

Summary of the Results of Terminal Evaluation

Date: September 12, 2009

Department in charge: Rural Development Department

1. Outline of the Project	
Country: The Republic of El Salvador	Project Title: The Project for Shellfish Aquaculture Development in the Republic of El Salvador
Issue/Sector: Fishery Development	Cooperation Scheme: Technical Cooperation Project
Division in Charge: Field Crop Based Farming Area Division I, Field Crop Based Farming Area Group, Rural Development Department	Total Cost(estimated at evaluation): 382 million yen
Period of Cooperation	(R/D): 11/Jan/2005-10/Jan/2010 (Extension: 11/Jan/2008-10/Jan/2010)
	Partner Country's Implementing Organization : Ministry of Agriculture (MAG), Center for Fishery and Aquiculture Development (CENDEPESCA) Supporting Organization in Japan: Fisheries and Ocean Technology Center/Hiroshima Prefectural Technology Research Institute, Yamaguchi Prefectural Fisheries Research Center
1-1 Background of the Project	
<p>In the Republic of El Salvador (hereinafter referred to as El Salvador), the rehabilitation has been attempted after going through the civil war in 80's (Peace Agreement in 1992) and a severe earthquake in 2001. However, there are still issues left such as the installation of social and economic infrastructure, the creation of employment opportunities, and the expansion of income disparity between urban and rural areas. Considering the poverty alleviation as an important political issue, the Government of El Salvador has positioned the eastern area of the country where the Departments of Usulután and La Unión are located (target areas of the Project) as the prioritized area of development in the "National Development Plan by Region" (2000). In this area, the marginal fishermen who hold approximately 10% of the total population tend to be in the situation of poverty without additional income sources apart from the fishery. Those marginal fishermen in the eastern coastal area have lived on the collection of shellfish mostly the types of anadara and native oyster. However, the inland population who lost their means of subsistence through and after the civil war had moved into the coastal areas and started to engage in the collection of shellfish, which caused the rapid decrease of resources. It has resulted in the downsizing and deterioration of the collected shellfish, the shift of the places to collect shellfish to more distant areas, and the decrease of income as well as the increase of working hours. While the native oysters are collected by men, the collection of anadara in the mangrove areas is carried out also by many impoverished women and children since it dose not require any special skills or tools.</p> <p>In order to solve these issues, it is necessary to establish the shellfish aquiculture techniques which are applicable for the marginal population in the coastal areas, and to raise awareness of people in the sustainable use of shellfish resources. At the same time, proposing the models for improving livelihood through the comprehensive approaches which benefit directly the people, including the diversification of income source, is considered as an urgent task. Thus the 3 years Project was started in January 2005 till January 2008 based on the request made by the Salvadorian Government. However, the Project was not able to establish the technologies in the massive production of seeds both for anadaras and oysters, and it was necessary to continue the assistance in the establishment of these technologies and the preparation of manuals, livelihood models and guides for artisanal fishers. Therefore, the Project was extended for 2 years since January 2008 accepting the request of Salvadorian Government.</p>	
1-2 Project Overview	
(1) Overall Goal: The model for upgrading livelihood mainly by introducing shellfish culture is disseminated in the Jiquilisco Bay of the department of Usulután and the coastal area of the department of La Union.	

(2) Project Purpose: The model for upgrading livelihood is proposed mainly by introducing shellfish culture based in an appropriate coastal resources management.

(3) Output

1. The shellfish seeds production techniques are established in the hatchery of CPT (CENDEPESCA Puerto El Triunfo).
2. A widen Anadara spp. culture technique to local artisanal fishers is established in the experimental sea areas and the experimental culture techniques of pacific oyster is established in CENDEPESCA.
3. Awareness on sustainable use of coastal resources and conservation of coastal environment is increased in the coastal marine areas of the model groups communities.
4. The models for upgrading livelihood are chosen for the artisanal fishers through the mollusks culture mainly in the model projects.

