Joint Mid-Term Evaluation Report on Japanese Technical Cooperation, Comprehensive Outreach and Fish Breeding Project

Department of Agriculture (DA)
and
Japan International Cooperation Agency (JICA)

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Abbreviations

BFAR	Bureau of Fisheries and Aquatic Resources
COFBreP	Comprehensive Outreach and Fish Breeding Project
DA	Department of Agriculture
EO	Executive Order
FY	Fiscal Year
GDP	Gross Domestic Production
GoP	Government of the Philippines
JCC	Joint Coordination Committee
LRT	Larval Rearing Tank
NFRDI	National Fishery Research and Development Institute
NIFTDC	National Integrated Fisheries Technologies Development Center
JICA	Japan International Cooperation Agency
LGU	Local Government Unit
MoA	Memorandum of Agreement
MoU	Memorandum of Understanding
MTPDP	Mid-Term Philippine Development Plan
ODA	Official Development Assistance
OJT	On the Job Training
PBDP	Philippine Bangus Development Program
PDM	Project Design Matrix
R/D	Record of Discussions
TWG	Technical Working Group

1. Outline of the Evaluation Study

1-1 Background of the Evaluation Study

JICA's technical cooperation project "Comprehensive Outreach and Fish Breeding Project (COFBreP, hereinafter referred to as "the Project") was launched in November 2006 and will be implemented for a period of three and a half (3.5) years in order to assist the National Integrated Fisheries Technology Development Center (hereinafter referred to as "NIFTDC") of the Department of Agriculture (DA) in improving aquaculture outreach in the target areas. During the half way of the Project duration, JICA and NIFTDC formed joint mid-term evaluation team for the purpose of reviewing the progress and performance of the Project and making an agreement regarding the activity plan for remaining project period.

1-2 Objectives of Evaluation Study

The objectives of the Mid-term Evaluation are;

1) to find the degree of achievement based on the Project Design Matrix (hereinafter referred to as "the PDM"),
2) to review the Project framework for successful implementation , and
3) to make recommendations regarding measures to be taken, if necessary, by Japanese and Philippine side for remaining project period.

1-3 Methodology of Evaluation Study

The evaluation was conducted;

1) jointly by Japanese and Philippine members of evaluation team,
2) by collecting data and information through
   - examining documents prepared by the Project
   - interviewing Japanese experts, NIFTDC counterparts, fish farmers and agriculture extension workers who joined the project activities,
3) assessing the degree of achievement of the Project, and
4) analyzing the overall achievement using five criteria. Five criteria are shown in the table below.

Criteria	Definition
1. Relevance	This is a question whether the Project purpose and overall goal are still in keeping with the priority needs and concerns at the time of evaluation.
2. Effectiveness	This concerns the extent to which the Project purpose has been achieved, in relation to the outputs produced by the Project
3. Efficiency	This is the productivity of the implementation process. How efficiently the various inputs were converted into outputs.
4. Impact	There are the changes, either intended and unintended, direct and indirect, positive and negative, which were made as a result of the Project
5. Sustainability	This is to question whether the Project benefits are likely to continue after the external assistance has come to an end.

1-4 Member of the Evaluation Team

(1) Japanese team

Mr. Satoshi Chikami (Team Leader /Aquaculture Technology)	JICA Senior Advisor
Ms. Junko Saikawa (Project Evaluation)	Consultant KRI International Corp.
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(2) Philippine team

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2. Outline of the Project

2-1 Background of the Project

In the Philippines, the fishery industry accounts for 4% of the country's GDP and 5% of the total working population. With growth of aquaculture averaging 10% annually, it is recognized as one of the prominent industries with high potential for more job creation and effective land utilization.

Milkfish is one of the major target fish species in Philippine aquaculture and produced mainly in Regions I, III, and IV. However, it has recently confronted some difficulties. The supply of wild fry has been decreasing due to deterioration of coastal resources. To address this, several hundreds of millions of artificially produced fry are imported from Indonesia and Taiwan, but these fry are said to suffer high mortality rates due to the long period of time needed for its transportation which necessitates the stabilization of supply of good quality fry. On the fish farmers' side, small fish farmers have difficulties in improving their livelihood due to various factors such as high price of feeds and inefficient operation. Therefore, the improvement of fish farmers' management is deemed very necessary as well as productivity, so that small-scale fish farmers can enjoy sufficient income. In addition, intensive aquaculture development, which is seen in Region I or Region III, has led to serious environmental problem such as deterioration of water quality of fish ponds, which would cause mass mortality of reared fish in the ponds and negatively affect the farmers' income and livelihood.

In this situation, the government of the Philippines established the Philippine Bangus Development Program (PBDP) which aims at stabilizing the production and supply of artificial fry to fish farmers through the enhanced activity of the National Integrated Fisheries Technology Development Center (NIFTDC) of the Bureau of Fisheries and Aquatic Resources (BFAR) of the Department of Agriculture (DA). In response to the request, the Japan International Cooperation Agency (JICA) launched the three and a half year technical cooperation project "Comprehensive Outreach and Fish Breeding Project (COFBreP) in November 2006.

2-2 Summary of the Project

Goal

Livelihood of fish farmers is enhanced in the targeted areas.

Project Purpose

Aquaculture outreach functions in the targeted areas

Outputs

1) Supply of fry from hatcheries is stabilized.
2) Fish farmers' knowledge of and skill in aquaculture production and management are improved at the pilot sites.

Activities (as of the beginning of the Project)

1-1 To clarify present situation and problems in milkfish fry production by reviewing the fry production process and structure.

1-2 To formulate a plan to improve the fry production process and hatchery management and then implement them at NIFTDC.

1-3 To make or improve technical manual and training program for hatchery workers.

1-4 To provide training to hatchery workers.

1-5 To visit and give advice to the PBDP hatcheries.

1-6 To support the establishment of a fry information network among PBDP hatcheries.

2-1 To clarify the present situation and problems in socio-economic and management circumstances affecting fish farmers.

2-2 To select pilot sites and implement activities through discussion with personnel concerned.

2-3 To improve training and outreach programs for fish farmers by reviewing them.

2-4 To make or improve training material and technical manuals for extension workers and fish farmers.

2-5 To hold training sessions for extension workers and fish farmers.

2-6 To support meetings of fish farmers for mutual understanding of good practices and necessary information.

3. Achievement of the Project

3-1 Inputs

3-1-1 Japanese side

(1) Dispatch of experts

Japanese experts have been dispatched in the following ten fields 1) Team Leader/Extension, 2) Aquaculture technology, 3) Training, 4) Broodstock Management, 5) Spawning Techniques, 6) Livefeed Management, 7) Marketing and business management, 8) Monitoring, 9) Resources Environment Research, and 10) Project Coordinator. Total M/M for dispatch of experts to the Philippines up to the end of June 2008 was 45.92M/M. Refer to Annex 1 for details.

(2) Provision of equipments

Vehicles and seawater intake pipes have been provided, based on the request from the GoP. The vehicles are in good condition and are fully utilized for project activities. The installation of this pipe was delayed due to the delayed budget disbursement of the GoP, but it will be installed within a few months.

Table 1: List of Provided Equipment

Equipment		Price	Condition
Van (Mitsubishi L-300 VERSA VAN)	1 unit	Php.779,000.00	Good condition and fully utilized
Pick Up (Isuzu D-MAX) with canopy and benchliner	1unit	Php 1,600,000.00	Good condition and fully utilized
HDPE Pipes for Seawater Intake	1 set	Php. 758,170.00	Not installed yet

(3) Training in Indonesia

Five trainees (2 counterpart personnel and 3 hatchery technicians of NIFTDC) participated in the training held in 6-30 November 2007 at the Gondol Research Institute for Mariculture (GRIM), Indonesia. Refer to Annex 2 for details.

(4) Local cost expenditure

About 6.55 million pesos has been expended as of end of March 2008. Refer to Annex 3-1 for details.

3-1-2 Philippine side

(1) Appointment of counterpart personnel

Project Director, Project Manager (in charge of pilot activities), counterpart staff (in charge of the *lablab* (blue algae) experiment at NIFTDC; natural food culture; pilot activities in Pangasinan, Pampanga, and Oriental Mindoro; pilot activity in water monitoring; pilot activity in fish

processing) have been assigned as counterpart personnel. Refer to Annex 4 for details. The job-orders who are engaged in hatchery work have been involved in the project activities, but one job-order, who was well capacitated in hatchery works, resigned to look for better employment conditions.

(2) Local cost expenditure

Around 10.68 million pesos has been expended by the end of February 2008 for operation of NIFTDC hatchery, improvement of Naujan hatchery, implementation of pilot activities and training programs. Refer to Annex 3-2 for details.

3-2 Activities

The table 2 shows the progress of the project activities.

Table 2: Progress of Activities

	Activity		Present status	Accomplish-ment
1.1	To clarify present situation and problems in milkfish fry production by reviewing the fry production process and structure.		- Understood the facilities and technical levels for 16 hatcheries under PBDP, then designed the vision to establish a functional satellite hatchery system. - Outputs: Report on Study of Current Status of Aquaculture Industry and Issues, Milkfish Hatchery Survey Team Report, Report on Wild Fry Component, Report on Imported Fry Structure.	completed
1.2	To formulate a plan to improve the fry production process and hatchery	Planning for the improvement of fry production process in hatchery management.	Prepared plan of improvement to produce milkfish fry constantly and carry out healthy management of hatcheries under PBDP.	completed

	management and then implement them at NIFTDC.	Technical assistance for fry production.	- Improvement of phycology laboratory - Improvement of culture process of nanochloropsis. - Improvement of culture process of rotifer. - Improvement of larval rearing management. - Outputs: NIFTDC milkfish hatchery produced 2.63 million fry in 2007, compared with 2006(2.07million). - Survival rate from fertilized eggs to fry shows 4.9% (2006) and 5.7% (2007). At a glance, fry production technique was improved in September and October in 2007 when water intake was improved through the technical assistance of Japanese expert. - Remarks: Disclosed necessity to bottom up basic hatchery management know-how and skills such as water intake management and communication management. Because of this, the project could not accomplish fry production well during spawning season in 2007.	will be continued until June 2009
		Technical assistance for breeder management.	- Improvement of seawater intake facility (installation of new engine, change and repair of pipes, improvement of bio-filter). Improvement of broodstock management (manage feeding system, improvement of feed, breeding record). - In the first half year of 2007, enough water could not be supplied to even 6 tanks due to trouble of water intake pump and engine. Because of this, it brought low spawning rate and low hatching rate. Based on this experience, the Project revised the plan to improve the situation and prepared road-map for NIFTDC hatchery.	will be continued until October 2009
1.3	To make or improve technical manual and training program for hatchery workers.	Preparation of training program.	- Reviewed the present training for hatchery workers and prepared a new training program (March 2007).	Completed
		Revise the training program.	- Revised the training program based on the result of the training in the 2nd Japanese fiscal year (March 2008).	Completed
		Preparation of training material.	- Prepared and distributed training material for hatchery workers based on the submitted training program (May 2007). These training materials are revised and integrated (March 2008).	Completed
		Preparation of technical manual for hatchery workers.	- Prepared and distributed technical manual for hatchery workers (draft) at the 1st training (May-June 2007). - Revised manual was distributed to the trainees before the spawning season in 2008 (March 2008).	Completed
		Revise the technical manual for hatchery workers and training program.	- Revised technical manual and training program based on the experience.	will be continued until October 2009

