

Chapter 13 Pilot Projects

13.1 Execution Context of the Pilot Projects

In El Salvador, the capture of artisanal fisheries in the coast (this subsector absorbs a total of 13,000 fishers) has decreased due to the impact of natural phenomena such as El Niño and Hurricane Mitch as well as the overexploitation of resources. After the earthquakes that took place in January of 2001, the dramatic reduction of the catch is a common phenomenon throughout the country and such situation has deepened even further the crisis faced by the fishers. Artisanal fisheries already suffered underdevelopment in terms of technique, fisheries management, product processing and fishers organization, which translated into a low productivity that with the deterioration of profitability in the last two or three years has reached an alarming level.

Within this context, Phase 1 of the Study has been conceived to elaborate a Master Plan. The Draft Final Report (1) elaborated in Phase 1 comprises all the sectors related with the development of artisanal fisheries such as fishing, aquaculture, marketing and processing of fisheries products, fisheries infrastructures, coastal environment, fisheries management, etc.

Four pilot projects were proposed in the Draft Final Report (1) as an integral part of the Development Study with the purpose of looking for a solution to the main development problems of the artisanal fisheries in El Salvador. These projects are considered as the first step in the search for sustainable development of artisanal fisheries in this country.

Phase II consisted of the implementation and evaluation of the following four pilot projects, and its objective was to make public the results of the Development Study. The results of these projects will be fed back in the Master Plan elaborated in Phase I, in order to improve the degree of perfection of the said Plan.

13.2 Project for the Improvement of the Fisheries Statistics System

13.2.1 Context of the Project

The Draft Final Report (1) pointed out two main issues regarding the data on individual fishers in the statistics system of CENDEPESCA;

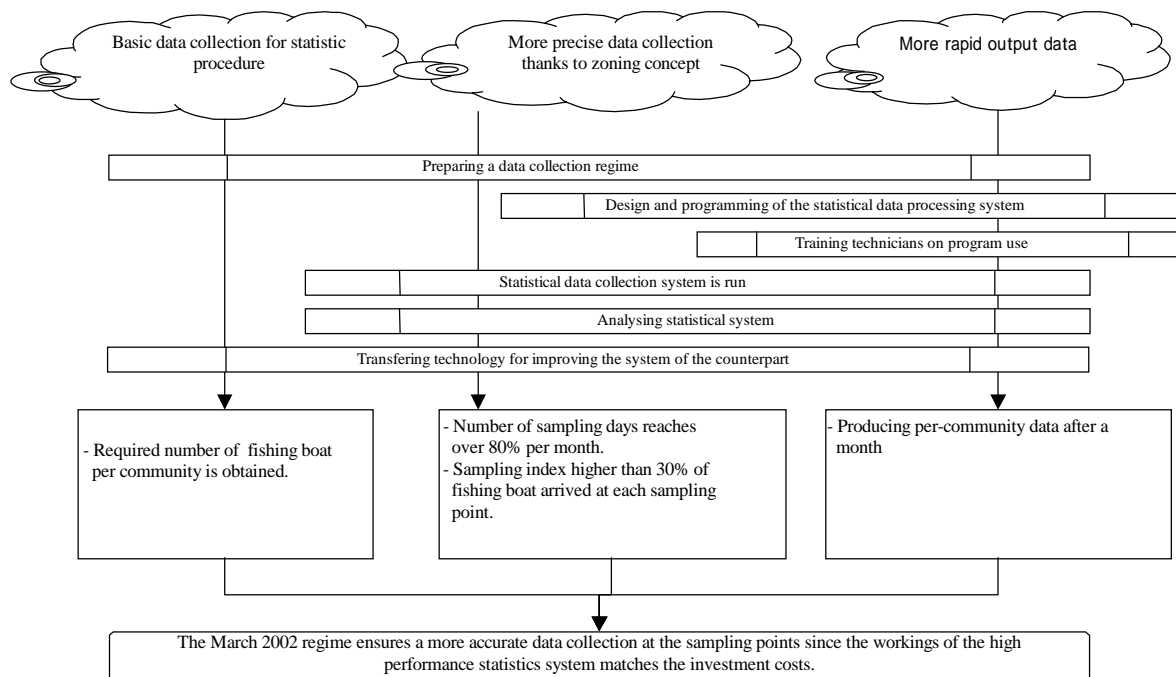
- Lesser efficiency of the statistics system for individual artisanal fisheries in comparison with other components of the fisheries statistics,
- Low accuracy level of the collected data and long processing time.

The Report also included the following recommendation, under the organizational regime of CENDEPESCA, and considering the need to improve the statistics system: To intensively collect data at the key points along the Salvadoran coast, to create a more effective data processing system considering the limiting financial, logistic and other resources of the institution, utilizing the concept of “territorial zoning.” This pilot project is implemented from September 2001 to this date (May 2002) to complete the fundamentals on the basis of the above proposal.

13.2.2 Design of the Project and Activities Carried Out

(1) Design of the Project

The following figure shows the basic concept of the sustainable statistics system for data collection under the current regime of CENDEPESCA.



(2) Activities Carried Out

1) Arranging the Organizational Regime for the Collection of Data in the Fishing Communities

Performed: Selection of sampled communities, preparation of the methodology for sampling, selection of data gatherers and updating of fishing boat registration. In

order to secure the fieldwork it was necessary to consider the level of the data collector from the communities and to that effect, a mathematics, reading and writing skills test was conducted. As a result of this effort, the performance of the data collector has been satisfactory in general terms although it consumed overtime.

