0	0	0	535	75	460	126.0	Female	80.1
III	645	0	0	0	645	118	527	111.0	Male	75.5
IV	430	0	0	0	430	52	378	124.0	Female	84.0
V	610	0	0	0	610	82	528	138.0	Male	85.3
Total	3,067	0	0	0	3,067	353	2,714	656.0		84.4

* Expected

Month: February 2008 (up to 16.02.2008)

Pond No.	Remains (Pc)	In (Pc)	Out (Pc)		Stock (Pc)			Feed (Kg)	Remarks	Cumulative S.R. (%) *
			Sold	Transfd	Total	Dead	survived			
I	821	0	0	0	821	39	782	117.0	Mixed	92.3
II	460	0	1	0	459	46	413	92.0	Female	72.0
III	527	0	14	0	513	47	466	70.0	Male	66.8
IV	378	0	7	0	371	42	329	92.0	Female	73.1
V	528	0	13	0	515	42	473	92.0	Male	76.4
Total	2,714	0	35	0	2,679	216	2,463	463.0		76.1

* Expected

Month: March 2008

Pond No.	Remains (Pc)	In (Pc)	Out (Pc)		Stock (Pc)			Feed (Kg)	Remarks	Cumulative S.R. (%) **	
			Sold	Transfd	Total	Dead	survived				Missing
I	782	0	27	0	755	15	0	740	7.0	Mixed	3.2%
II	413	0	1	0	412	6	0	406	0.0	Female	0.3%
III	466	0	7	0	459	7	0	452	0.0	Male	3.0%
IV	329	0	1	0	328	8	0	320	0.0	Female	1.8%
V	473	0	6	0	467	8	0	459	0.0	Male	3.1%
Total	2,463	0	42	0	2,421	44	0	2,377	7.0		2.4%

** Actual

Summary from November 2007 to March 2008

Pond No.	Original stock (Pc)	Harvested (pc)	Dead crab (pc)	Lost crab (pc)	Survival rate (%)
I	847	27	80	740	3.2%
II	574	2	166	406	0.3%
III	698	21	225	452	3.0%
IV	450	8	122	320	1.8%
V	619	19	141	459	3.1%
Total	3,188	77	734	2,377	2.4%

3.4. Economical viability

The summary of income and expenditures which was compiled based on the monthly general ledger was prepared (Table 11), which accounted for a total expenditure of Riel 6,988,800 (USD 1,747.20) against the total income of Riel 379,500 (USD 94.90). SEAFDEC spent Riel 6,302,000 (USD 1,575.50) for this operation and still the project was short of Riel 307,300 (USD 78.80), which was offset by the unspent fund of Riel 401,650 (USD 100.40). As such, needless to mention, the economic return in this mud-crab fattening experiment ended up by far a negative outcome with deficit gross income of Riel 6,609,300 equivalent to USD 1,652 (Table 12).

Table 11: Summary of income and expenditures in crab fattening operation

Item	Month							Total
	Oct-07	Nov-07	Dec-07	Jan-08	Feb-08	Mar-08	Apr-08	
1. Income								
- Received from SEAFDEC		2,300,000	2,292,000	770,000	940,000	0		6,302,000
- Sales of crab		0	0	0	224,000	155,500		379,500
- Others		0	0	0	0	0		0
Sub-total:		2,300,000	2,292,000	770,000	1,164,000	155,500		6,681,500
								0
2. Expenditure								0
- Purchase of crab seed		1,341,600	1,163,500	0	0	0		2,505,100
- Feed		126,200	487,800	595,200	449,600	126,000		1,784,800
- Bait for traps		0	0	0	48,000	34,000		82,000
- Fuel		0	18,000	33,500	0	38,400		89,900
- Labour		120,000	415,000	310,000	290,000	160,000		1,295,000
- ice		16,000	78,000	93,000	76,000	0		263,000
- Food for staff		0	0	0	0	0		0
- Equipment		65,000	457,800	0	10,000	0		532,800
- Materials		0	0	12,500	0	0		12,500
- Communication cost		60,000	60,000	60,000	60,000			240,000
- Miscellaneous		33,000	52,500	48,200	6,000	44,000		183,700
Sub-total:		1,761,800	2,732,600	1,152,400	939,600	402,400		6,988,800
3. Balance	401,650	939,850	499,250	116,850	341,250	94,350	94,350	-307,300