(4) Input (at the point of this evaluation study)

Japanese side (during the extension period):

- ◆ 2 long term experts (Chief advisor/Mollusks seeds culture, Administrative coordinator/Mollusks culture)
- ◆ 5 short term experts (4 areas including the Sessile organisms study, Evaluation of artificial fish reef, Commercialization of mollusks, and Formulation of livelihood models)
- ◆ Equipment worth 5,580,000 yen for the acquisition in Japan, as well as 24,000 US dollars for the local acquisition
- ◆ 2 trainees for the trainings in Japan (group trainings in “Sustainable Aquaculture Development”, and “Planning of Fishery Community Development”)
- ◆ Local cost equivalent to approximately 198,000 US dollars (from January 2008 to June 2009)

Salvadorian side (during the extension period):

- ◆ Allocation of Counterpart Personnel(C/P): 4 administrative C/Ps and 6 technical C/Ps (including 1 person who is currently studying long term in Japan with government sponsored scholarship)
- ◆ Existing facilities and land for the construction of new laboratory in Puerto El Triunfo
- ◆ Project cost equivalent to approximately 102,000 US dollars (from January 2008 to July 2009)

2. Evaluation Team

Members of Evaluation Team	Leader: Mr. Tomoyuki OKI, <i>Director, Field Crop Based Farming Area Division I, Rural Development Department, JICA</i> Shellfish Aquaculture: Mr. Tadayuki KANEYASU, <i>Former Director of Hiroshima City Fisheries Promotion Center</i> Planning and Coordination: Mr. Yohei HASHIMOTO, <i>Field Crop Based Farming Area Division I, Rural Development Department, JICA</i> Evaluation Analysis: Ms. Yuki OHASHI, <i>Consultant, Interworks Co., Ltd.</i> *The Evaluation was realized jointly with 3 more Salvadorian members.
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Period of Evaluation	23/Aug/2009 - 13/Sep/2009	Type of Evaluation: Terminal Evaluation
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3. Results of Evaluation

3-1 Achievement of the Project

(1) Achievement of Outputs

Output 1: The shellfish seeds production techniques are established in the hatchery of CPT (CENDEPESCA Puerto El Triunfo).

Among the 2 anadara species treated by the Project, concerning the Curil, the production techniques of 5mm seeds and adequate intermediate breeding techniques have been established. As to another species of anadara, the Casco de Burro, the technique to obtain mature individuals has not been established, and the trials have been continued. Regarding the Pacific Oyster, the Project has succeeded in the induced spawning twice during the extended period, and produced more than 200,000 of 5mm seeds in each spawning. In terms of the adhesion of local oysters, although it was

identified through the monitoring and investigation during the extended period that the cube-shaped artificial reef showed better results than that of the pyramid shape, it is necessary to continue further monitoring to find out the adequate timing to collocate the reefs.

Output 2: A widen Anadara spp. culture technique to local artisanal fishers is established in the experimental sea areas and the experimental culture techniques of pacific oyster is established in CENDEPESCA.

Among the anadara species, the trials of Curil farming utilizing the fishnet bags have been going on, and an adequate method and possible production scale will be identified by the end of the project period. As to the Casco de Burro, the trials to identify the ways to raise them in bags and adequate density for farming have been carried out and some results will be shown by the end of the project period. However, it will be necessary for the technical C/Ps to continue the trials to identify the appropriate farming techniques. Regarding the Pacific Oyster, the Project carried out trials to identify the farming environment, sessile organisms, locally available materials for farming, and new farming ground. As a result, the technical C/Ps are now capable to continue such trials collaborating with fishermen without assistance from Japanese Experts. In terms of the production scale of local oysters using the artificial reefs, although the results differed among the reefs, the production scale of the successful case has been identified.

Output 3: Awareness on sustainable use of coastal resources and conservation of coastal environment is increased in the coastal marine areas of the model groups communities.

It was considered that this Output was achieved during the original project period.

Output 4: The models for upgrading livelihood are chosen for the artisanal fishers through the mollusks culture mainly in the model projects.

During the extended period, 5 livelihood activities will be compiled as models by the end of the Project, including the 1) aquaculture of the Curil with the seeds produced in the laboratory, 2) aquaculture of the Casco de Burro with the seeds produced in the laboratory, 3) aquaculture of the Pacific Oyster, 4) production of local oyster allocating the artificial reefs, and 5) collocation of the artificial reefs for single-hook fishing.

(2) Achievement of the Project Purpose

Project Purpose: The model for upgrading livelihood is proposed mainly by introducing shellfish culture based in an appropriate coastal resources management.