2) Design and Programming of the Statistical Data Processing System

The design, programming and testing of the database were carried out. For the design of the data base the method “Objective-oriented approach” was applied and the Office2000 Access database was used considering the compatibility issues with other types of database employed by the Statistics and Informatics Department. One important aspect has been to establish the basis for the post management of the program upon finishing the Project and using the most of the basic function of “Access.” A gradual process was used for programming the statistical data processing system. Some manual work is necessary in some parts of the program when processing the data, however, the objective was achieved: “More rapid output data.” Only two or three errors were detected and timely corrected through the C/P. The program shows no errors currently after sufficient tests were performed.

3) Training on Data Processing Software

Training was conducted for the C/P in charge of managing the software and the installation of the equipment. Training on Access was carried out for those in charge of statistics at the headquarters of CENDEPESCA, and training on MS-Excel and Internet was performed for those in charge of statistics in the zone offices. Because the level of knowledge and experience of the groups was diverse it is not possible to determine how much each participant improved, however, considering that all participants now have the basic knowledge to use the program, it can be concluded that the training was effective. The installed equipment is working satisfactorily.

4) Operation Monitoring System

The establishment of the organizational regime was conducted for monitoring, in terms of data collection and imputing, as well as of the use of the landed volume data base system. It was observed that the performance of the CENDEPESCA personnel was lower than that of the gatherers hired for the Project due to the complexity of their work. In addition, the format used in the collection of field data has been corrected and there were only few delays in the plan of activities as a result.

5) Data Collection Analysis System

Data collection and monitoring of the management system, problem solving activities, system general analysis and improvement work were conducted during the first absence period of the Study Team. Based on the results of the monitoring, it was

deemed convenient that CENDEPESCA take the necessary measures to ensure the sampling method.

6) Improvement of the Statistics and Technology Transfer System

The technology transfer for the management of the data collection system was carried out and the manual for the management of the statistics system was elaborated. Regarding the management of the data collection system, we realized the importance of identifying the person responsible and his rank in each stage of the data collection process, and so we referred to the management of the total system using the diagram of the system instead of the technology transfer for the program. Regarding the transference of the statistics management system, the progress of the elaboration of manuals and documentation concerning the statistics system has been designed and revised. This exchange has brought about an acceptable level of understanding of the system. Transfer of technology was completed in July 2002.

13.2.3 Project Evaluation

The project was evaluated from the Efficiency, Effectiveness, Relevance, Impact, and Sustainability stand points, however, in this chapter, only Efficiency is addressed, the remaining aspects can be observed in the Pilot Study Report.

The overall goal of the Pilot Project herein is to “contribute to the arrangement of the fisheries through a sustained responsible management of the fisheries resources.” Within the framework of that overall goal, a more specific objective was defined: “To obtain more accurate data at the sampling sites in order to ensure a good operation of the new statistical system which seeks efficiency in the correlation of data.” The results expected at the end of the Project are:

- Obtaining data for the base of the statistical processing,
- Obtaining more accurate statistical data per species, month and sampling point, and,
- Conducting the output processing of the statistical data with a higher performance, based on the effective operation of the data collection system implemented.

Degree of reach of each expected result;

(1) Obtaining Data as a Basis for Statistical Processing.

The objective at the beginning was to keep the number of fishing boats in each fishing community under control that were needed for statistical data processing.

However, the JICA technical team accepted CENDEPESCA'S request to use this opportunity to update the fishing boat Registry performed by PRADEPESCA, in 1997, and this activity caused a delay in the implementation of the Project mainly in registering *Cayucos* (canoes). Nevertheless, the information necessary for the processing of the statistical data has already been obtained and only updating of the registry mentioned above is remaining. However, this situation will not have impaired the fulfillment of the objective since the zoning will be performed based on the base data including the number of fishing boat at the end of 2002. In that sense, it can be confirmed that the reach of this result was satisfactory.

(2) Collecting More Accurate Statistical Data per Species, by Month and Sampling Site.

Indicators were established to verify the level of achievement and "samplings were performed of over 80% (four times per week)) and "samplings were made on over 30% of the fishing boat arrived per sampling point." Upon revising the activities performed according to the indicators mentioned above, it was detected that the correlation of the data by the collectors of CENDEPESCA did not go well (regarding the planned sampling days: 40%, number of samples planned: 10%), in relation to what was obtained by the personnel hired by the Study Team (90%, 50%). This was probably due to the excessive workload of the CENDEPESCA group. In addition, the negative influence has been minimal since every zone where the data collectors of CENDEPESCA work corresponds to a single community.

(3) Performing of the Statistical Data output system with Better Performance, Based on the Effective Functioning of the new Data Collection System.

Some deficiencies were observed in the fill out process by the data gatherers in spite of having implemented a training plan to avoid such situation. Among the possible contributing factors were the understanding and communication levels lower than expected not only of the collectors but also of the technical personnel offered by CENDEPESCA. This was not an obstacle though, since such limitation was solved by the Statistics Department and the performance of the typing and processing the data greatly increased. Therefore the expected result is considered to have been accomplished, however, it is convenient to solve this problem with the field personnel through continuous training and guidance.

13.2.4 Lessons and Recommendations

(1) Studying and Determining the Human and Financial Capacity of CENDEPESCA

As mentioned in Chapter 9 of Part I, the statistical data had been collected and processed until this date within the framework of the Regional Support Program for the Development of Fisheries in the Central American Isthmus (PRADEPESCA).