Table 12: Economic returns in mud-crab fattening based on the 2nd experiment

No	Item	Amount	
		in Riel	in USD
1	Sales (77pcs, 19.05kg)	379,500	94.9
2	Incurred expenses	6,988,800	1,747.2
	- Crab seed	2,505,100	626.3
	- Feed	1,784,800	446.2
	- Bait for traps	82,000	20.5
	- Fuel	89,900	22.5
	- Labour	1,295,000	323.8
	- Ice	263,000	65.8
	- Equipment and material	545,300	136.3
	- Communication	240,000	60.0
	- Miscellaneou	183,700	45.9
3	Gross income	-6,609,300	-1,652.3

8. Conclusions and recommendations

After the completion of the 2nd experiment in mud-crab fattening, which resulted in a failure with extremely low survival rate of 2.4%, a workshop attended by all the members of Mud-crab Culturing Group (MCCG) was held on 1 April 2008. This workshop aimed to review the whole exercise of the 2nd experiment and analyze the cause of low survival rate, and based on the outcome the group should decide for the future course of action including the option of withdrawing from the potential venture of mud-crab fattening. In fact, after the first experiment was carried out in February to June 2007, the group analyzed the cause of failure, and remedial measures were decided and implemented prior to the commencement of the 2nd experiment. It was very convincing at that time that the cause of the failure in the 1st experiment was most attributed to unfavorable environmental conditions during hot and dry seasons. Therefore, the best season for the 2nd experiment was selected from November to March, but the outcome ended up as discouraging. Understanding this fact, the workshop analyzed the failure and concluded the future course of operation as follows:

- The major cause of low survival rate could be attributed to allowing crabs to escape during the high tide in November and December when all the ponds was covered with sea water.
- It was admitted that some crabs were lost by theft or poaching.
- To consolidate their functions, the group structure was reorganized with 12 more active and young fishers as members.
- The JICA expert suggested arranging a study tour to Kompot where one private crab farmer manages commercially a mud-crab fattening business. This was done on 8 April 2008 under the financial auspices of JICA.
- Further, the JICA expert committed to contribute an automatic recording machine for salinity and temperature of the ponds using JICA funds, the cost of which was estimated at around USD 5,000.
- The Chief of Community Fisheries Prey Nup II (CF) entreated the FiA, SEAFDEC and JICA for a continued trial of crab culture with his commitment of maximum support.
- Finally, it was decided to try once more the mud crab fattening activity and that:
 - the ponds should be thorough dried and cleaned, and applied with lime,
 - fattening should be started with young and healthy crabs (100 g ave size) and harvested when they reach marketable size of 200 g, the duration of culture is estimated about 2 months,
 - the results of the observation during the study tour in Kompot should be discussed among the members and reflected in the next operation, and
 - the automatic recording machine to be donated by JICA should be installed and properly maintained by the project team and MCCG.

9. Study tour to Kompot

The study tour in Kompot to observe the commercial scale mud crab fattening activity was conducted on 8 April 2008 for the members of the MCCG and the project team under the financial auspices of JICA. The major findings were as follows:

1. The dimension of the Kompot pond was 2,000 m² (the MCCG pond is 1,968 m²).
2. The Kompot pond was separated in two parts by nylon screen, one for female and another for male crabs.
3. The number of crabs cultured in Kompot farm was 4,500 crabs (25-33g; 30-40 pcs/kg), which means the density was 2.25 crabs/m².

4. Feeds were given twice a day; i.e. 4 kg at 07:30 AM and 6 kg at 5:30 PM.
5. Feeds, mainly trash fish costing at 1,500 Riel/kg were scattered along the edge of the pond.
6. Pond water was changed every 3-4 days by PVC in-outlets pipe (25 cm diameter) installed at the bottom of the pond. In case the amount of water in the pond is not sufficient, water is pumped in from the sea.
7. No measurements on water temperature, salinity and DO concentration was carried out due to lack of necessary equipment.
8. In case of rising water temperature, the solution was to throw a mixture of urea and diammonium phosphate (DAP) in the pond in order to reduce the water temperature.
9. A small air-pump operated by 40-A battery, was installed in the pond to generate oxygen in the water.
10. Harvest of the Kompot pond was made after 68 days' stocking. The total harvest was estimated at around 200 kg, with estimated average weight of 400 g/pc, which implied that the total number of crabs that survived was 500 pcs, giving a survival rate of 11.1%.
11. The marketing prices are 35,000 and 25,000 Riel/kg for the first and the second grade, respectively.
12. The best season for crab fattening is in September and October due to low temperature and little rainfall.
13. The problems encountered by the Kompot farm included:
 - crab moving from one pond to another
 - theft or poaching
 - water pollution
 - noise pollution by firecrackers causing death of crabs
 - cheaper prices of pond-reared compared with naturally caught crabs