The groups of marginal fishermen which have been engaged in the farming experiment and model activities of aquaculture of the 2 species of anadara and the Pacific Oyster have already gained necessary skills, and they are able to continue the farming activities if there are continuous supports, which include the provision of seeds and farming materials, strengthening of organizations, commercialization, etc.). As to the group of local oyster farming utilizing the artificial reefs, although they have been continuously working on the collection of oysters, they have problems in their community organization to manage their reefs and are trying to find a solution. There are 5 livelihood activities (shellfish aquaculture and others) which have been examined their profitability and compiled as guidebooks for marginal fishermen during the extended period. Their feasibility will be demonstrated using the data and information obtained through the farming trials and the collocation of artificial reefs by the Project. The technical C/Ps have already gained certain level of abilities in the production of seeds (excluding the production of seeds for the Casco de Burro and raising methods of reproducers of Pacific Oyster), farming methods, and the orientation to the groups of marginal fishermen. It is considered that they can continue the activities by themselves in the future.

(3) Achievement of the Overall Goal (prospect)

Overall Goal: The model for upgrading livelihood mainly by introducing shellfish culture is disseminated in the Jiquilisco Bay of the department of Usulután and the coastal area of the department of La Union.

Currently 10 groups of marginal fishermen have been working with the Project. The CENDEPESCA has a plan to introduce the Livelihood Improvement Models to additional 4 sites in the country for next year. It is considered that the results of the Project will be expanded to the Jiquilisco Bay as well as the coastal area of the department of La Union. Also, in the Fonseca Bay area of the department of La Union, there are increasing interests in the shellfish aquaculture among

the groups of residents, and in the Jiquilisco Bay there are some possibilities that other governmental projects may provide financial supports to implement livelihood projects of the anadara farming.

3-2 Summary of the Evaluation Results

(1) Relevance

The Project is relevant to the needs of target group, governmental policy of El Salvador, and Japanese ODA policy. Although the project period was extended since it required longer period than expected to develop the related techniques using the technologies introduced by the Project, the development of the techniques was completing mostly during the extended period, except a part of techniques (attainment of matured individual of the Casco de Burro).

(2) Effectiveness

By the end of the project period, 11 Livelihood Improvement Models (established 6 models during the original project period and 5 models in the extended period)¹ will be proposed by the Project. The development of techniques to artificially produce the seeds of Curil and Pacific Oyster will be completed, the technical C/Ps have obtained sufficient knowledge related to the production of seeds and aquaculture techniques, and the groups of marginal fishermen who involved in the Project have gained skills of shellfish farming. On the other hand, the model projects have not reached to the stage which their activities are maintained without assistances of CENDEPESCA and other supporters, since there are some issues remaining related to the organizational strengthening, as well as the marketing and selling. In terms of the local oyster production, there are some unsolved issues such as problems of community organization and the adequate timing of installing artificial reefs. Also, although the feasibility of Livelihood Improvement Models will be shown using the results of trials and investigations, the results of actual application of the models in the groups of marginal fishermen will not be demonstrated since the design of the Project did not include such activities sufficiently.

(3) Efficiency

Each activity was carried out mostly as planned, and the Outputs were produced as the results of the activities. However, the realization of the Outputs was delayed due to the delays in the technical development. As to the Input, while it was generally adequate both in Japanese and Salvadorian sides, it has been taking long time to fulfill the vacancies of the technical C/Ps by Salvadorian side.

(4) Impact

There are many groups of marginal fishermen who are interested in the Model Projects, and some supporting organizations which show their interest in the provision of financial support in such activities. Therefore, the Overall Goal is most likely achieved. In order to disseminate the Livelihood Improvement Models proposed by the Project and achieve the Overall Goal, the continuous technical supports, social assistances and follow-ups will be necessary. CENDEPESCA plans to examine the possibilities to provide such supports from now on.

(5) Sustainability

The new Salvadorian Government shows an interest in the project activities and will increase the budget of CENDEPESCA for next year about 380,000 US dollars. In the institutional aspect, the permission and concession systems (such as necessary procedures to obtain permission, etc.) of related institutions such as MAG, the Ministry of Environment and Natural Resources (MARN), and local governments are not determined. In the organizational aspect, there is an insufficiency of human resources who engage in the extension, and it is necessary to discuss about concrete measures of dissemination. In the financial aspect, there are possibilities of obtaining financial supports for the shellfish culture activities from some donors and supporting organizations, which makes it possible to secure the initial investment for the shellfish culture activities such as purchasing equipment, materials and seeds. Also there is a growing interest in the CENDEPESCA itself to disseminate the models of shellfish culture, by examining the possibilities to give priority in the utilization of

¹ During the original project period: 1 model of Anadara culture, 3 models of means of Anadara distribution (selling to local broker, management of seaside kiosk, direct selling to cities), and 2 models of other livelihood improvement activities (beef cattle breeding and poultry raising), and during the extended period: 5 models described in the Output 4, in the "3-1 Achievement of the Project".