However, this project pursued the ideal image of the statistics without sufficiently taking into account the human and financial limitations of CENDEPESCA. As a result, the implemented system has not been used in practice. In establishing a statistics system in a developing country it is necessary to first design a project coherent with the technical and financial capacity of the executing agency. The system proposed by the Pilot Project is simple and its function limited, but has been conceived in a way that makes it easy to maintain and operate by the human resources available at the statistics unit.

(2) Clarifying the Reach of Operation¹ of the Statistics System

For the design of the system it is important to first know what CENDEPESCA seeks, what the order of priorities and the technical level are, and then dimensioning the system. The data required for managing the resources are several and a system designed without first defining the scope of the operation will create discrepancies between the vested interests (1) of who is going to design the system, (2) who is going to operate the system, and (3) who is going to use the results provided by the system. Basically, it requires dimensioning the system by listening to each one of the parties involved in it and defining a design that will satisfy their interests.

(3) Training the Statistical Data Collection and Processing

The key component of the statistics system is the data collection process. Three types of forms were designed in the Pilot Project and the data gathering personnel has been trained through the Statistics Department of the counterpart on the meaning of the items in each form and on how to fill them out. This seminar has been organized several times with the purpose of teaching the methodology for data collection. However, because of the limited time available it has not been possible to cover all persons. Three scales have been established in order to evaluate the degree of knowledge mastered: Levels 1, 2 and 3.² It is considered that still up to this date only the teachings of the first level have been imparted. The levels of mastery of the Statistics Unit counterpart personnel were also 2 or 1, with the exception of a few people. In order to be able to collect the data correctly, it is required that all

¹ The reach of operation in this case means the reach of the fisheries data to be managed, the technical level required for each component integrating the statistics system, and the workload required to improve and operate the system.

² Level 1: Mastery of the procedures imparted in the seminars on the methodology of data collection.
Level 2: In order to have this level, the personnel must not only master the procedures imparted in the seminars but also must understand the meaning of each item and be capable of formulating any doubt. The personnel of this level must be capable of filling out the forms adapting to the specific conditions of each item of investigation.
Level 3: In order to have this level, the personnel must be capable of analyzing the collected data and pointing out any contradiction found throughout the items in the forms and propose options to correct them.

collecting personnel should have a level of 2 or 3 in the case of the employees of CENDEPESCA. The preparation of the manual for data collection procedure also constitutes a very important task. In conclusion, the results of the activities in this regard have not all been satisfactory.

Project for the Improvement of the Fisheries Statistics System

Period: September 2001 to March 2002

Project summary	Indicators	Verification sources	Assumptions		
<p>Overall goal Contributing to acquire the improved statistical data as a basis for the good management of the hydrobiological resources.</p>	<p>The share of the species landed at every zone will be recorded.</p>	<p>Monitoring sheet for share of species landed per zone.</p>	<ul style="list-style-type: none"> CENDEPESCA does not object the ongoing development of the statistics system 		
<p>Objective of the Project Under the March 2002 system, the acquisition of more accurate data is ensured at the sampling points since the high performance of the statistics system matches the investment costs.</p>	<ol style="list-style-type: none"> The statistical error margin for disembarkation volume at each sampling point will be less than 20%. Taking countermeasures for improving the statistics system only for users 	<p>Verifying the degree of learning through the preparation of a user's manual for the statistics system.</p>	<ul style="list-style-type: none"> There are no obstacles for the technology transfer on the system between the local members. CENDEPESCA does not object to keeping a necessary minimum budget for sampling 		
<p>Outputs</p> <ol style="list-style-type: none"> Obtaining basic data for the statistical procedure. Obtaining more accurate statistical data per species and per community. More rapid data output due to the good functioning of the statistics system. 	<ol style="list-style-type: none"> Required number of fishing boats per community is obtained. 1. The number of sampling days reaches over 80% per month. 2. Sampling index will be over 30% of fishing boats arrived at every sampling point. Producing data after a month per community. 	<ol style="list-style-type: none"> List of the number of fishing boats per community. Collected forms. Usage time record for each processing stage. 	<ul style="list-style-type: none"> CENDEPESCA does not object to keeping the current organizational system. CENDEPESCA does not object to keeping preventive maintenance for the calculations. 		
<p>Activities</p> <ol style="list-style-type: none"> Preparing a system for data collection (1) (community selection, form preparation, training for sampling technicians and fishing boat registration). Design and programming of the statistical data processing system (2,3). Training the technicians on the use of the program (3). The statistical data collection system is implemented (3) Analyzing statistical system (3) Transferring technology to the counterparts for the improvement of the system (1,2,3). 	<p style="text-align: center;">Investments</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top;"> <p>Japan</p> <p><u>Human Resources</u> Consultants (2) Local consultants (27)</p> <p><u>Equipment</u> Computers (6) Stickers (7000) Bicycle (5), Fax machines (2)</p> </td> <td style="width: 50%; vertical-align: top;"> <p>El Salvador</p> <p><u>Human Resources</u> Counterpart (2) Local officials (10)</p> <p><u>Infrastructure</u> 5 zone offices</p> </td> </tr> </table>		<p>Japan</p> <p><u>Human Resources</u> Consultants (2) Local consultants (27)</p> <p><u>Equipment</u> Computers (6) Stickers (7000) Bicycle (5), Fax machines (2)</p>	<p>El Salvador</p> <p><u>Human Resources</u> Counterpart (2) Local officials (10)</p> <p><u>Infrastructure</u> 5 zone offices</p>	<ul style="list-style-type: none"> The community members do not object the sampling activities. Other data collectors of CENDEPESCA do not object the sampling activities. <p>Preliminary conditions CENDEPESCA does not have any objections to the implementation of the Project.</p>
<p>Japan</p> <p><u>Human Resources</u> Consultants (2) Local consultants (27)</p> <p><u>Equipment</u> Computers (6) Stickers (7000) Bicycle (5), Fax machines (2)</p>	<p>El Salvador</p> <p><u>Human Resources</u> Counterpart (2) Local officials (10)</p> <p><u>Infrastructure</u> 5 zone offices</p>				