10. Reference

- Aquaculture Extension Manual No.27 Mud Crab, AQD, March 1999
- Report on Experimental Mud-crab Culturing in Shihanoukville, Etoh S. , August 2007
- Study tour on Crab Culture in Kampot Province, Longdy V., April 2008

Annex 9

Economic Feasibility Sheet on Sea-Bass Cage Culturing

(Fish Cage Culturing Group, CF Pry Nup II)

1. Base of calculation

- Number of members : 6
- Species of fish for culturing: Sea-bass (*Lates calcarifer*)
- Construction cost: Self-employed labour
- Dimensions of cage: 2.5x2.5x2.0m(LxWxH)
- Number of cages: 6 sets
- Number of net: 8 sets (spare 2 nets)
- Cost of necessary construction materials (in USD)

1. Wood frames (1m ³ x \$300)	300
2. Screw (2kg x \$8)	16
3. Plastic buoy (12pcs x \$20)	240
4. Rope (25kg x \$4)	100
5. Netting material for 8 nets (72kg x \$4)	360
6. <u>Net construction (8pcs x \$7)</u>	<u>56</u>
Total:	1,072 (Riel 4,288,000)
- Cost of installation : Riel 4,288,000 (USD 1,072)
- Depreciation of facilities: 4 years for frame and 2 years for cages
- Culturing duration: 6 months
- Number of croppings per year : 1time (Sept to May)
- Marketable size of fish: 500gr
- Size of fingerling : 3 inch
- Cost of fingerling: 900 Riel per pc (3" size)
- Feed conversion rate: 3.0
- Price of fish feed (trash fish caught by set-net): Riel 1,500 per kg
- Price of marketable size of fish: Riel 16,000 per Kg in Sihanoukville
- Mortality rate: 40 percent
- Number of harvestable fish : 1,500pcs (500gr size)
(20kg/sq.m. x 2.5m x 2.5m x 6 cages/0.5kg)
- Total weight of harvested fish : 750kg
(1,500pcs X 0.5kg)
- Number of fingerings stocked : 2,500pcs (3" size)
(1,500pcs /0.6)

2. Annual Fixed cost

	<u>Riel ('000)</u>	<u>USD</u>
- Depreciation of facilities (Frame for 4 years: Riel 656,000) (Cages for 2 years: Riel 832,000)	1,488	372
- Maintenance cost for facilities (Riel 4,288,000 x 5%)	214	54
Sub-total:	1,702	426

3. Annual variable cost

- Cost of fingerling (2,500pcs x Riel 900)	2,250	563
- Cost of feed (2,500pcs x 0.8 x 0.5kg x 3 x Riel 1,500)	4,500	1,125
- Cost of fuel (10l x 8 months x 5,000Riel)	400	100
- Marketing overhead (750kg x Riel 16,000 x 5%)	600	150
- Misc. including communication (Riel 3,000 x 210dys)	630	158
Sub-total:	8,380	2,095

4. Annual net income

- Sales (750kg x Riel 16,000)	12,000	3,000
- Expenditure	10,082	2,521
- Gross income	1,918	480
- Share to each member per year	320	80

5. Return on investment

- Initial investment cost	4,232	1,058
- Return on initial investment (%)	45.3	%

Annex 10

Minutes of the 4th Steering Committee (SC) Meeting Integrated Coastal Resources Management in Sihanoukville (ICRM-SV)