1.4	To provide training to hatchery workers.		- Implemented the hatchery training for the trainees invited from each worker from 11 public hatcheries and 7 workers from 4 private hatcheries, totaling to 18 workers. - Refer to Annex 5 for detail.	will be continued until July 2009
1.5	To visit and give advice to the PBDP hatcheries.		- Visited Naujan hatchery to discuss and submitt report to produce fry at the hatchery (including road-map). The Project invited 2 staff from Naujan hatchery to train with OJT on breeder management, fry production, primary food culture from 17 Feb to 15 March 2008. Visited Naujan hatchery to provide technical assistance (May 2008).	will be continued until July 2009
1.6	To support the establishment of a fry information network among PBDP hatcheries.		- Prepared and submitted draft plan to build up hatchery workers network among hatcheries under PBDP based on the discussion made during the 1st hatchery training (Oct. 2007).	will be continued until July 2009
2.1	To clarify the present situation and problems in socio-economic and management circumstances affecting fish farmers.	Preparation for socio-economic study.	- Assisted JICA office to prepare TOR for local consultants.	Completed
		Study and analysis on the present status of milkfish aquaculture.	- Implemented socio-economic study for milkfish aquaculture to clarify demand and supply of fry, fish distribution, socio-economic circumstances around fish farmers together with baseline survey at pilot sites. - Outputs: Fish Farmer Management Report, Pilot Site Baseline Survey Report.	Completed
2.2	To select pilot sites and implement activities through discussion with personnel concerned.	Selection of pilot sites.	- Selected candidate pilot municipalities from three provinces through discussion with BFAR Regional Office and provincial agricultural offices. Held workshop attended by LGU extension workers, fish farmers, and Barangay captains (17-18 Jan. 2007). Finalize pilot municipalities from three provinces through discussion with counterparts (Feb. 2007). - Pangasinan: Dagupan, Binmaley, Lingayen; Pampanga: Macabebe, Masantol, Sasmuan; O.Mindoro: Bongabong, Roxas	Completed
		Selection of pilot activities.	- Selected pilot activities (8 pilot activities) to implement in the 2nd fiscal year which include some requirement to solve at each site. - Selected 3 pilot activities for 3rd fiscal year.	will be continued until March 2009
		Start up the activities at pilot sites.	- Start up 8 pilot activities in the 2nd fiscal year in Pangasinan, Pampanga and Oriental Mindoro. - Refer to Annex 6 for detail.	will be continued until June 2009

		Technical assistance for milkfish aquaculture.	- Carry out experiment at NIFTDC to exploit new technique for low cost and environmental friendly aquaculture through modifying traditional technique (mass production of *lablab*, efficacy of dry *lablab*, experiment on *suso* (sea snail)).	will be continued until June 2009
		Monitoring at pilot sites.	- Assisted counterparts to monitor the pilot activities and gave advice to the fish farmers.	will be continued until November 2009
2.3	To improve training and outreach programs for fish farmers by reviewing them.	Preparation of training program.	- Prepared training program by reviewing the contents and implementing methods of the present training program for fish farmers and extension workers.	Completed
		Preparation of extension program.	- Prepared extension program to build harmonious relationship between fish farmers and extension workers by using pilot activities as an extension tool.	Completed
2.4	To make or improve training material and technical manuals for extension workers and fish farmers	Preparation of training material	- Prepared training materials for the 1st and 2nd fish farmers and extension workers trainings (March 2007, revised in March 2008).	Completed
		Preparation of technical manual for fish farmers and extension workers	- Prepared and distributed manuals for extension workers and fish farmers at the 2nd fish farmers training (March 2008). These manuals are composed of technical know-how and fish farm management based on the experiment and accomplishment of the on-going pilot activities.	Completed
		Revise technical manual and training material for fish farmers and extension workers.	- Revise the training materials and technical manuals based on the experience in the past year, if necessary.	will be continued until October 2009
2.5	To hold training sessions for extension workers and fish farmers.	Implementation of fish farmers training.	- Implemented the 1st and 2nd fish farmers trainings for 21 fish farmers in Pangasinan, another 21 fish farmers in Pampanga, another 23 fish farmers in Bongabong and another 20 fish farmers in Roxas. - Refer to Annex 7 for detail.	will be continued until September 2009
		Implementation of extension workers training.	- Implemented the 1st and 2nd extension workers trainings for 7 staff from municipal agriculture offices, 3 staff from provincial agriculture office and 3 staff from BFAR regional office. Revised training and extension program based on the experiments. - Refer to Annex 8 for detail.	will be continued until August 2009

2.6	To support meetings of fish farmers for mutual understanding of good practices and necessary information.	Holding fish farmers meeting to exchange information.	- Implemented fish farmers meetings in barangays in Masantol (16 Oct. 2007) and Macabebe (16 Oct. 2007), Pampanga, in Bongabong (5 Nov. 2007) and Roxas (5 Nov. 2007), Oriental Mindoro to exchange information of pilot activities and opinions.	will be continued until August 2009
		Holding JCC and TWG meeting.	- Held TWG meetings three times (21 Nov. 2006, 11 May 2007, 27 Sep. 2007) and JCC meeting two times (27 Nov. 2006, 5 March 2008).	will be continued until February 2010
		Implementation of advertisement.	- Published news letter vol. 1(Feb. 2008) and established the project homepage (Feb.2008).	will be continued until February 2010

3-3 Outputs

The table 3 shows the status of progress in terms of indicators that measure the level of achievement of the project outputs (as per PDM version 2). Extent of achievements as well as remaining challenges of each output for the rest of the project duration are described in terms of these indicators as well as observations made through interviews and field visit.

Table 3: Achievement of Project Outputs (as of June, 2008)

Narrative Summary	Indicators	Achievement
Output 1 Supply of fry from hatcheries is stabilized	1-1 Number of days that supporting hatcheries (personnel) are instructed and trained	- Training course was conducted for 18 hatchery workers from 16 hatcheries for 11 days. - Most of them agreed that their knowledge and skills level were enhanced in the post training self evaluation. - Japanese experts provided advice to NIFTDC hatchery workers upon necessity on site. - Japanese experts visited Naujan hatchery 4 times and provided technical advice. - Two Naujan hatchery workers were invited to NIFTDC and provided with on-the-job training for 30 days.
	1-2 Fry production improves at PBDP hatcheries	- Fry production in NIFTDC 2.07 million (2006) 2.63 million (2007) - Egg production in NIFTDC 43.22 million (2006) 47.49 million (2007) - In 2007, fry production was realized in September, which was previously regarded as off-season month. - Even though Naujan hatchery has not produced fry yet, they are ready to produce fry from larvae or fertilized eggs.

	1-3 PBDP hatcheries improve milkfish fry survival rate	- Survival rate from egg to fry in NIFTDC 4.9%(2006) 5.7% (2007) - Refer to Annex 9 for details. - Other hatcheries have no available data on it.
Output 2 Fish farmers' knowledge of and skills in aquaculture production and management are improved at the pilot sites	2-1 Number of training days that extension officers and fish farmers have participated in by means of prepared materials.	- 9 training courses were held for 144 fish farmers with the provision of materials developed by the project for 17 days. - 2 training courses were held for 27 extension workers with the material developed by the project for 8 days. - Most of the training attendants agreed in the post training self evaluation that their knowledge and skills level were enhanced.
	2-2 Number of fish farmers adopting production and management techniques introduced by the project	- A total of 15 pilot farmers applied the production and management techniques introduced by the project.

Output 1: Supply of fry from hatcheries is stabilized

Output 1 has been partially achieved. Regarding NIFTDC, a series of the project activities on broodstock management, spawning technique, natural food management, and water management has stopped the downturn trend which started since 2004 and improved production compared with that in 2006. NIFTDC has improved its amount of egg and fry production and fry survival rate. Especially, it is a significant achievement for the stabilization of fry production that NIFTDC produced 319,000 fry in September 2007, which is usually regarded as off-season month. This is considered as a very important step for the envisioned year-round production. Regarding the hatchery in Naujan, which is one of the PBDP hatcheries in Oriental Mindoro, it was confirmed by the evaluation team that it has improved its facilities such as water intake, phycology laboratory, and aeration system and is ready for fry production. It was also confirmed that the hatchery workers in Naujan who attended the training in NIFTDC are ready to utilize what they learned for their hatchery operations.

However, it is not sure whether or not and to what extent the trainings contributed to the stabilization of fry production in the other 15 PBDP hatcheries all over the Philippines, and there are no exact data available on the production.

Output 2: Fish farmers' knowledge of and skills in aquaculture production and management are improved at the pilot sites

Output 2 also has been partially achieved. The fish farmers and extension workers from the pilot

municipalities attended the training and acquired knowledge on milkfish aquaculture, but it is the only pilot farmers among the training participants who have applied what they have learned in the training for their works including the pilot activity. In addition, the pilot activities in coordination with LGU extension workers who attended the training demonstrated and disseminated the effectiveness of the new skills learned, but the neighboring farmers have not adapted the new technology, even though he/she has interest in it.

3-4 Project Purpose:

Project purpose: Aquaculture outreach functions in the targeted areas.

Table 4 below shows the status of indicators that measure attainment level of the project purpose.

Table 4: Achievement of the Project Purpose (as per PDM version 2)

Narrative Summary	Indicator	Achievement
Aquaculture outreach functions in the target areas	1. More fish farmers adopt techniques introduced by the project	- The pilot farmers have applied the acquired skills and knowledge in their operation - There was no information gathered to determine whether or not the other fish farmers who attended the training continued to apply the acquired skills and knowledge in their operation
	2. Efficiency of PBDP hatchery operation increased	- NIFTDC has improved its egg production, fry production, and fry survival rate, compared to production in 2006. See data mentioned in table 3. - Naujan hatchery has improved its facilities for fry production. - 6 of 16 PBDP hatcheries has no egg and fry production in 2007

It is too early to determine the precise degree of the achievement at the mid point, but generally speaking, the achievement of the project purpose is limited.