13.3 Project for Supporting the Formation of Fishers' Organizations

13.3.1 Context of the Project

In El Salvador, fishers' organizations have not developed significantly and the artisanal fisheries cooperatives are the only organizations specific to artisanal fishing which have a very low coverage. The economic conditions of these cooperatives have a negative incline trend these years, in fact, the majority of the artisanal fisheries cooperatives have ceased their activities up to this date.

On the other hand, the catch of coastal resources has a decreasing tendency since the second half of the 90's due to the increase in numbers of artisanal fishers and the shrimp trawling fisheries in the coastal areas mainly. Undoubtedly, fisheries in El Salvador in general (not only artisanal but industrial also) have entered a very hard period. Management of the coastal resources must begin as soon as possible, but no implementation matrix exists (Fishers Organization). The forming and strengthening of new artisanal fishers organizations is urgent.

Under this context, the Project for Supporting the Formation of Fishers' Organizations examines the degree of feasibility to form and strengthen the fishers' organizations through coastal resources management activities with their own initiatives. The Pilot Project includes, on the other hand, the objective of creating a success model by working with the fishers that have a high level of awareness of coastal resources management, which would allow the application of the same success model to other areas.

13.3.2 Design of the Project and Activities Carried Out

The Project was carried out with the purpose of achieving an active management of the coastal resources by the fishers. Detailed activities were not determined at the time of planning but rather through the workshops, using participative methods. The attached Project Design Matrix (PDM) provides a view of the Project itself.

(1) Project Activities

This section explains the activities carried out during the Project under "Outputs-Activities" of the PDM. The detail of the activities can be seen in the Monitoring Table.³

1) Understanding the Project Management Methodology by C/P

Preparation started since August 2001, the preparation period in Japan. The activities

³ See "Pilot Study Report".

in El Salvador began since the second day of the period for El Salvador.

2) Formulation and Implementation of the Coastal Resources Management Project in Barra de Santiago

The implementation of the Project was assumed to take place in Barra de Santiago since a high level of awareness by the fishers in the area had been confirmed. A meeting was held with the fishers of Barra de Santiago immediately after the arrival of the Study Team. The detailed activities were determined with the agreement for the implementation of the Project. The Project stayed with the forming of fishers' organizations for the management of coastal resources through the construction of artificial reefs and the establishment of protected areas.

The construction activities and the establishment of the protected areas were delayed due to various factors such as: the need to redesign the anchor, miscalculation of the construction period for them, and failure to consider the conditions of the sea (waves). The first installation was done on October 22 with a one-month delay. Nevertheless, the activities continued after the Study Team returned to Japan and the second installation took place in late November, the third installation was done in early December.

At this point, installation points were lost due to the intervention of the industrial boats and artisanal fishers from other communities (float cable cuts and/or moving artificial reefs). However, the presence of groupers (mero) around the installed anchors was visually confirmed. The participating fishers report the catch of snappers (pargo) at the installation site, which had never happened before in that place.

Regarding the research on the ecosystem of the estuary, the activities were conducted according to plan at first but fell behind schedule from the second survey and on. Later, the counterpart (C/P) in charge of the activity was dismissed and the activities were suspended. Up to this date, no person for this activity has been hired and there are no positive prospects.

3) Formulation and Implementation of the Coastal Resources Management Project Outside Barra de Santiago

Several meetings were held with the artisanal fishers. The target community for the Project was determined based on the result of the meetings and the discussions with the C/P and San Antonio Los Blancos was selected. The geographic condition of San Antonio Los Blancos was applicable to several fishing communities and this factor was considered as an important selection criterion for this community. The

possibility of adding a new function to the existing fishing cooperatives can also be examined. The formulation of the Project was done in mid September through the workshop employing a participative methodology. As in Barra de Santiago, the Project intends to establish protected areas through the installation of artificial reefs.

The process of the Project was delayed because of the same reason as in Barra de Santiago but the fishers carried on with the activities and managed to install reefs towards the end of November for the first time and continued to do it after. This activity was interrupted by the New Fisheries Law in December. The group of fishers in San Antonio Los Blancos has requested a resolution to establish protected areas. The installation of reefs can be restarted by obtaining approval for the request. The construction of reefs (anchors) has continued, nevertheless. By means of an underwater survey, the existence of lobster at the anchor part of the reef has been confirmed.

4) Expansion of the Project to Neighboring Communities

The workshops were carried out in the neighboring communities. The communities where the workshops were held are: Garita Palmera, San Marcelino, Colorada and Isla Tasajera. As a result of these meetings, San Marcelino was added as a target group of the Project. An expansion was even planned and carried out to take advantage of the first anniversary of the resolution of Barra de Santiago. The event was prosperous and achieved the presence of the Minister of Agriculture and Livestock, and the Ambassador of Japan among other guests. The Project managed to seize the opportunity to use funds from the Japanese Embassy to extend the Project from one site to an entire region. The Study Team and CENDEPESCA backed the NGO that is the direct recipient of the funds.