Venue: The meeting room, Agriculture Department, Sihanoukville, Cambodia

Date: 20th February 2008

1. List of Participant

DOF, Cambodia

01. Mr. Ing Try	Deputy, Director General, FiA, PNH
02. Mr. Ke Pha	Deputy, Director of Agriculture Department, SV
03. Mr. Poum Sutha	Chief of Inspectorate Office, FiA, PNH
04. Mr. Duong Samath	Director, Cantonment of Fishery Kampong Som
05. Mr. Pich Bunna	Vice Chief, CFDO, FiA, PNH
06. Mr. Sin Satharath	Deputy, Director of Cantonment of Fishery Kampong Som
07. Mr. Nen Chamroeun	Deputy, Director of Cantonment of Fishery Kampong Som
08. Mr. Kao Monirith	Inspection Officer, FiA, SV
09. Mr. Yos Chanthana	Team Leader/Marine Biologist
10. Ms. Heng Ponley	Fishery Officer, CFDO, FiA, PNH
11. Mr. Samreth Keila	Extension worker of ICRM-SV

SEAFDEC/TD

12. Dr. Siri Ekmaharaj	Secretary-General
13. Mr. Sei Etoh	Project leader
14. Ms. Sumitra Ruangsvakul	Socio-economic Section Head
15. Ms. Jariya Sornkliang	Marine Biology Researcher
16. Ms. Thanyalak Suasi	Socio-economist

2. Contents of meeting

2.1. Welcome address:

- Ms. Heng Ponley addressed agenda and objectives of the meeting, as followed as:
 - to endorse the biannual project progress reports for 2007
 - to endorse the proposed work-plan for 2008
 - to discuss other issues pertinent to the project management and strategic issue
- She invited Mr. Ke Pha, Deputy, Director of Agriculture Department, Sihanoukville, to give welcome speech on behave of Agriculture Department.
- Mr. Ing Try, Deputy, Director General of Fisheries Administration was welcome Secretary General, SEAFDEC to opening address of the meeting.
- Dr. Siri Ekmaharaj, Secretary General, was welcome all participant, this is my first visit to the project site of Integrated Coastal Resources Management in Sihanoukville. I have observed various activities being carried out by the project in last few days with deep impression. On behalf of SEAFDEC, I would like to express my sincere appreciation to Sihanoukville Municipality and Fisheries Administration of Cambodia for collaboration and invariable inputs rendered to the project. It is no doubt that the project has been progressing on the right track toward the goals of the project and producing numbers of tangible outputs. The knowledge and experiences gained through this project operation are certainly conducive to transfer not only to other fishing communities in Cambodia but also

to those in other countries of the region. Similarly, I would like to congratulate the project on the enthusiastic participation by both fishermen and fisherwomen to activities like mushroom production, mud-crab culturing, fish refugia, and so forth. This will be a featured model in an integrated coastal fisheries management approach combined with social community development. Lastly, but not least, on behalf of SEAFDEC, I would like to express my appreciation to the JICA Expert, Mr. Hatori, for his contribution to the project which is very vital.

2.2. Endorsement the minute of the 3rd SC meeting

- Ms. Heng Punley invited Mr. Yos Chanthana, project team leader to present the minute of the 3rd SC meeting for endorsement.
- Mr. Ing Try informed the new section of FiA in Sihanoukville that, new section is Inspection, so the new chart of SC meeting of ICRM-SV project will be added new section to Vice Chairman, SC will have 2 Vice Chairman, Inspection and Agriculture.
- Mr. Etoh suggested that, the new chart of Steering Committee must be draft and sent to SEAFDEC.
- Mr. Ing Try replied that, we will discuss more on new member of SC and sent the draft to SEAFDEC. The second issue would like to informed that, FiA nominated Mr. Nen Chamroeun to acting on Aquaculturist in ICRM-SV, because Mr. Meas Chanda moved to the other section.
- Mr. Etoh commented that, Mr. Meas Chanda can be translate to English, but Mr. Nen Chamrouen may be help project not so far.
- Mr. Ing Try replied that, Mr. Nen Chamrouen will work closely with Mr. Chanthana, and he is a good communication with community, and please understand the situation of FiA.
- Mr. Etoh commented more on monthly report that, there are not report from Cambodia site to SEAFDEC, some progress work did not inform to SEAFDEC before, this is problem for us to budget arrangement, and give the sample of progress work, the releasing mud crab in December, which didn't inform to SEAFDEC.
- Mr. Ing Try informed to Mr. Chanthana that, please follow this work.
- Mr. Chanthana replied that, the report has recorded everyday, but he does not have time to translate and making report to SEAFDEC and FiA, because he had a lot of official work.
- Mr. Ing Try informed to Mr. Nen Chamrouen that, please make report to Khmer and sent to Mr. Chanthana to translate to English.
- Mr. Doung Samart mentioned that, all staffs of Cantonment Fishery of Kampong Som were busy, especially this duration was staff's movement of FiA.
- Mr. Ing Try informed to Mr. Chamrouen that, please must finish the report on 25 of month and translated by Mr. Chanthana on 29, and sent to SEAFDEC and FiA.
- Mr. Etoh mentioned on new staff of FiA at project site, FiA has promised to provide the additional staff to take care mud crab culture.
- Mr. Ing Try explained that, FiA try to find, and bring new staff to attend at site 2-3 days per week to recording the log book.
- Mr. Pich Bunna, Vice Chief, CFDO, PNH mentioned that, CFDO would like to get progress report of this project, please sent report to CFDO.
- Mr. Ing Try informed that, Ms. Ponley will be reported to CFDO.