Even though the fish farmers appreciate the training, at the time of the evaluation, it was not confirmed if other participants applied the technologies/approach. It was confirmed that the pilot farmers have continuously applied the technologies/approach introduced by the project. According to the interview with the pilot farmers and LGU extension workers, most of neighboring farmers have not actively applied technologies yet, because they are in the mode of "wait and see", even though they understand and are interested in the effectiveness of new technology/approach through information exchange meetings. In addition, the pilot farmers have benefited from the improved

aquaculture outreach. However, the benefits have not been spread to the entire provinces of Pangasinan, Pampanga, and Oriental Mindoro.

Even though there is no clear definition of "efficiency of hatchery operation", the evaluation team found that some indicators such as egg and fry production and its survival rate in NIFTDC has been improved, as discussed above. In addition, we can say that the facilities of the Naujan hatchery has been completed and improved through the funding support of BFAR Region IV-B and trainings conducted and technical assistance by the project. However, it is too early to determine at this time whether or not the project contributed to the improvement of hatchery operation in other PBDP hatcheries.

4. Implementation Process

4-1 Project Implementation System

It could be said that the project implementation structure has been functioned in general by assigning appropriate Japanese experts and Philippine counterparts to respective project activities (refer to Annex 10). The project team, the pilot municipalities, and the pilot farmers signed Memorandum of Agreement (MoA) to agree the implementation arrangement before they started the pilot activities. Based on the MoA, the extension workers in the pilot LGUs have been involved with the pilot activities, however, many of them have difficulties in fully committing themselves due to insufficient budget from pilot municipalities for their transportation and per diems.

As for the monitoring system for the project, monitoring including actual visits of about twice a month to the pilot sites have been conducted by the Project (Japanese experts and counterpart personnel) in cooperation with the extension workers in the pilot LGUs. Moreover, Japanese experts prepare progress reports biannually which are shared with Philippine counterparts.

On decision making process, the Joint Coordination Committee (JCC) meetings were held to: 1) report and review the achievements during the past year; and 2) approve the activities and plans for the coming year. On the other hand, the Technical Working Group (TWG) Meetings were held to discuss technical matters raised in the project activities, as shown in the table below. Even though the JCC Chairperson, who is the Director of DA-BFAR did not attend the JCC meetings so far, his representative ably chaired the meeting.

Table 5: JCC and TWG meetings

	Attendance	Remarks
Joint Coordination Committee		
November 27th, 2006	29	Inception Report, Plan of Operation, and PDM was adopted
March 5th, 2007	42	Activities in 2006 were reported and work plan for 2007 was approved and adopted
Technical Working Group		
November 21st, 2006	15	
May 11th, 2007	22	
September 27th, 2007	25	

4-2 Commitment of the Philippine side

The Philippine side have shown relative ownership and commitment to the project, in general. The Philippine counterpart staff in NIFTDC have committed themselves in the project activities, but many of them could not fully participate in the activities and decision-making process, due to their multi tasking work. In addition, it is the job-orders who are engaged in daily hatchery operation in NIFTDC, but their unstable and unfavorable employment conditions did not make

them fully committed. As for the pilot municipalities which expressed their commitment in the Memorandum of Agreement, not only LGU extension workers but also some mayors demonstrated very high interest in the project activities. However, it is observed in the sites that the budgetary support or commitment from the municipalities were insufficient and limited, which affected the extension workers in performing their tasks.

4-3 Communication and Information Sharing

During the Japanese experts stay in the NIFTDC, communication and information sharing between Japanese experts and counterpart personnel seems to be smooth in general. The conduct of monthly project team meetings and weekly sub-group meetings have effectively facilitated better communication. However, they had difficulties in timely and smooth communication with each other and decision-making on day-to-day operations during the absence of Japanese experts and the counterparts due to their tasks other than the project, even though they communicated with each other via phone and e-mail.

4-4 Other Factors Affecting Project Accomplishment

A series of natural calamities (typhoons, earthquake, and high tide) and force majeure (e.g. breaking of pond dike, lost of fry /fingerling, etc.) have heavily affected the facilities of NIFTDC (e.g. seawater intake facility) and pilot activities.

5. Result of the Evaluation with the Five Criteria

5-1 Relevance: High

Project design is still relevant in view of consistency with Philippine policies, Japanese ODA policies, and the needs of the target group, as follows:

1) The fishery sector, especially the aquaculture sub-sector, is recognized as one of the prominent industries for job creation and food security in support of the country's drive toward economic development. Even though there are no written documents to show GoP's commitment to continue the PBDP, the Director of DA-BFAR confirmed during the meeting with the evaluation team that milkfish is one of the most important national fish commodities and the GoP will continue to support its production.
2) This project is consistent with the aid policy of Japanese government. In the country assistance strategy for the Philippines, which is currently being revised, the improvement of livelihood in rural area is one of its three priorities, and this project seems to be able to contribute to the improvement of livelihood
3) The project is responding to the needs of the fish farmers in the pilot municipalities. The project activities have addressed the location-specific problems, which were identified by the socio-economic survey conducted in the project, as well as the discussion with various stakeholders, including representatives of fish farmers, and are expected to contribute to the improvement of fish farmers' knowledge on aquaculture technologies and their livelihood.

5-2 Effectiveness: Fair

The project purpose has been partially achieved.

The NIFTDC as the mother hatchery has improved its fry production, to a certain degree, due to the project's effort. On the other hand, the Naujan regional central hatchery has been already capacitated to start seed production. If the GoP continues to secure sufficient budget and personnel for these two hatcheries, they can enhance their egg and fry production in anticipation of future demands.

In addition, all pilot fish farms trained in the project have practiced the technologies introduced by the project in their pilot activities. The neighboring farmers are interested in and ready to introduce the technologies, if they are persuaded by the demonstration of the successful results of the pilot activities. Therefore, it can be said that the practice of the techniques will be spread to the neighboring fish farmers through information exchange meetings, if the project can demonstrate good results.

However, the evaluation team has recognized that the full achievement of the project purpose within

the project duration is difficult to realize because the coverage of the project appears to be too large. It is difficult for the project to provide on-site technical assistance to all the PBDP hatcheries as it has done so with the NIFTDC and Naujan hatcheries due to time and personnel limitations. Further, it is also deemed difficult to disseminate the skills and knowledge not only within the pilot municipalities but also the entire provinces, considering time, budgetary and personnel requirements.

5-3 Efficiency: Fair

The project has been efficiently implemented in general. As discussed above, the project activities, such the trainings, have deepened the knowledge of the trainees on aquaculture technologies. Through the site visits and interviews conducted in this evaluation survey, it was confirmed that most of the pilot farmers have continued and will continue to apply the technologies and approach which were introduced through the trainings or direct technical transfers provided by the project. The training in Indonesia for NIFTDC hatchery workers enabled them to improve their operation protocol and procedures.

However, there are some factors that affected the efficiency of the project activities, as follows:

- The absence of Japanese experts from March to April, which is the peak season for milkfish spawning, hindered the NIFTDC to be provided with timely and adequate technical advice on hatchery operations.
- Since some of the pilot sites, especially in Oriental Mindoro, are far from the NIFTDC, the project could not easily access the sites, which sometimes resulted to difficulty in providing assistance and monitoring the pilot activities.
- Even though budget was properly allocated to the project by the NIFTDC, the delay of the budget disbursement hindered timely response to the problems raised in the hatchery operation, such as the procurement of the spare parts for hatchery facilities or travel expenses of the staff to the pilot sites.
- A series of natural disasters posed constraints to the full utilization of the inputs. For example, the fry and fingerlings provided to the pilot farmers escaped from the ponds due to high tides and typhoon before harvest, and the project could not show the good examples to the neighboring farmers.

5-4 Impacts: Fair

(1) Achievement of Overall Goal

It is too early to evaluate the prospects of the achievement of the overall goal. However, when we focus on the impact to the pilot sites, we can observe some achievements which might contribute to the improvement of the livelihood of fish farmers within three to five years after the project

completion. For example, the possible introduction of dried *lablab*, which is verified by the project, can decrease usage of compound/commercial feed which suppresses fish farmers' management. Further, the realization of year-round fry production and supply from NIFTDC might increase the farmers' chance to produce and sell milkfish during off-season and to augment their income.

(2) Other Impacts

The evaluation team found that some of the pilot activities generated unexpected positive impacts, as follows:

- Through the pilot activities on water quality monitoring for three LGUs' staff in Pangasinan, not only the skills and knowledge on the monitoring procedures but also their consciousness for environment were enhanced. This also attracted the interests of the mayors in the pilot municipalities which might generate positive impacts on the LGUs' policy decisions on the activity.
- The activities to introduce the modular system in Bongabong, Oriental Mindoro enhanced not only the pilot farmers' eagerness for more efficient milkfish production but also stimulated their wives' entrepreneurship. The wives established women's group by themselves, and the project provided them with technical support on the milkfish processing to improve their livelihood.

No unexpected negative impacts were found.

5-5 Sustainability: Fair

(1) Policy aspect

The policy support of DA-BFAR can be expected. As discussed above, the Director of DA-BFAR confirmed that milkfish is one of the important national fish commodities and the GoP will be supportive for the outreach of milkfish aquaculture. NIFTDC under the DA-BFAR has vigorously committed themselves in outreach activities by utilizing its technical advantage in the situation where LGUs or DA-BFAR regional office cannot afford to provide enough extension services to the fish farmers. Also, in the interview by the evaluation team, the Center Chief of NIFTDC expressed his intention to continue the outreach activities in coordination with LGUs. However, it is not clear whether or not LGUs and DA-BFAR regional office will disseminate the knowledge and skill to the fish farmers within their coverage area due to varying priority thrusts and programs.

(2) Financial aspect

The necessary budget has been allocated for the project so far. The NIFTDC's budget is allocated based on annual proposal submitted to the DA-BFAR, and since milkfish aquaculture is considered a priority commodity by the DA-BFAR, securing adequate budget might not be a problem as far the hatchery operations are concerned. As for LGUs, we cannot expect much that LGUs allocate enough

budget on extension services, even though the role of the extension workers on LGUs are critical to disseminate the skills and knowledge introduced by the project to neighboring farmers. It is major concern of the project that insufficient budget for transportation and per diems might discourage the LGU extension workers to sustain the activities after the project withdraw from the sites.