13.3.3 Project Evaluation

The Efficiency evaluation begins as analysis of the activities and then goes to the analysis of the level of outputs. The effectiveness is evaluated with these two sources of information.

(1) Level of Outputs

There are 4 outputs in this project:

- The C/P of CENDEPESCA understands the Project management methodology, theoretically.
- Formulation and Implementation of the Coastal Resources Management Project at Barra the Santiago.
- Formulation and Implementation of the Coastal Resources Management Project in a

community outside La Barra the Santiago (later, San Antonio Los Blancos was selected as the target of the Project).

- Expansion of the Project to neighboring communities.

The levels of outputs are shown below in a summarized manner⁴.

1) Understanding of the Project Management Methodology by C/P

The training was carried out as planned originally even with several limiting factors such as time, mainly. There were no problems at lecturer or text level, however, only 8 out of the 15 C/P were able to participate because of the unfortunate presence of the red tide incident. This level of participation did not allow attaining a satisfactory level, which is more than 80%. Notwithstanding, it can be added that the C/P of this project has participated fully and has reached the basic level of the Project management methodology.

2) Formulation and Implementation of the Coastal Resources Management Project at Barra the Santiago

There were no problems in the preparation process. However, a mayor delay was observed in the construction and installation of the reef. The need to modify the design of the anchor, the miscalculation of the construction period and failing to take into consideration the conditions of the sea were the main reasons for the delay. The one-month delay was overcome later thanks to the efforts of the fishers in continuing with the activities and there is now a perspective of finishing the construction of the reef as was originally planned. Regarding the confirmation of the effect, it has not been possible to verify the installation points of the reef due to the previously mentioned interventions. The presence of grouper has been confirmed visually and there are reports of the capture of snappers which had not happened before in this area. Considering this result, the effect of the installation can be confirmed to a certain extent.

The ecosystem research was suspended since the C/P was dismissed. Fortunately, this activity is not a determining factor and therefore the negative influences remained small and not affect the Project.

In spite of the results, the fishers continued with the activities during the absence period of the Study Team, and the outcome was satisfactory level of reach can be confirmed.

⁴ For more details refer to the Summary Table for the Evaluation "Pilot Study Report".

3) Formulation and Implementation of the Coastal Resources Management Project at San Antonio Los Blancos

The candidate community selection was carried out, and an agreement was reached with the group of fishers for workshops as planned. The activities of the Project fell behind because of the same reason of Barra de Santiago. The fishers of San Antonio Los Blancos continued with the activities during the absence period of the Study Team, which allowed recovering from the delay. The New Fisheries Law forced the fishers to suspend the reef installation activities. The fishers of San Antonio Los Blancos responded to this situation by requesting a resolution from CENDEPESCA. The continuity of these activities depends on the result of the request. The effect of the installed reefs is similar to that of Barra de Santiago.

Considering these results, it can be confirmed that the expected results have been achieved to some extent, however, the continuity of the activities will depend on the request mentioned above.

4) Expansion to Neighboring Communities

This result was added again based on the progress of the Project. Workshops were planned and carried out in the neighboring communities, two expansion events and meetings with the fishers were held in Barra de Santiago. Based on these activities, a project similar to Barra de Santiago started and the expansion of that same project was applied through the small-scale fund managed by the Japanese Embassy. All of these activities have been performed. At this time, there is great difficulty in extending the Barra de Santiago project because of the antagonistic relations among the groups of fishers. The effort has continued to involve the C/P to call for a meeting of all boards of directors of the existing groups. Therefore, it can be confirmed that the expected level has been reached.

Considering the results mentioned above, the degree of reach of the Project objective is satisfactory in spite of the major problems. In Barra de Santiago, it was possible to confirm positive results within the target group of the Project but it has not been possible to extend the activities to a regional level. The New Fisheries Law deems the area of Became del Zapata as one of the protected areas and the group achieved favorable conditions to continue with the activities but it is difficult to have regional development with few fishers. On the other hand, the fishers of San Antonio Los Blancos showed great capacity to implement and expand the Project but the New Fisheries Law requires them to suspend the installation of artificial reefs.

(2) Effectiveness from the Organization Forming Stand Point

This section analyses the effectiveness of this Pilot Project going back to the starting point, or better said, from the standpoint of “organization forming.” The group of Barra de Santiago had already initiated incipient actions while the fishers of Los Blancos had not started concrete actions although there was one cooperative. Finally, the producers of San Marcelino that participated later in the Project were members of a new group formed to that end⁵.

1) Organization in Barra de Santiago

In Barra de Santiago, the fishers’ organization was promoted through the reef installation project. This is reflected in the increasing number of participants in the activities after the Project started. The distribution of responsibilities⁶ was done in a spontaneous and voluntary manner. On the other hand, three representatives of each group served as liaisons with CENDEPESCA and the Study Team, which shows that the functions of a group or organization are being progressively established.