2.3. Annual progress report for 2007

- Mr. Yos Chanthana explained the progress report of project on biannual report (July-Dec. 2007).

- Mr. Poum Sutha, Chief of Inspection Office, FiA, recommenced on crab bank that, crab bank activity in Prey Nop II may be problem in some season, on fresh water and monsoon, please consider this situation.
- Mr. Etoh explained the crab bank system in Chumphon, Thailand, Langkawi, Malaysia and Japan, some member of CF Prey Nop II and FiA's staff have visited crab bank at Chumphon and have their idea already. Cambodia site prefer Chumphon model, by release gravid crab to cage in the sea. For the Japanese model, by marking at the carapace and releasing at the sea have implemented in Chumphon in monsoon season.
- Mr. Etoh explained more that, project called all members of crab trap fishing and crab gill net fishing to meeting on 18 February, this meeting have designed the structure and management plan on crab bank activity. The structure will be taken one month, and this activity must take a lot of volunteer work from fishermen.
- Mr. Etoh informed more that, he was very happy, because member of crab bank group was young generation.
- Mr. Etoh mentioned on crab bank by FiA that, FiA will be implemented Crab Bank by paid gravid crab to fishermen, this activity was co-management between government and fishermen, when FiA stop to paid, fishermen will be stop to give gravid crab.
- Mr. Poum Sutha suggested that, crab bank can be enhancement the resources or not.
- Mr. Etoh replied that, this activity was successful on resource enhancement in Thailand, the scientific data on catch data will be show CPUE of this species.
- Mr. Ing Try informed that, the system of crab bank on payment and not payment, which one will be work, this is only experiment.
- Mr. Doung Samart, Director of Cantonment Fishery of Kampong Som, recommenced on crab culture that, why crab culture have problem, and the result is still is small.
- Dr. Siri Ekmaharaj, SG, SEAFDEC given more information on this problem that, mud crab culture can not culture too long period, because mud crab will be loss and dead, if taken short period, the crab will be more escape death than long period.
- Mr. Etoh explained that, FiA and SEAFDEC have meeting to discussion to stop or continue on mud crab culture, the result of this meeting, project will be started the second experiment on November 2007, and lucky for this experiment, there was new JICA expert, Mr. Hatori have close monitoring, the result of this experiment is good on economic.
- Dr. Siri given more information on mud crab culture that, there are a lot of Tilapia, this fished will be killed by tea cake, and the crab culture system will change from long period to short period (fattening), the short period was less than one month. The survival rate of crab is about 90% in this system (short period), the other system of crab culture, by used plastic box for one crab.
- Mr. Etoh informed that, project will meeting to discuss on new system, after the second experiment was finishing.
- Mr. Ing Try informed on new system that, the next experiment of mud crab culture will be used short period (fattening) 2 – 3 ponds.
- Mr. Ing Try requested Project Leader that, the publication will be printing the leaflet of progress of ICRM-SV in Khmer and English.
- Mr. Etoh replied that, this budget was putting in work plan 2008.