(3) Organizational/Technical aspects

Even though the GoP is supposed to implement the rationalization plan based on Executive Order No. 366, the Center Chief of NIFTDC expressed his intention not to decrease the number of the counterpart staff including the job-orders. This will ensure that technology transferred to NIFTDC will be sustained and utilized in their operation after the project. Whether or not the extension workers will continue to disseminate the transferred technology in his/her task heavily depends on the budget allocation from the pilot municipalities.

5-6 Conclusion

The project is consistent with the national policy of the GoP and Japanese ODA policy, and sufficiently reflect the needs of the target group. Even though the project surely has improved and will improve the aquaculture outreach in the pilot areas, it seems to be difficult to realize it in the original target areas, i.e. the entire provinces. Despite several factors hindering efficiency, the inputs has been efficiently utilized to achieve the Outputs 1 and 2. It is too early to evaluate the impact and sustainability of the project, but the evaluation team found some positive unexpected impacts generated by the project, and also found financial concerns to sustain the outreach activities after the project, especially on the part of the LGUs.

6. Recommendation

Based on the evaluation findings, the evaluation team would like to raise several matters that it deems as necessary for the effective and efficient project implementation for the rest of the project duration.

(1) Concentration on the improvement of NIFTDC and Naujan hatchery

The socio-economic survey revealed that most of the PBDP hatcheries do not only need technical advice but also improvement of facilities such as water intake, and therefore, it is not realistic to activate, operationalize or enhance all PBDP hatcheries within the project duration, when we take into consideration time and personnel constraints of the project. It is recommended that the project should utilize its limited resources on the improvement of NIFTDC and Naujan hatchery, which has been realized step by step so far. After the operations of NIFTDC are enhanced, it is expected to function as a mother hatchery to provide milkfish egg and fry to other hatcheries and adequate technical support including on-the-job training, as it did for the workers from Naujan hatchery. It is also reasonable to enhance Naujan hatchery because it is expected to work as the source of fry for the Mindoro Island and may contribute in ensuring the sustainability of the project effectiveness.

(2) Improvement of NIFTDC's hatchery management

In order to enhance and maximize NIFTDC's operational capacity in egg and fry production, there is a need to closely monitor the daily operations and provide timely response to issues raised in the hatcheries. Thus, the followings are recommended to NIFTDC:

1) Team-building or workshop should be undertaken to identify problems and to formulate possible solutions to improve operations. Providing opportunities for job-order personnel and enabling them to make presentations on their daily operation and technical know-how may facilitate mutual understanding, and might boost their motivation and confidence.
2) An increase in wages for the job-orders should be considered, in order to motivate them economically and prevent from possible resignations.
3) Timely decision-making by the management personnel and budget disbursement based on mutual understanding of the current situation of hatchery operation should be realized to deal with urgent matters such as damage of hatchery facilities, minimize such damages and maximize production. Additional assignment of regular staff in hatchery section is preferable to facilitate its decision making.

(3) Reconsideration on Timing and Volume of Dispatch of Japanese Experts

The evaluation team found that the absence of Japanese expert from March to April hindered the provision of timely and adequate assistance on hatchery operation even though they made sincere efforts to communicate via phone and e-mail. Recognizing that March to June is the peak season

for milkfish production, it is deemed necessary that technical assistance is extended for the improvement of egg and fry production, thus, JICA should consider the dispatch of Japanese experts to NIFTDC as long as possible during the period from March to June.

In addition, it is recommended that the additional assignment of Japanese experts may be considered, recognizing that: 1) Naujan hatchery needs intensive technical supervision to start fry production within the project duration, 2) there is a need to facilitate better communications among NIFTDC staff for further efficient operation, and 3) the implementation of pilot activities needs more time than expected.

(4) Role of Local Government Units

Although the role of the LGU extension workers is critical to ensure the success of the pilot projects, problems such as lack of budget for transportation, per diem and communication hampered their effective performance of tasks, as identified by the evaluation team. Nonetheless, their role is essential in monitoring the aquaculture activities, including technology packaging and information dissemination in their locality. And also it is expected that the LGU replicate and expand the pilot activities in its respective jurisdictions. For this reason, it is recommended for the Project to take possible measures to ensure LGU's commitment and active participation in the pilot activities.

On the other hand, the evaluation team is recommending the participation of the regional BFAR extension workers in their respective provinces, particularly in Regions I, III and IV-B. It is further proposed that a point person be assigned for documentation, communication and guidance to the pilot farmers in the pilot municipalities. In this regard, it might be helpful if a Memorandum of Understanding (MOU) between the Project and the respective BFAR regional office should be forged.

(5) Revision of the PDM

Since the original PDM attached to the Minutes of Meeting signed on August 10th, 2006 did not include the objectively verifiable indicators, it was revised to include these indicators, and approved in the JCC on 27 November 2006 (refer to Annex 11). However, there has been further "inputs" after the first revision of the PDM, some descriptions for "narrative summary" are still vague for interpretation, and quantitative indicators/targets were not set.

Thus, the evaluation team recommends further modifications of the PDM in order to accord it with the findings of the evaluation as follows:

1) Inputs

Fields of Japanese experts are to be slightly revised in accordance with actual. Since the significance of motivation and team building for hatchery management is recognized by the Project team, additional Japanese expert in the filed of "hatchery team building" is proposed. Moreover, description of "provision of equipment", "C/P training in Japan or in a third country", and "local operating costs" are added, in accordance with actual inputs.

2) Activities

Since the Project team recognize the significance of motivation and team building for hatchery management, Activity 1.2 is proposed to be revised as follows:

Original: To formulate a plan to improve the fry production process and hatchery management and then implement them at NIFTDC.

Revised: To formulate a plan to improve the fry production process and hatchery management (such as motivation and team building) and then implement them at NIFTDC.

Description of Activity 1.6 is also to be revised as follow, implying that the proposed network should function not only for fry information exchange but mutual cooperation among hatcheries:

Original: To support the establishment of a fry information network among PBDP hatcheries.

Revised: To support the establishment of a PBDP hatchery network.

3) Outputs

Output 1: The original PDM seems to have a large gab between the project activities and output of "stabilization in supply of fry". In order to make this linkage more logical, description of the output 1 is to be revised as follows:

Original: 1. Supply of fry from hatcheries is stabilized.

Revised: 1. Fry production process and management are improved at PBDP hatcheries.

Output 2: Since the project activities include trainings for extension workers, the corresponding outputs should be included. Moreover, since "pilot sites" may be interpreted as the very limited area, like barangay where the pilot activities are undertaken, and extension workers as well as fish farmers for participating in the trainings are selected from municipality level, "pilot sites" should be more clearly defined to be "pilot municipalities".

Original: 2. Fish farmers' knowledge of and skill in aquaculture production and management are improved at the pilot sites.

Revised: 2. Fish farmers and extension workers' knowledge of and skill in aquaculture production and management are improved at the pilot municipalities.

4) Project Purpose and Overall Goal

"Targeted areas" in the original PDM cover too large areas, implying three target provinces. It should be defined to the "pilot municipalities". Currently the pilot activities are undertaken in 8 municipalities and it will be eventually increased up to about 12 municipalities, the area of which is considered large enough for project coverage.

5) Verifiable Indicators

In accordance with the revision of description of the narrative summary, we propose to set the quantitative indicators as follow, considering the achievements and future plans of the project activities, their expected outputs and effects:

i) Output1: Since the degree of technical inputs such as on-site guidance and trainings by the project are different among NIFTDC, Naujan, and other PBDP hatcheries, indicators/targets are proposed to be set separately. It is also proposed to set an indicator for output corresponding Activity 1.6 (To support the establishment of a PBDP hatchery network).

ii) Output 2: Indicators/targets showing the outputs from the project activities provided for extension workers such as trainings are set. An indicator for output of the Activity 2.6 (To support meetings of fish farmers for mutual understanding of good practices and necessary information) is also set.

iii) Project Purpose: "Increase in supply of eggs and fry" is proposed to use for showing improvement of efficiency of NIFTDC hatchery. In addition, "production of fry in off-season months" is proposed as another indicator showing stabilization of fry production.

Two indicators on reaction of fish farmers (those who participated in trainings and those who participated in pilot activities) are proposed for explaining the effects of NIFTDC's outreach function.

iv) Overall Goal: Since original indicator 2 is not appropriate for verifying the achievement of overall goal, it is proposed to be deleted.

Though original indicator 1 covers only the aspect of decrease in aquaculture production cost, inclusion of the aspects of its sales and profits to the indicator is recommended, for verifying the enhancement of fish farmers' livelihood.

These indicators will be utilized for verifying the achievement of outputs, project purpose, and overall goal at the terminal evaluation to be held around the end of 2009.

6) Means of Verification

Together with the revision of indicators (objectively verification indicators), "means of verification" are also proposed to be modified considering data/information availability at the time of the terminal evaluation.

7) Important Assumption

Considering the above-mentioned proposed revisions, pre-condition as well as important assumptions are reviewed and proposed to be revised as follows:

"Domestic milkfish demand does not decrease drastically" is set as a pre-condition for the Project, since the Project is based on the fact that milkfish is one of the most important national fish commodities.

"Sea water supply and quality does not worsen compared to the present level" which was originally a pre-condition is changed to an important assumption for achieving the outputs, since quality and quantity of water ensured is one of the important factors which will affect the improvement of fry production.

"There were no disastrous diseases" which was originally an important assumption of generating outputs is proposed to be regarded as the one for achieving the project purpose.

"There is no drastic increase of price of farm inputs such as fertilizer and feed" is added as an important assumption for achieving the overall goal, since this increase will definitely affect the cost for aquaculture production of fish farmers.

For details of the above proposed revisions, please refer to Annex 12: Proposed PDM.