With the progress of the Project an internal and external contribution imbalance was perceived. Internally, some members that contributed economically to the preparation of the reef demanded the same degree of sacrifice from the other members and temporarily left the group when their demand was denied. This event has questioned the contribution imbalance among members, but the fishers themselves expressed that when the members returned to the group they felt more solidarity than before. Externally, the group addressed with their own initiative the non-member fishers during the expansion campaign and later meetings. Although, this “from the members to the non-member” approach served to confirm that the members clearly understood the objective and the nature of the Project, the impact has not been significant. As pointed out in the section “d. Expansion to the Fishing Communities of the Zone”, it is mainly due to the resentment of the non-member fishers who misinterpreted that a particular group is benefited from the Project, as pointed out in section “d. Expansion to the Fishing Communities of the Zone.” It has been observed that the development of the organization in a given zone is limited when attempting to undertake the task

⁵ The newly formed group in San Marcelino integrated individual fishermen and integrated the members of the Cooperative Mar y Concha for the activities of the Project. The facility for the workshops was provided by the cooperative, but the works were implemented by both members and non-members of the cooperative alike.

⁶ For example, the extraction of mangrove roots to build the reef was assumed by the relatively younger members that went fishing less frequently. The welding was performed by members with some iron works experience. Anchor construction, reef installation and other works that demanded strength have been carried out by the youth. Watercrafts and outboard engines for the installation of the reef were provided by the members of other groups, and the tasks were distributed among the participants in a spontaneous manner.

through the expansion of the beneficiary group and so the method employed invites the other groups and organizations to be a part of the activities through CENDEPESCA.

2) Organization in Los Blancos and San Marcelino

The recipients of the Project in Los Blancos are the members of an already existing cooperative. This section addresses the expansion of the Project to other fishing communities of the zone since the progress of the awareness process for the recipients has already been discussed in a different section.

The fishers gained awareness of the critical situation of the resources during their participation in workshops that lasted several days. Their attitude change was not only shown through their initiative to fabricate the reef for the conservation of the fishing ground but also through their initiative to visit and invite individual fishers and groups of fishers to be a part of the activities. The same efforts were also conducted in Barra de Santiago, but almost no fishers or groups responded to the invitation, unlike Los Blancos where many fishers and groups reacted in a positive manner. Their response has been particularly swift by the fishers of San Marcelino where the Study Team and CENDEPESCA personnel conducted workshops requested by the community. It can be stated that in this case, the first goal of organization, "sharing the objectives," has been attained.

As a result of the workshops, it has been decided to implement a project to fabricate and install a reef also in San Marcelino. The fishers of this community are divided into members and non-members of the cooperative. In order to start the Project two representatives of the non-member fishers and one representative of the cooperative acted as liaisons with the CENDEPESCA and Study Team personnel. The facility was provided by the cooperative and the tasks were carried out basically by the people that "were available at the time." No serious problems have aroused, until now, because of the contribution imbalance, as was the case in Barra de Santiago.

3) Movements in Other Fishing Communities

The implementation of the Projects in Los Blancos and San Marcelino awakened the interest of the fishers in Isla Tasajera and Colorada to participate in the activities. The arrival of the Study Team in February 2002 was awaited to request the organization of the workshops (this same request had been submitted previously to CENDEPESCA, but an answer had not been possible due to the lack of transportation and budget). It has been foreseen to implement the same reef fabrication and installation project for the organization of this community within the framework of the Non-refundable Financial Cooperation for Community Projects.

13.3.4 Another Pilot Project: Diagnosis and Advise on Cooperative administration

Chapter 9 Part I discusses the diverse administrative problems surrounding the existing fishing cooperatives. In Phase 2 the diagnosis of the operations of these organizations and advice based on the results of the diagnosis,⁷ was performed parallel to the implementation of the Projects.

The diagnosis and advice were performed through workshops for the representatives of the cooperatives. As a first step, the current situation of the administration in general was clarified through the revision of the balance sheet, and other operational indicators. Later, workshops for four diagnosed cooperatives were held with special focus on “the awareness” of the participants. That is, inducing them to realize for themselves the effects of an inefficient functioning of the organizations, so as to improve the management and the fishers’ organization.

(1) SOWT (Strengths, Opportunities, Weaknesses and Threats) Analysis

The following chart summarizes the SOWT Analysis results obtained during the workshops

<p><u>Strengths</u></p> <ul style="list-style-type: none"> • Good reputation • Member willingness • Providing infrastructure for the activities • Experience on productive activities <p>Presence of leaders trained on cooperative administration.</p>	<p><u>Opportunities</u></p> <ul style="list-style-type: none"> • Access to financing through FACOPADES • Formation of reefs to protect the resources • Necessary land for tourism • FACOPADES gathering center for marketing purposes • Support for the Projects by the NGO’s, FIAES y FONAES
<p><u>Weaknesses</u></p> <ul style="list-style-type: none"> • Deficiencies in member education • Lack of knowledge on high sea fishing • Members do not work systematically (lack of organization). • Lack of managerial capacity. • Lack of distribution channel. • Lack of mortgages to access loans. 	<p><u>Threats</u></p> <ul style="list-style-type: none"> • Natural Disasters • Marine crime (theft) • Competition against industrial fishing • Destruction of the marine Environmental Laws and regulations that are in favor of industrial fishing.

⁷ A local consulting firm was hired for the diagnosis and advises. The specifications of the labor work

(2) Vision to the future

At the workshops, each one of the cooperatives established a look into the next five years. Some participants have even managed to define the priority order of the key factors and necessary activities. Each one of the representatives of the cooperatives drew their vision of the future based on the current situation and in doing so, gained awareness of the importance of administrative diagnosis. The result of the workshops can be observed in “Annex”.