2.4. Work Plan for 2008

- Mr. Etoh informed the work plan 2008 that,
- Base line and monitoring survey was continued 2 activities, regular collection of fish landing data, analysis and compilation of data and information in 2007.

- Encouragement CBFM, all Prakas and regulation have completed and approved, waiting to implementation. Project have started the internal regulation on blood cockle fishing, this activity will start to learning the internal regulation of CF, and the important thing of this regulation is controlling the illegal fishing.
- Promotion Local Business, The mushroom Producers Group Community Fisheries Prey Nop II have organized on 18 February 2008, the next step, project will call all members to the first assembly at next month, the main propose of the 1st assembly, to identify how production was increasing or decreasing, and initiate the potential on local business.
- Aquaculture, sea bass cage culture will start this year, after the location is available and SEAFDEC will be calculated on economic ability.
- Enhancement human resources capacity and participation, this activity will continue human resource development.
- Rehabilitation and enhancement of coastal resources, crab bank activity is one of rehabilitate activity, and this activity will be coordinated with local enforcement unit to protect coastal resources. FiA have approved equipment and some budget to enforcement unit to monitoring survey. Mangrove reforestation will be continued in this year. FEDs or ARs will study on which one available for this area, and must consider SEAFDEC's budget.
- Fishing/Fish handling, this activity is lower priority of fishermen's need.
- Evaluation, project will be terminated at the end of 2008, and in August, project will make work plan 2009 to donor.
- Mr. Etoh informed more that, now project did not to know the result of 2009, continue or not, please make sure on the result with TF.
- Mr. Ing Try replied that, Cambodia site will prepare the action plan of 2008 by clarify some activities, and submit to Council Committee of SEAFDEC, and hope this project will be terminated in 2009.
- Dr. Siri informed more that, TF-IV will be terminated in 2008, but TF-V will be started in 2010, this fund have budget related on coastal management, may be supported some activities of this project.
- Mr. Poum Sutha informed on AR that, project may be AR installation, because the result of AR installation is clearly than crab bank activity on good resource abundant.
- Mr. Etoh suggested that, please give the structure and cost of AR to SEAFDEC.
- Mr. Etoh mentioned on crab culture that, after the 2nd experiment finished, all of staff's concern must come to meeting and discussion together, like CF, FiA and SEAFDEC. SEAFDEC will be prepared the report and design the next plan.

2.5. Closing the meeting

- Mr. Ing Try expressed thanks all participants taking their valuable time to participate this meeting, and he praised all participants with success in their duties now and in the future.

Draft by: Sumitra Ruangsivakul	27.02.2008
Endorsed by: Yos Chanthana	14.06.2008
Endorsed by: Sei Etoh	14.06.2008

Annex 11

THE MINUTES OF THE 6TH IMPLEMENTATION COORDINATION COMMITTEE (ICC) MEETING

Integrated Coastal Resources Management in Sihanoukville (ICRM-SV)

- Venue: Meeting Room, Agriculture Department Sihanoukville

- Date: 20 June 2008

List to participants

DOF Cambodia & Fisheries Office Sihanoukville

25. Mr. Ing Try	Deputy Director General, DOF, PP
26. Mr. Ke Dha	Deputy Director, Agriculture Dept., SV
27. Mr. Kao Mony Rith	Deputy Director of Marine Fisheries Inspectorate
28. Mr. Duong Samath	Director of Fisheries Administration Cantonment Kampong Som
29. Mr. Sam Rith Sambo	Vice chief CFDO, DOF, PP
30. Mr. Sin Satharath	Vice Director of Fisheries Administration Cantonment Kampong Som
31. Mr. Sopheap	Vice chief of conservation office, FiA
32. Mr. Yos Chanthana	Project Team leader
33. Ms. Heng Punley	Project Socio-economist
34. Mr. Nen Chamroeun	Project Aquaculturist
35. Mr. Sam Rith Keila	Project Extension worker
36. Mr. Va Longdy	FiA Officer

CFs

37. Mr. Mok Sen	Mud-crab Culture Group leader
38. Mr. Nos San	Local Patrolling Unit leader of CF Prey Nub 2
39. Ms. Ya	Blood Cockle Fishers Group leader
40. Mr. Noh Bet	Deputy Chief of CFs Prey Nub2
41. Mr. You Nos	Crab Bank Group leader