Annex 1: Dispatch of Japanese Expert

	Title	Name	Company	the 1st fiscal year					the 2nd fiscal year												the 3rd fiscal year			1st Year	2nd Year	3rd Year (April-June)	Total
				2006					2007												2008						
				Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Phill.	Phill.	Phill.	Phill.
In the Philippines	Team Leader/Extension	Tokio Kitamado	ICNet Ltd.	30(11/6-12/5)		15(1/7-1/21)			15(4/28-5/12				90(8/15-11/12)					30(2/4-3/15)				30 (6/1-)		1.50	4.50	1.00	7.00
	Aquaculture technology/Training	Masakazu Takano	Fisheries & Aquaculture International Co. Ltd.	30(11/6-12/5)		45(1/15-2/28)			64(4/28-6/30				56(9/7-11/1)					45(1/24-3/8)						2.50	5.50	0.00	8.00
	Broodstock management and spawning techniques/Livefeed management	Sumito Akatsu	Fisheries & Aquaculture International Co. Ltd.						55(4/28-6/21)			(Emergency leaving for Japan due to sickness)												0.00	1.83	0.00	1.83
	Broodstock management and spawning techniques/Livefeed management	Masakazu Takano	Fisheries & Aquaculture International Co. Ltd.										33(8/5-9/6)					10(1/14-1/23)						0.00	1.43	0.00	1.43
	Broodstock management and spawning techniques/Livefeed management	Takao Sasaki	ICNet Ltd.											37(9/22-10/28)										0.00	1.23	0.00	1.23
	Broodstock management and spawning techniques/aquaculture technology	Masakazu Takano	Fisheries & Aquaculture International Co. Ltd.																			45 (4/15-6/3)		0.00	0.00	1.50	1.50
	Training/Livefeed management	Kouji Kitagawa	Fisheries & Aquaculture International Co. Ltd.																				42 (5/18-)	0.00	0.00	1.40	1.40
	Marketing/business management	Yoshiaki Matsuda	ICNet Ltd.				45(1/7-2/20)							45(8/25-10/8)										1.50	1.50	0.00	3.00
	Monitoring	Takao Sasaki	ICNet Ltd.				60(1/15-3/15)			75(5/10-7/23)												45 (4/15-5/29)		2.00	2.50	1.50	6.00
	Resources Environment Survey/Monitoring	Hiroyuki Kawasaki	ICNet Ltd.	0(emergency leaving for Japan due to sickness)																				0.00	0.00	0.00	0.00
	Resources Environment Survey/Monitoring	Hiroshi Ohmizo	ICNet Ltd.		15(11/21-12/5)																			0.50	0.00	0.00	0.50
	Resources Environment Research/Monitoring	Hiroaki Terashima	ICNet Ltd.				45(1/7-2/20)							45(8/15-9/28)					30(1/15-2/13)			30 (5/12-6-10)		1.50	2.50	1.00	5.00
	Coordinator	Masako Tsuzuki	ICNet Ltd.		21(11/15-12/5)		17(1/8-1/24)	22(2/14-3/7)		60(5/5-7/3)				60(8/15-10/13)						49(1/27-3/15)		42 (5/18-)		2.00	5.63	1.40	9.03
																								11.50	26.62	7.80	45.92

Annex 2: Details of the Training in Indonesia

Date	6-30 November 2007	
Venue	Gondol Research Institute for Mariculture (GRIM), Indonesia	
Trainees	1. CORDELIA NIPALES	Senior Aquaculturist, NIFTDC
	2. EDITHA ROXAS	Aquaculturist II , NIFTDC
	3. ROLANDO BAUTISTA	Hatchery Technician in Broodstock Management
	4. GRACE ABDALA	Hatchery Technician in Natural Food Production
	5. LARRY ESTABILLO	Hatchery Technician in Larval Rearing
Subjects	**Lecture**	**Lecturer**
	Broodstock Management	Mr. Agus Priyono
	Larval Rearing Management	Mr. Tony Setyadharma, Mr. Agus Priyono
	Live Food Culture (phytoplankton)	Mrs. Titiek Aslianti
	Live Food Culture (zooplankton)	Dr. Gde Sumiarsa
	Feed Management	Mr. Ketut Suwirya
	Fish Deseases	Mr. Zafran, Mr. Fritz Johnny
	Field Work	
	Feed Preparation	Mr. Agus Priyono
	Broodstock Maintenance	Mr. Agus, Mr. Tony
	Live Food Culture (Nanno Chloropsis and Rotifer)	Mrs. Titiek Aslianti
	Larval Tank Preparation	Dr. Gde Sumiarsa
	Egg Handling & Sorting	Mr. Agus Priyono
	Larval Rearing, Hormon preparation, Hormon Formulation	Mr. Tony Setyadharma
	Larval Rearing	Mr. Tony Setyadharma

Annex 3: List of Local Cost Expenditure

Annex 3-1: Local Cost Expenditure shouldered by Japanese Side (by the end of March 2008)

	2006-2007	2007-2008	
Local Employees	199,000	1,339,000	
Consumable goods	200,000	346,000	
Travel Expense	60,000	115,000	
Printing cost	1,000	77,000	
Cost for rent	297,000	203,000	
Training	87,000	1,242,000	
Pilot Activities	0	935,000	
Equipment for office	710,000		
Equipment for water quality		135,000	
Equipment for hatchery		502,000	
Equipment for pilot projects		105,000	
Total	1,554,000	4,999,000	6,553,000

in Philippine peso

Annex 3-2: Local Cost Expenditure shouldered by Philippine Side (by the end of February 2008)

Fields	Items	Local contribution	Specifications
Operation cost for hatchery at NIFTDC	milkfish hatchery	2,800,000 Peso	Cost for broodstock management and spawning.
	primary food	619,000 Peso	including inovation cost for Phyco Laboratory.
	water intake facilities	3,700,000 Peso	Cost for maintenance of water intake facilities.
	labour	1,920,000 Peso	Labour cost covering the above three items.
Innovation cost for Nauian Hatchery	milkfish hatchery	900,000 Peso	For facilities to attain the 1st step.
Pilot activities	water quality monitoring	201,000 Peso	for nanalysis in Lab. And maintenance of boats
	cost for supply of fries	88,000 Peso	Fry supply to pilot fish farmers.
	transportation	250,000 Peso	For fuel and drivers' allowance.
Trainings	local contribution for trainings	198,000 Peso	Hatchery workers' training, extension workers' training, fish farmers' training and workshop.
	Total	10,676,000 Peso	

Annex-4: List of Counterpart Personnel

No.	Counterpart	Title	Position	Responsiblities in the Project
1	Dr. Westly R. Rosario	Center Chief IV, NIFTDC Interim Executive Director, BFAR-NFRDI	Project Director	Chairman of the TWG meeting. Decision maker in counterparts for the Project.
2	Engr. Enrique B. Marquez	Engineer III/Senior Aquaculturist, NFRDI	Project Manager/In Charge of Pilot Activities	Leader for the pilot activities.
3	Ms. Cordelia B. Nipales	Head Marine Finfish Hatchery/Senior Aquaculturist, BFAR-NIFTDC	Counterpart staff/In Charge of the Lab-lab Experiment at NIFTDC	In charge of milkfish hatchery, hatchery worker trainig and experiment in NIFTDC.
4	Ms. Editha C. Roxas	Head, Natural Food Production, Fresh water Finfish/Aquaculturist II, BFAR-NIFTDC	Counterpart staff	In charge of the primary food section.
5	Mr. Racquel A. Ferrer	Head, Project leader of Oyster Culture, BFAR-NIFTDC	Counterpart staff/ In Charge of Pilot Activities in Pangasinan	In charge of the pilot activities in Pangasinan.
6	Mr. Reivin Vinarao	Aquaculturist I, BFAR-NIFTDC	Counterpart staff/In Charge of Pilot Activities in Pampanga (Aug. 2007-January 2008)	In charge of the pilot activities in Pampanga until January 2008.
7	Mr. Roberto S. Bravo	Head, Sual Fish Cage Station	Counterpart staff/In Charge of Pilot Activities in Pampanga (February 2008-)	In charge of the pilot activities in Pampanga after January 2008.
8	Mr. Angelito Dela Cruz	Head, Live Fish Marketing /Researcher, Morobicus Project, Aquaculturist I, BFAR-NIFTDC	Counterpart staff/In Charge of Pilot Activities in Oriental Mindoro	In charge of the pilot activities in Oriental Mindoro, extension worker's training and fish farmers training.
9	Mr. Regino R. Regpala	Head, Environmental Monitoring Unit, Aquaculturist I, BFAR-NIFTDC	Counterpart staff/In Charge of Pilot activity in Water Monitoring	In charge of a pilot activity on water quality monitoring.
10	Mr. Jose B. Gamboa III	Head, Fish Processing/ Senior Aquaculturist, BFAR-NIFTDC	Counterpart staff/In Charge of Pilot activity in Fish Processing	In charge of a pilot activity on fish processing.

Annex 5: Details of Hatchery Worker Training

Place	Session	Date	Site	Trainees	Attendants	Subjects	Accomplishment
Pangasinan	1st	21 May- 1 June 2007	NIFTDC, Dagupan City	16 hatchery workers under PBDP	18	・Basic culture of natural food (counting, preparation of tank, preparation of culture water, feeding, harvest) ・Basic measure for breeder management (judgment of maturity, water exchange, feeding management) ・Basic measure of fry management (water exchange, feeding management, counting) ・How to analyze and take countermeasure for the technical problems in hatchery.	・Understood basic nannno culture (1st, 2nd, 3rd) and implemented it. ・Mastered basic rotifer culture with use of nanno and yeast and implemented it. ・Mastered how to strengthen nutrition of rotifer. ・Mastered basic technique on breeder management and implemented routine breeder management. ・Mastered basic technique on fry management and produced fry. ・Understood how to analyze technical problems in hatcheries and took countermeasure to solve them.

Annex 6: Details of Pilot Activity

(1) Pangasinan

Municipal.	Purpose	Target f. farmers (agencies)	Input	Present status	Accomplishment by activity
Dagupan, Binmaley, Lingayen	Establish water quality monitoring system for the river over several LGUs.	Agriculture offices of Dagupan City, Binmaley and Lingayen	1. Local; 201,000peso for boat maintenance and analysis in laboratory, 2 local staffs 2. Japan; Equipments for water monitoring, 1 Japanese expert	Implemented water monitoring and analysis of it during rainy season and presented the result at Binmaley. Water monitoring for dry season is being done in April 2008. Resuts were also presented in Lingayen in May 2008.	The results of the monitoring were presented whenever there were chances, then concerned people and agencies are interested in it.
NIFTDC	Establish technical measure to use lablab effectively with experiment in NIFTDC.	Non	1. Local; Tank, fry, feed, 1 local staff 2. Japan; 1 local consultant, 2 Japanese experts	Following 3 experiments are being implemented. 1.Mass production of lab-lab 2.Efficacy of dry lab-lab 3.Effect of suso and its possibility to utilize for aquaculture	Utilization of dry lab-lab as feed by adding protein will be realized in near future. In this fiscal year, it is going to be proven in a pilot pond in Dagupan City.
Dagupan	Promote fingerling production with effective use of natural food.	Mr.Fred Quinto	1. Local; 30,000fry, Transportation, 2 local staff 2. Japan; 5,520peso for pond preparation, 2 Japanese experts	Stocked 30,000 fry on 26 Oct. 2007 and delivered fingerling in April 2008.	It is going to analyze the cost benefit of fingerling production business, then implement proof activity of dry lab-lab.
	Promote grow-out production with effective use of natural food.	Mr.Marcelino Fernandez	1. Local; 5,000fingerling, transportation, 2 local staff 2. Japan; 5,520peso for pond preparation, 2 Japanese experts	Stocked 5,000 fingerling on 30 Oct. 2007. Supplied compound feed for 1 month before harvest (10 Mar. 2008).	Obtained complete production and sales data. It is disclosed that the cost of compound feed depress the production benefit which tells us the importance to adopt effective use of natural food.
Lingayen	Promote grow-out production with effective use of natural food with modular system.	Mr.Orlando Bartome	1. Local; 35,000fry, transportation, 2 local staff 2. Japan; 17,350peso for pond preparation, 2 Japanese experts	Stocked 15,000 fry on 26 Oct. and 20,000 fry on 9 Nov. 2007. Transferred only 3,253 fingerling to transition pond on 13 March 2008.	The reason behind of such high mortality will be examined.