(3) Considerations

The recent workshops have led the participating representatives realize the gravity of the situation, but only four cooperatives reacted in a positive manner showing interest in overcoming their reality. One of these cooperatives has even formulated the importance of the fisheries management to the other members. On the other hand, the cooperative that recently declared itself bankrupt surprised the organizers of the workshops with its opinions, since, in spite of having been through the discussion of administrative problems, still sought to solve their problem through debt, forgiveness or external help (renewal of obsolete equipment and materials). It is necessary to select from among the existing cooperatives, those that should be given support and those that should be reorganized, and to concentrate the efforts that will serve as the basis of the development of artisanal fishing in the corresponding zone.

13.3.5 Experiences and Recommendations

(1) Awakening the Awareness of the Fishers as “Owners”

Awakening the initiative and awareness of the fishers as “owners” of the Project constitutes an important starting point. It is necessary that the external contributions be limited only to providing objective information to better understand the current situation, and letting the participants “think” for themselves. Many times the external personnel (e.g.: CENDEPESCA) opens the meetings and if the external contribution is excessive, inducing the participants to reach awareness is not possible. It is important for all activities to bear in mind that awareness of the fishers as owners always constitutes the starting points.

(2) Studying and Learning About the Perception of the Fishers

There is a large number of artisanal fishers in the Salvadoran coastline and their reaction to the threat of a decrease in the capture as of the second half of the 90’s has been diverse: some try high sea fishing, some use illegal fishing gear and others lost interest in fishing. Some fishers (although a few) took the initiative to intensively

prepared by the Study Team, which also supervised the organization of the workshops.

protect the resources and it is necessary - bearing in mind that there are all kinds of mindsets - to identify these fishers or groups who are aware that there “will not be a future if the resources are not adequately managed even if it means sacrificing the immediate interests.” In order to find them, it is necessary to conduct community surveys and establish direct communication with the fishers.

(3) Taking into Account the Vision of the Fishing Organizations

The organization process requires time, and it is relevant to effectively use the existing groups as much as possible, but it is also true that not all organizations (in the case of El Salvador almost all are fishing cooperatives) can be used. As mentioned before, the Projects implemented in the past have had a negative effect because of the external support consisting of equipment and materials, which have increased the dependency of the recipients on external support. In order to use the existing fishing cooperatives as the promoting body of the Project, it is necessary to know their vision before initiating the activities. The presence of fishers or organizations that do not show interest in building their future through their own efforts would be an obstacle to the development of the Project.

(4) Utilizing Accessible Support Efficiently

It is necessary to invest efforts to attract external capital always in a planned manner, and given the limited budget of CENDEPESCA it is indispensable to channel technical assistance or external financing in order to implement the Project throughout the country. In addition to the young volunteer expert dispatch program of JICA, among the possible sources of support, it is also mentioned the hiring of local consultants, through sources such as FISDL, of the Salvadoran Government; Non-refundable Financial Cooperation for Community Projects, of the Japanese Embassy; Fisheries Fund, of Banco Agrícola; Non-refundable Financial Cooperation of IDB; etc. It is also possible to implement projects for the construction of fisheries infrastructures and artificial reefs through the Non-refundable Financial Cooperation for the Fisheries Area of Japan. It is important to implement the activities in a continued and effective manner systematically using the various external support schemes.

(5) Taking into Account the Local Characteristics of the Organizations

The experiences with the Pilot Projects have made it clear that it is not always possible to maintain an ideal relation among the various fishing organizations. It is important to collect more information on the groups and organizations of a given zone and the existing relations among them. It is not easy to know exactly the relations among the organizations. Fortunately, due to the institutional reform of CENDEPESCA that started in 2001, there is a possibility for the local personnel to

be strengthened and increased, and it is necessary to further consolidate communications with the fishers and collect information on this aspect.

(6) Considerations on Historic Background

This segment address the various considerations that should be analyzed by external people. The Central American countries – El Salvador included – have gone through a very agitated political period, from the 60's to the 90's. The movements intensified particularly from the 60's to the early 90's in such a way that, not a few countries experienced the political conflict where the State lost its actual function, and El Salvador was no exception. It is necessary to take into account, that the current situation of artisanal fishery has its roots in the historical background and a project or plan could therefore not be conceived without considering such background. The delay in the organization process of the fishers could also be a consequence of this situation, it is said that individuality prevails in the Latin-American culture and that no ground facilitates the process of organization forming. However, it is also true that some agricultural and labor organizations have existed previously in El Salvador that expanded their scope from local to regional to national. This is a fact, however, it is necessary to take into consideration that the past political conflict came from the confrontation of these organizations and the government or the armed forces, and it is evident that “forming new organizations” constitutes a delicate issue. This is one of the considerations that external players should pay special attention to, when implementing a project.

Project for Supporting the Formation of Fishers' Organization

Area and Project Objective: Artisanal fishers of Barra de Santiago, Los Blancos and other nearby communities