SEAFDEC/TD

18. Mr. Sei Etoh	Project leader
19. Ms. Sumitra Ruangsivakul	Socio-economic Section Head
20. Ms. Jariya Sornkliang	Researcher on marine biology
21. Ms. Thanyalak Suasi	Researcher on socio-economy

Proceedings of the meeting

Before starting the meeting, Mr. Yos Chanthana, the project team leader, briefed the objectives, provision agenda and timetable. Regarding to the objectives of the meeting, he mentioned 3 important points in the following:

- To monitor the project progress since the last ICC meeting,
- To discuss the proposed project immediate action plan for the next 3 months, from the point of view of practical implementation,
- And to identify the constraints in the project implementation at local level and suggest

After Mr. Yos Chanthana finished his explanation, Mr. Ing Try delivered welcome speech in which he expressed deeply thanks to all participants from Department Agriculture, SEAFDEC/TD, Fisheries Administration Inspectorate, CFDO, Fisheries Administration Cantonment, CF Prey Nub 2. He reminded the participants to take into consideration on discussing the problems happened during implementation of the project since the 5th ICC meeting.

2.1 Endorsing Minute of the 5th ICC Meeting

After adopting the provision agenda, Mr. Ing Try invited Mr. Yos Chanthana to read the 5th ICC minute line by line. Mr. Chanthana went through the minute; some comments and clarifications from participants in the following:

- Mr. Etoh explained the importance of communication system for the project because he was in Bangkok. He complained about bad communication between him and project team leader. He stressed that, information from the project site was very important for him to draft project progress. He said that sometimes he got information from Mr. Hatori.
- Mr. Yos Chanthana accepted Mr. Etoh's complaint and he expressed his promise to improve the communication way. He also promised to compile monthly report and send it to the project leader.
- Mr. Etoh expressed his appreciation on LEU activities; however, he observed that the illegal activities were still prevailing in the CF fishing ground. Evidently, he found illegal drag nets every trip to Prey Nub 2. He continued that he was informed by patrolling unit that illegal fishing could operate in the CF fishing ground because the engine of patrolling boat fell in out-of-order. He reminded that the Cantonment promised to purchase a brand new 13hp-engine for patrolling boat but until now he has not seen it yet.
- Mr. Doung Sam Ath reaffirmed to buy 13hps-engine for LEU soonest.
- Mr. Ing Try asked the project members to explain about results of mushroom's business by women groups. He expressed his concern about money used by the groups might not be not transparent or in wrong direction. He suggested the project staffs to prepare regulation of the women's group.
- Mr. Etoh replied that, regulation of the group was finalized and endorsed by the group members. He asked Mr. Yos Chanthana to explain the reasons why Fisheries Administration Cantonment did not aware about it.
- Mr. Yos Chanthana agreed that this regulation did not send directly to Mr. Director of Kamong Som Cantonment, but his officer should inform him about it. However, Mr. Chanthana agreed to send it to Mr. Director.
- Mr. Etoh confirmed this issue to Mr. Doung Sam Ath " Do we need approval from the Cantonment or not?
- Regarding to Mr. Ing Try's concern on transparency of mushroom group, Mr. Chanthana explained that income from this business was recorded carefully in logbooks. The logbooks

were audited frequently by project staffs, he said. He assured that the money was managed in the transparent way.

- Mr. Doung Sam Ath recommended that the income from mushroom cultivation should be deposited in the bank to avoid loosen cases.
- Mr. Doung Sam Ath replied that, no need to be approved by the Cantonment; but the project should send any document to his office by CC for their documentation.

After discussing actively, all participants endorsed the 5 Minute of the 4th ICC Meeting

2.2. Achievement of activities since the 5th ICC meeting

After endorsing 5th ICC meeting minute, Mr. Yos Chanthana reported the achievement on project activity made since the last ICC meeting. Based on Mr. Chanthana's presentation, participants asked for clarification and comments in the following:

- Mr. Kao Monyrith, Deputy Director of Marine Fisheries Administration Inspectorate, asked about the animal raising by women's group. He wanted to know about types of animals were introduced and the results and the problems happened. He suggested the project to consult with veterinarian in term of techniques and disease prevention.
- Mr. Hatori commented that in Cambodia animals are susceptible to disease. So, before investing in animal rising, the group members should consult with responsible line authorities to make sure of being free from epidemic animal disease.
- Mr. Ke Pha, recommended that the project should formulate a committee to oversee animal raising. For instance pig raising, after breeding, the project should share some small pigs to other members. He added that farmers who want to raise pig should prepare pigpen themselves.
- Mr. Sopheap said that in animal raising the project should find technical assistance from veterinary office.
- Regarding to mud crab culture, Mr. Sam Rith Sambo said that "according to presentation by Mr. Chanthana, mud crab culture did not get good results, so does the project have any strategies to succeed it?"
- Mr. Hatori explained the reasons of high mortality rate. He observed the water quality and the results of water parameters did not show any significant problems. But he found that during full moon in November the high tide reached the maximum level which caused all ponds flooded; so crabs might escape from the ponds.
- Mr. Etoh explained that water quality was not the problem; but he was sure that most of the crabs were stolen. He complained that the Cantonment promised to assign one staff to stay 24hours at project site, but he was informed that not any fisheries staff stayed at the ponds.
- Mr. Ing Try asked Mr. Mok Sen to explain on the stolen issue. Mr. Mok Sen said that "I know person who stole the crab, but I don't want to show the name".

- To protect from stealing crab, Mr. Ing Try informed the meeting that “the Cantonment will give 200,000 Riels per month to one person who is assigned to stay 24hours at the project site. Mr. Ing Try suggested Mr. Chanthana and Keila to find any measure to protect crab from escaping out of the ponds.
- Mr. Etoh suggested closing all water gates by replace PVC pipes. He added that PVC pipes should be installed at the bottom of the pond in order bottom water can be exchanged.
- Mr. Hatori explained the need of exchange water at the bottom of pond because at the bottom, water contains more salinity than in the surface.
- Mr. Doung Sam Ath suggested that culturing period should be from 1 to 1.5 moths following Dr. Siri, DG of SEAFDEC, advice. He added that we should use soft shell crab for fattening.
- Mr. Etoh replied that soft shell fattening was another option; but first of all we should continue using small hard shell crabs for growing-out.

2.3 Immediate work plan

- Mr. Etoh explained the meeting the immediate work plan until October 2008 as follows.

Baseline / monitoring survey

- Continue fish landing data collection
- Continue marine biological survey for blood cockle
- Publication of the report on Fish Landing Data in 2006 and 2007

Encourage and extend locally-based fishery resources management

- Following to the provisions of CFAMP, the resources management measures are to be implemented; i.e. management of fish refugia for blood cockle
- Reinforcement of the structure and capacity of Local Enforcement Unit (LEU)
- Management of Crab Bank

Promotion of local business

- Monitoring activities of Mushroom Producers’ Group and assisting them if necessary
- Studying better utilization of saving account
- Completion of mud-crab culturing ponds’ preparation work
- Commencement of the 3rd mud-crab culturing experiment
- Promotion of the sea-bass culturing by the newly organized Fish Cage Culturing Group

Enhance human resources capacity and participation

- Reinforcement of the structure and capacity of CFPN2
- Identify the community base volunteer work
- Publication of reports, manuals and PR materials
- Organizing fishers’ workshops, training courses and study tours as required

Rehabilitate and enhance coastal resources

- Promotion of management of the fish refugia
- Implement mangrove reforestation through voluntary participation
- Study a possibility of installation of ARs

Project management meeting

- Preparation of the 7th ICC meeting to be held in October 2008

Final project evaluation

- Identification of a relevant outsourced consultant

- Participants endorsed work plan presented by Mr. Etoh
- Mr. Ing Try suggested Mr. Etoh to allocate budget for producing video spots on the project activities for documentation. The spot may be broadcasted at TV channels for instant Banyon TV etc.
- For video spot, Mr. Doung Sam Ath commented to produce it in Khmer version.
- Mr. Ing Try instructed Mr. Doung Sam Ath to find another place for planting mangrove.

Closing the meeting

At the end of the meeting, Mr. Ing Try thanked to all participants for their time and efforts to participate in the 6th ICC meeting. After that he declared closing the meeting.

Drafted by Yos Chanthana

Date: 01 August 2008

Approved by Sei Etoh

Date: 04 August 2008