(2) Pampanga

Macabebe	Introduction of fingerling production business with effective use of natural food.	Mr. Ruben Tongkol	MOA has not yet concluded.	Stocked hatched fry at NIFTDC in March 2008. There appeared some disease for stocked fry.	
Sasumuan	Introduction of fingerling production business with effective use of natural food.	Mr. Romeo Sunga	1. Local; 85,000fry, 2 local staff 2. Japan; 24,000peso for pond preparation, 2 Japanese experts	Stocked 85,000 fry hatched at NIFTDC on 8 Oct. 2007, however, about 80,000fry were lost due to typhoon hit last Oct.-Nov. 2007. Remained 1,100 grow-out (350kg) was harvested on 17 May 2008.	1. It has been proved that it is possible to produce fingerling during rainy season even though 0-salinity provided stocking fry adjusted to 0 salinity before stocking. 2.Fingerling production was failed due to hit of typhoon.
Masantol	Introduction of fingerling production business with effective use of natural food.	Mr.Manny Sunga	1. Local; 60,000fry, 2 local staff 2.Japan; 10,000peso for pond preparation, 2 Japanese experts	Stocked 60,000 fry hatched at NIFTDC on 28 Sept. 2007. Harvested 4,600 fingerling on 9 Feb. and 11,510 fingerling on 15 Feb. then completed to harvest about 5,000 fingerling afterwards, totaling 21,110 fingerling harvested.	1. It has been proved that it is possible to produce fingerling during rainy season even though 0-salinity provided stocking fry adjusted to 0 salinity before stocking. 2.It is disclosed that breakeven quantity is about 20,000fingerling against 60,000fry.

(3) Oriental Mindoro

Bongabong	Income generation with profitable grown-up production with effective usage of natural food in modular system based on group approach.	Small group in fish farmers association	1. Local; 50,000fry, 2 local staff, 2 times demonstration during harvest 2. Japan; 306,340peso for pond preparation and typhoon protection, 2 Japanese experts	Stocked 64,000 fry hatched in Iloilo hatchery in Aug. 2007. Implemented harvest demonstration from nursery pond to transition ponds on 10-12 Oct. 2007. About 38,000 fingerling out of 50,000 were lost due to typhoon hit from Nov. to Dec. 2007. The Project continue to assist them to protect the pond against forthcoming natural calamity and to materialize constant harvest.	The way for income generation by introducing modular system with group approach is shown to the area where fish farmers worked individually and the aquaculture was not the effective income generation method.
Roxas	Profitable grow-out production with effective use of natural food and poly-culture with shrimp.	Ms.Rebecca E. Tatoy	1. Local; 2 local staff 2. Japan; 50,435peso for pond preparation and fry, 2 Japanese experts	Prepared the pond from July 2007 and stocked 6,500 fingerling and 5,000 baby shrimp in Aug.2007. Compared with neighboring ponds where they stocked only baby shrimp, the shrimp grew better in the pilot pond and she harvested the shrimp on 27 Dec. 2007, however, it has taken time for milkfish to grow out.	It is going to analyze cost benefit after completion of the 1st production cycle.

Annex 7: Details of Fish Farmer Training

Place	Session	Date	Site	Trainees	Attendants	Subjects	Accomplishment
Pangasinan	1st	3-5 Sept. 2007	NIFTDC, Dagupan City	7 from Dagupan 7 from Binmaley 7 from Lingayen Total 21	16	Pond preparation to grow natural food, milkfish aquaculture, How to maintain water quality, basic book keeping for fish farmer, fish farm management, field trip.	·Trainees know how to prepare suitable ponds for natural food growing. ·Trainees can keep production records. ·Trainees can present their own fish farm management.
	2nd	18-19 Feb. 2008	NIFTDC, Dagupan City	The same attendants at the 1st session	10	Structure of fish pond, precautionary methods for natural calamity, water quality monitoring, how to harvest/ post harvest, fish processing, natural food experiment, fish farm management.	·Trainees obtain knowledge of precautionary measure for natural calamity. ·Trainees know background of fish kill. ·Trainees know the way to add value of milkfish. ·Trainees know effective use of natural food. ·Trainees can analyze and present their own fish farm management.
Pampanga	1st	10-12 Sept. 2007	SACOP, San. Fernando	7from Masantol, 7 from Sasmuan and 7 from Macabebe, Total 21	14	Pond preparation to grow natural food, milkfish aquaculture, How to maintain water quality, basic book keeping for fish farmer, fish farm management, field trip.	·Trainees know how to prepare suitable ponds for natural food growing. ·Trainees can keep production records. ·Trainees can present their own fish farm management.
	2nd	21-22 Feb. 2008	SACOP, San. Fernando	The same attendants at the 1st session	8	Structure of fish pond, precautionary methods for natural calamity, water quality monitoring, how to harvest/ post harvest, fish processing, natural food experiment, fish farm management.	·Trainees obtain knowledge of precautionary measure for natural calamity. ·Trainees know background of fish kill. ·Trainees know the way to add value of milkfish. ·Trainees know effective use of natural food. ·Trainees can analyze and present their own fish farm management.
Bongabong, O. Mindoro	1st	17-18 Sep. 2007	MinSCAT, Bongabong Campus	20 from Bongabong	18	Pond preparation to grow natural food, milkfish aquaculture, How to maintain water quality, basic book keeping for fish farmer, fish farm management, field trip.	·Trainees know how to prepare suitable ponds for natural food growing. ·Trainees can keep production records. ·Trainees can present their own fish farm management.
	2nd	26 Feb. 2008	MinSCAT, Bongabong Campus	The same attendants at the 1st session	16	Structure of fish pond, precautionary methods for natural calamity, water quality monitoring, how to harvest/ post harvest, fish processing, natural food experiment, fish farm management.	·Trainees obtain knowledge of precautionary measure for natural calamity. ·Trainees know the way to add value of milkfish. ·Trainees can analyze and present their own fish farm management.
Roxas, O. Mibdoro	1st	20-21 Sep. 2007	Roxas Municipal building	20 from Roxas	19	Pond preparation to grow natural food, milkfish aquaculture, How to maintain water quality, basic book keeping for fish farmer, fish farm management, field trip.	·Trainees know how to prepare suitable ponds for natural food growing. ·Trainees can keep production records. ·Trainees can present their own fish farm management.
	2nd	27 Feb. 2008	Roxas Municipal building	The same attendants at the 1st session	8	Structure of fish pond, precautionary methods for natural calamity, water quality monitoring, how to harvest/ post harvest, fish processing, natural food experiment, fish farm management.	·Trainees obtain knowledge of precautionary measure for natural calamity. ·Trainees know the way to add value of milkfish. ·Trainees can analyze and present their own fish farm management.
Bongabong, O. Mindoro		28 Feb. 2008	MinSCAT, Bongabong Campus	15 from Dayhagan, Bongabong, 15 from Darahican, Roxas	35	How to process milkfish, lecture and practice (smoking, bottling, boneless, marinade) .	·Trainees can produce boneless milkfish. ·Trainees can produce bottling milkfish. ·Trainees can produce smoking milkfish. ·Trainees can produce marinated milkfish.

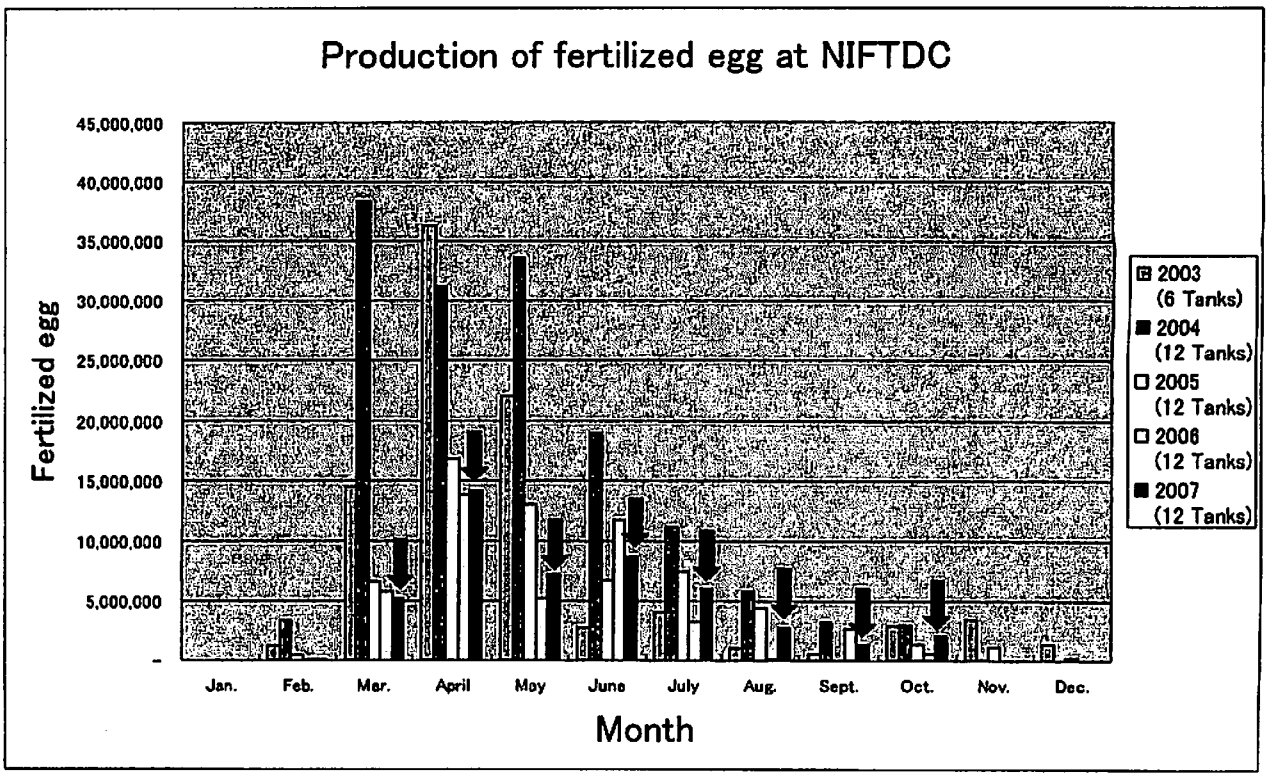
Annex 8: Details of Extension Worker Training