Fishery Trust Fund (Fideicomiso Pescar). In the technical aspect, the technologies introduced and developed by the Project are accepted by the technical C/Ps and groups of marginal fishermen. However, some trained staff resigned from CENDEPESCA due to the issues of employment conditions, and in such cases it may affect the technical sustainability negatively.

3-3 Factors promoting the production of effects

- ◆ The management level of the MAG had a high interest in the Project, and technical C/Ps engaged in the activities positively.
- ◆ The new facility for the seed production was constructed.
- ◆ The 1,000 US dollars revolving fund was established for the emergency use.

3-4 Factors inhibiting the production of effects

- ◆ During the extended period, the Project could not receive sufficient cooperation from the Social Development Unit of CENDEPESCA.
- ◆ The construction of new facility for the production of seeds was delayed.
- ◆ The vacancy of the staff was not fulfilled adequately by CENDEPESCA.

3-5 Conclusion

The Project extended the duration for 2 years since there were some technical issues remaining at the end of 3 years of the original project period, such as mass seeds production of anadara and the establishment of techniques for cultivation of Pacific Oyster. As a result, owing to the efforts of Experts and C/Ps, the techniques for production of seeds and cultivation of Curil and Pacific Oyster were mostly established. The achievement in the production of Curil seeds has no precedent, which is worth noting as a result of the Project. It is expected that Experts and C/Ps prepare manuals of such techniques and make an effort to takeover the skills to get them settle. On the other hand, there are issues remaining in the development of techniques in the cultivation of reproducer and the induced spawning of Casco de Burro, and the formulation and strengthening of organization and marketing and selling which are important to disseminate the models in new groups of marginal fishermen. It is important for C/Ps trained by the Project and CENDEPESCA to continue the effort to solve these issues, receiving the advice from Experts during the rest of the project period.

3-6 Recommendations

[Recommendations for during the project period]

- (1) The Project needs to complete following technical items before the end of project period
 1. Prepare the guidebook for fishers in Livelihood Improvement Models, and receive an approval from CENDEPESCA and fishers.
 2. Prepare and revise the technical manuals
 3. Keep making efforts to establish the cultivation techniques for reproducer of Casco de Burro
 4. Stabilize the seed production at the new facility, and present the direction toward the establishment of structure for mass production
- (2) It is recommended that MAG and CENDEPESCA secure the technical and financial measures to provide equipment and human resources to maintain and manage the existing facilities, and support the operational plan for the next year which has already presented to MAG and CENDEPESCA.
- (3) It is recommended that MAG and CENDEPESCA revise the policies of Fishery Trust Fund to include the aquiculture activities in its scope of target.
- (4) It is recommended that MAG and CENDEPESCA promote the procedures of MARN for the establishment of guideline of the shellfish culture.
- (5) Considering the self sustaining development of the project activities, it is recommended that MAG and CENDEPESCA implement the validation and dissemination of the models in the other fishers' communities. In order to do so, it is necessary to request and secure the cooperation from NGOs, local governments, ADESCO, donors and other national related institutions from now on by January 2010 together with Experts.

[Recommendations for after the completion of the Project]

- (1) It is recommended that CENDEPESCA implement monitoring to identify the location and timing of the installation of artificial reefs which is adequate for adhesion of local oysters.
- (2) It is recommended that CENDEPEDCA continue the activities to solve the remaining issues, receiving the Japanese supports such as volunteer schemes.
- (3) It is recommended that MAG, CENDEPESCA and OSPESCA collaborate in the possibility of implementing the Project at regional level in order to strengthen sustainability of the Project, receiving the advice from Japanese assistance.

3-7 Lessons Learned

- (1) It is necessary to deliberate the flow of each activity and adequate period in chronological order, to design a project which consists of different stages such as technical development, trials, and implementation of model projects.
- (2) When a project introduces foreign species, it is necessary to verify the environmental issues with every aspect and select the species which have a higher likelihood of receiving approval from local authorities at an early point.