Subjects	Purpose	Accomplishment
FISRT COURSE **Date: 27-31 Aug. 2007** **Venue: NIFTDC** **Attendants: 14 extension workers from BFAR Reginal Offcice, Provinces, and Municipalities**		
Part I		
Roles and Qualities of Efficient and Effective Extension Workers?	Problem analysis	・Prepared action plan and presented it. ・Obtained how to improve knowledge to be good extension workers. ・Prepared short lists on other government agencies, international organization, NGO, etc. and considered networking with them. ・After the training, the networking was strengthened through budget allocation in Oriental Mindoro. ・Trainees exerted to make communication with training fish farmers.
Developing Effective Communication	Communication knowledge improvement	
Introduction to Particpatory Development Communication	Communication knowledge improvement	
Forging linkages, networks and partnerships	Networking with other agencies, budget allocation	
Conflict Resolution: Negotiation	Knowledge improvement for problem solving in outer activities	
Giving Effective Presentation	Effective presentation and reporting	
Part II		
Overview of milkfish culture	Review on the milkfish aquaculture	・Obtained suitable knowledge on milkfish aquaculture. ・Understood how to analyze the milkfish aquaculture from the economic point of view, and began to monitor fish farmers log book. ・realized the importance of water quality and soil management in ponds. ・realized the difference between compound feed and natural food in terms of characteristics, advantages and disadvantages.
Culture method in Milkfish Farming	Review on the basic knowledge of milkfish aquaculture	
Pond preparation	Knowledge on the standard pond preparation	
Fish Nutrition and Feeding Management	Knowledge improvement on feed for milkfish aquaculture	
Water Quality Analysis	Review on the importance of water quality management	
Fish Health Management	Knowledge improvement on fish disease of milkfish	
Fish Farmer Register Book and Book Keeping	Economic view on the fish farm management	
SECOND COURSE **Date: 11-13 Feb. 2008** **Venue: NIFTDC** **Attendants: 13 extension workers from BFAR Regional Office, Provinces, and Municipalities**		
Fish Health Management 2	Sampling knowledge during fish disease incidents	・Began to send soil and water sample in case problems happen after realizing how to make sampling of them. ・Prepared monitoring form after studying on items which are important to monitor. ・Studied how to improve aquaculture methods in accordance with natural calamity and implemented them at the pilot sites. ・Analyzed filled-up log book with fish farmers during the 2nd fish farmers training. ・Motivation has increased for the extension workers to extend what they learned to other extension workers.
Water Quality Analysis 2	Knowledge on sampling of water quality control	
Milkfish Harvest	Knowledge improvement on milkfish harvest	
Precautionary Measure to protect fish from Natural Disaster	Knowledge on precautionary measure for natural calamity	
Fish Farmer's Registration Book	Review and improvement on knowledge how to analyze log book records	
Development of a Monitoring Sheet	Review on importance of monitoring and how to use new knowledge	

Annex 9: Production Record of NIFTDC Hatchery

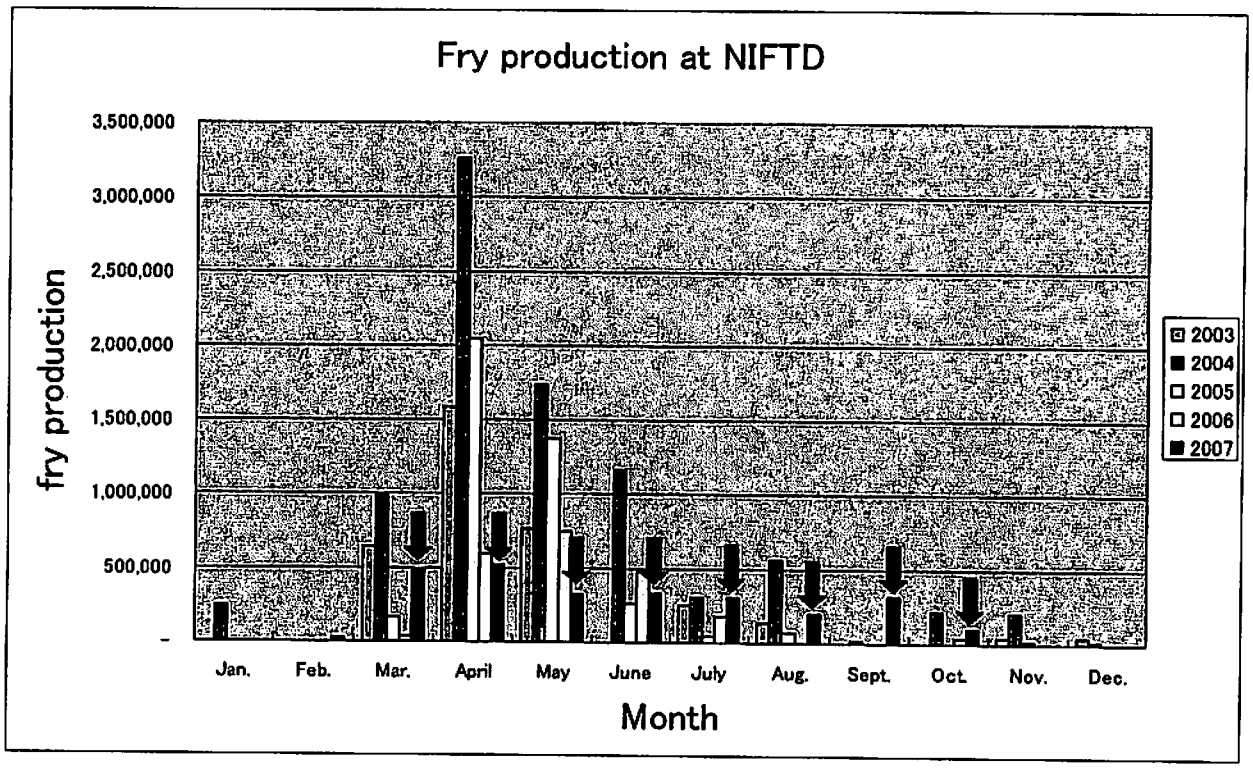
(1) Egg Production in NIFTDC Hatchery

	2003 (6 Tanks)	2004 (12 Tanks)	2005 (12 Tanks)	2006 (12 Tanks)	2007 (12 Tanks)
Jan.					
Feb.	1,273,000	3,380,000	439,520	102,037	78,000
Mar.	14,489,600	38,386,750	6,646,094	5,755,417	5,186,000
April	36,297,800	31,224,000	16,864,202	13,827,642	14,150,000
May	22,063,900	33,584,050	13,013,612	5,270,763	7,183,000
June	2,817,500	18,924,334	6,701,726	11,681,592	8,658,000
July	4,110,700	11,167,261	7,412,648	3,244,054	6,043,000
Aug.	1,082,600	5,769,821	4,375,348	151,504	2,772,000
Sept.	576,200	3,208,006	4,464	2,632,176	1,377,000
Oct.	2,848,200	3,006,464	1,382,161	559,436	2,037,000
Nov.	3,514,200	58,799	1,150,945		
Dec.	1,427,000		201,600		
Total	**90,500,700**	**148,709,485**	**58,192,320**	**43,224,621**	**47,484,000**
Eggs Given to satellite	46,982,400	29,556,218	14,672,646	951,812	1,212,000



(2) Fry Production in NIFTDC Hatchery

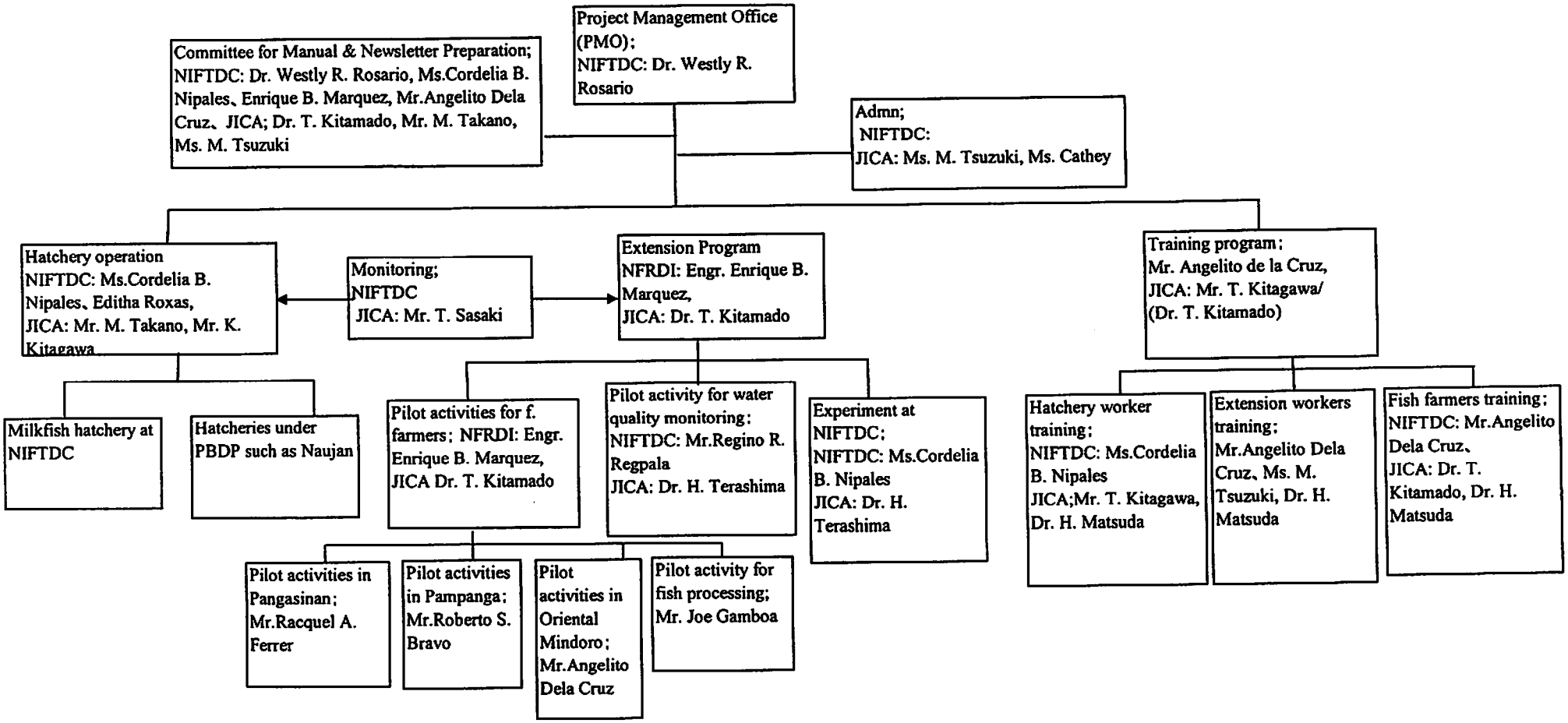
	2003	2004	2005	2006	2007
Jan.		243,300			
Feb.					26,000
Mar.	638,400	989,800	162,725	35,000	490,000
April	1,580,250	3,260,600	2,048,150	594,000	528,000
May	769,650	1,737,650	1,374,950	747,000	329,000
June		1,169,417	258,750	478,000	339,000
July	254,100	307,050	42,550	181,000	304,000
Aug.	134,865	558,900	69,000		195,000
Sept.		19,375			319,000
Oct.		218,900		35,000	95,000
Nov.	47,250	206,275	22,339		
Dec.	47,250	19,550			
Total	**3,471,765**	**8,730,817**	**3,978,464**	**2,070,000**	**2,625,000**



(3) Survival Rate from Egg to Fry

	2003	2004	2005	2006	2007
Egg Production (except eggs given to	**43,518,300**	**119,153,267**	**43,519,674**	**42,272,809**	**46,272,000**
Fry Production	**3,471,765**	**8,730,817**	**3,978,464**	**2,070,000**	**2,625,000**
Survival Rate from good eggs	8.0%	7.3%	9.1%	4.9%	5.7%

Annex 10: Project Implementation Structure



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Annex 11: Project Design Matrix (version 2: current)

Comprehensive Outreach and Fish Breeding Project

Ver. No.2
Oct 16, 2006

Narrative Summary	Objectively Verifiable Indicator	Means of Verification	Important Assumption
Overall Goal			
Livelihood of fish farmers is enhanced in the targeted areas.	1 Production costs decline in fish farmers' operations in the targeted areas. 2 Technical sustainability increases for fish farmers in the targeted areas.	Fish farmers' production record Monitoring records on bio-resources in the targeted areas.	Domestic milkfish demand does not change significantly.
Project Purpose			
Aquaculture outreach functions in the targeted areas.	1 More fish farmers adopt techniques introduced by the project. 2 Efficiency of PBDP hatchery operations increases.	1-1 Fish farmers' register record 1-2 Oral survey at pilot sites 2-1 Operation records of PBDP hatcheries	Necessary budget is secured.
Outputs			
1 Supply of fry from hatcheries is stabilized 2 Fish farmers' knowledge of and skill in aquaculture production and management are improved at the pilot sites	1-1 Number of days that supporting hatcheries are instructed and trained. 1-2 Fry production improves at PBDP hatcheries. 1-3 PBDP hatcheries improve milkfish fry survival rate. 2-1 Number of training days that extension officers and fish farmers have participated in by means of prepared material. 2-2 Number of fish farmers adopting production and management techniques introduced by the project.	1-1 Project activity record 1-2 Production/sales records of PBDP hatcheries 2-1 Project activity record 2-2 Production records of fish farmers	Natural fry and imported fry does not decrease in price significantly. Those trained continue to work in aquaculture. Extraordinary natural calamities do not occur.
Activities	**Inputs**		
1-1 To clarify present situation and problems in milkfish fry production by reviewing the fry production process and structure. 1-2 To formulate a plan to improve the fry production process and hatchery management and then implement them at NIFTDC. 1-3 To make or improve technical manual and training program for hatchery workers. 1-4 To provide training to hatchery workers. 1-5 To visit and give advice to the PBDP hatcheries. 1-6 To support the establishment of a fry information network among PBDP hatcheries. 2-1 To clarify the present situation and problems in socio-economic and management circumstances affecting fish farmers. 2-2 To select pilot sites and implement activities through discussion with personnel concerned. 2-3 To improve training and outreach programs for fish farmers by reviewing them. 2-4 To make or improve training material and technical manuals for extension workers and fish farmers. 2-5 To hold training sessions for extension workers and fish farmers. 2-6 To support meetings of fish farmers for mutual understanding of good practices and necessary information.	(Philippine side) 1. Counterpart personnel 1) Project Director 2) Project Manager 3) Other counterparts 2. Provision of office space 3. Operating costs	(Japanese side) 1. Experts 1) Extension 2) Aquaculture technology and training 3) Broodstock management and spawning techniques/fish nutrition and livefeed management 4) Marketing and business management 5) Monitoring (social research) 6) Resources environment research/monitoring	There are no disastrous fish diseases. **Pre-condition** Sea water supply and quality does not worsen compared to the present level.

Annex 12: Project Design Matrix (version 3: Proposed)

Project Name: Comprehensive Outreach and Fish Breeding Project
Project Period: 3.5 years from November 2006
Target Area: Pangasinan, Pampanga, and Oriental Mindoro
Target Group: Hatchery workers, Extension workers, and Fish farmers

Ver. No.3
2008.6.26

Narrative Summary	Objectively Verifiable Indicator	Means of Verification	Important Assumption
Overall Goal			
Livelihood of fish farmers is enhanced in the pilot municipalities.	1 Profitability of aquaculture production of a fish farmer in the pilot municipalities is improved (decrease in production cost and increase in sales) compared to the one before the actual operation of the Project started.	1-1 Fish farmers' production and sales record in the pilot municipalities. 1-2 Sample farmers survey in the pilot municipalities (Questionnaire survey for the pilot fish farmers).	
Project Purpose			
Aquaculture outreach functions in the pilot municipalities.	Aquaculture outreach of NIFTDC functions as shown in the following indicators: 1 Supply of milkfish eggs and fry of NIFTDC are increased compared to those before the actual operation of the Project started. (Those figures for 2006 are 27.46million, and 2.03million, respectively.) 2 NIFTDC produce fry in off-season months (July - February) every year. 3 50% of fish farmers, who participated in trainings but not pilot farmers, apply skill and knowledge introduced by the Project. 4 70% of fish farmers, who participated in pilot activities, continue to apply knowledge and skill on milkfish aquaculture and management introduced by the Project.	1 Production record of NIFTDC. 2 Production record of NIFTDC. 3 Questionnaire survey for fish farmers who participated in trainings. 4 Questionnaire survey for the pilot fish farmers.	1 Necessary budget is secured. 2 There is no drastic increase of price of farm inputs such as fertilizer and feed.
Outputs			
1 Fry production process and management are improved at PBDP hatcheries.	1-1 70% of PBDP operational hatchery workers, who participated in trainings or received technical manual(*1) provided by the Project, apply skill and knowledge introduced by the Project for operation of their hatcheries. 1-2 PBDP hatchery network meeting s were held at least once a year. 1-3 Milkfish egg production, fry production, and fry survival rate of NIFTDC are increased compared to those before the actual operation of the Project started. (Those figures for 2006 are 43.22 million, 2.07million, and 4.9%, respectively.) 1-4 Naujan hatchery produces fry.	1-1 Questionnaire survey for PBDP hatchery workers who participated in trainings.. 1-2 Minutes of meetings. 1-3 Production records of NIFTDC hatchery. 1-4 Production records of Naujan hatchery.	1 Wild fry and imported fry does not decrease in price significantly. 2 Those trained continue to work in aquaculture. 3 Extraordinary natural calamities do not occur. 4 There are no disastrous fish diseases.
2 Fish farmers and extension workers' knowledge of and skill in aquaculture production and management are improved at the pilot municipalities.	2-1 70% of extension workers in the pilot municipalities, who participated in trainings, pilot activities, and received technical manual(*1) provided by the Project, apply skill and knowledge introduced by the Project for their duties. 2-2 80% of fish farmers, who participated in training, agree that their knowledge and skill are enhanced. 2-3 Fish farmers' meetings are held to share good practices from the pilot activities (at least once for each good practice).	2-1 Questionnaire survey for extension workers in the pilot municipalities. 2-2 Self-evaluation sheet for trainings. 2-3 Project Progress Report.	

Activities	Inputs		
1-1 To clarify present situation and problems in milkfish fry production by reviewing the fry production process and structure. 1-2 To formulate a plan to improve the fry production process and hatchery management (such as motivation and team building) and then implement them at NIFTDC. 1-3 To make or improve technical manual and training program for hatchery workers. 1-4 To provide training to PBDP hatchery workers. 1-5 To visit and give advice to the PBDP hatcheries. 1-6 To support the establishment of a PBDP hatchery network. 2-1 To clarify the present situation and problems in socio-economic and management circumstances affecting fish farmers. 2-2 To select pilot sites and implement activities through discussion with personnel concerned. 2-3 To improve training and outreach programs for fish farmers by reviewing them. 2-4 To make or improve training material and technical manuals for extension workers and fish farmers. 2-5 To hold training sessions for extension workers and fish farmers. 2-6 To support meetings of fish farmers for mutual understanding of good practices and necessary information.	(Philippine side) 1. Counterpart personnel 1) Project Director 2) Project Manager 3) Other project counterparts 2. Provision of office space 3. Operating costs	(Japanese side) 1) Team Leader/Extension 2) Training 3) Aquaculture technology 4) Broodstock management and spawning techniques 5) Livefeed management 6) Marketing and business management 7) Monitoring 8) Resources environment research 9) Hatchery team building 10) Coordinator 2. Provision of Equipments 3. C/P trainings (in Japan or in a third country) 4. Local operating costs	Sea water supply and quality does not worsen compared to the present level. **Pre-condition** Domestic milkfish demand does not decrease drastically.

Note *1: Technical manuals for hatchery workers, extension workers, and fish farmers are draft ones which were distributed mainly through trainings. They will be finalized after the terminal evaluation.