Project Summary	Indicators	Source of Information	External Condition
<p>Overall Goal: Two entities: -CENDEPESCA and Artisanal Fishers jointly manage coastal resources.</p>	<ol style="list-style-type: none"> 1. Fishers' organizations to manage coastline resources by their own initiative until March 2003. (Level of organization: C. See criterion in the attached reference sheet). 2. The system supported by the central and zone office, CENDEPESCA, has risen to level B (See the level in the attached reference sheet). 	<p>Report on Zone Offices</p>	<p>· The fishing policy, which acknowledges the relevance of artisanal fishery, does not change.</p>
<p>Objective of the Project: Fishers in the area of the project, by their own initiative, have gained awareness in the management of coastline resources.</p>	<ol style="list-style-type: none"> 1. 80% of the inhabitants in the area of the project have some knowledge on management of coastal resources, 50% of them show a change of attitude and 10% participate positively in the activities to manage coastline resources. 	<ol style="list-style-type: none"> 1. Results of surveys carried out to the inhabitants. 2. Results of the fishers' interviews for this project. 3. Results of the area impact of the survey. 	<p>· They do not deny the resolution requisition submitted by the artisanal fishers .</p> <p>· C/P do not change position nor resign</p>
<p>Outputs:</p> <ol style="list-style-type: none"> 1. C/P of CENDEPESCA theoretically comprises the methodology of project administration. 2. Formulation and execution of Project Administration of Coastline Resources in Barra de Santiago. 3. Formulation and execution of Project Administration of Coastline Resources in the community outside of Barra de Santiago 4. Expand the project in the nearby communities.. 	<ol style="list-style-type: none"> 1. 80% of the C/P related to the project participate in the PCM workshop carried out in September, 2001, gaining 70 points or more in the comprehension test. 2. The group of fishers in Barra de Santiago (Guardians of Barra de Santiago) understands the objective of the project, and carry out activities by its own initiative (Level of maturity of the organization in March, 2002: C. See the level in the reference sheet). 3. The group of fishers is determined in September 2001, and the selected group comprises the objective of the project, and carries out the activities on its own initiative (Level of maturity of the organization in March, 2002: C. See the level in the reference sheet). 4. The project is expanded at least one community until March, 2002. 	<ol style="list-style-type: none"> 1-1. Record of training on PCM. 1-2. Result of the comprehension test (Final Report) 2-1. Monitoring record 2-2. Result of the interviews to fishers. 3-1. Monitoring record 3-2. Result of the interviews to fishers. 4. Pilot Study Report (Record of project activities) 	
<p>Activity:</p> <ol style="list-style-type: none"> 1-1. Preparing the ZOPP workshop 1-2. Execution of the ZOPP workshop 2-1. Preparation 2-2. Planning (Participative workshop in the community) 2-3. Production and installation of an Artificial Reef 2-4. Confirmation of the artificial reef effect 2-5. Learning about an Estuary Ecosystem 3-1. Discussion about a community to execute a project 3-2. Determining the community (Los Blancos) 3-3. Planning (Workshop in the community) 3-4. Production and installation of an artificial reef 3-5. Confirming the effect of an artificial reef 4-1. Execution of workshops in nearby communities 4-2. Executing an event for the extension in Barra de Santiago 4-3. Execution of an extension workshop for BS groups 4-4. Starting a project in San Marcelino 4-5. Supporting the expansion of the usage of small-scale grant assistance 	<p style="text-align: center;"><u>Investment</u></p> <p>Side of Study Team</p> <p>< Personal ></p> <ul style="list-style-type: none"> · Consultant responsible of the project: 1 (3.83 M/M) · PCM moderator and training assistant: 2 (8 days) · Workshop assistant: 2 (10 M/day) · Investigator of the cooperative administration: 1 (20 M/day) · Research assistant: 1 (120 M/day) <p>< Materials ></p> <ul style="list-style-type: none"> · Materials for artificial reef · Materials to investigate the estuary eco-system 	<p>Side of CENDEPESCA</p> <p>< Personal ></p> <ul style="list-style-type: none"> · Personnel of the Social Development Unit: 1 · Personnel of the Zonal Office: 1 - 2 <p>< Other ></p> <ul style="list-style-type: none"> · Office space for the Study Team · Specific telephone line for the Team Study 	<p>· Industrial fishers do not hinder the project with political pressure.</p> <p><u>Pre-conditions:</u></p> <ul style="list-style-type: none"> · Fishers target of the project does not oppose to the execution of the project. · C/P participate in the activities of the project.

1. Overall Goal Indicators

a) Indicator for the fishers' organization component

A: Has the capacity to solve problems on its own and develop institutionally.

B: Has the will to solve problems but sometimes requires guidance from CENDEPESCA or the Study Team.

C: Has the capacity to solve institutional problems with partial guidance from CENDEPESCA or the Study Team.

D: Has the capacity to solve institutional problems with the guidance of CENDEPESCA or the Study Team.

E: It is difficult to solve institutional problems even with the guidance of CENDEPESCA or the Study Team.

b) Indicator for the CENDEPESCA component

A: Has the capacity to support the fishers' group in a positive and full manner.

B: Has the capacity to support the group of fishers.

C: Although not enough, the capacity to support the group of fishers is being created.

D: Has the capability to partially support a group of fishers.

E: It is difficult to support a group of fishers.

2. Result Indicator (indicator 2 and 3)

A: Can perfectly manage the Project through its own efforts.

B: Can manage the Project through its own efforts although with some difficulty.

C: Can manage the Project with partial support from CENDEPESCA or the Study Team.

D: Can manage the Project with full support from CENDEPESCA or the Study Team.

E: Cannot manage the Project even with the support of CENDEPESCA or the Study Team.

13.4 Artisanal Fisheries Diversification Project

13.4.1 Context of the Project

In El Salvador, artisanal fisheries in the coastal areas focus primarily on bottom fish species such as croakers, snappers and shrimps. The shrimp trawl fisheries started in the 50's in the coastal areas, and through the exportation to the United States contributes to the Salvadoran economy for the earning of foreign currency. Fishing grounds have been overexploited by the industrial fishing activities for a long time, catching morallas including even the economically important juvenile species.

Artisanal fisheries first started to use shrimp gill nets in the late 80's. The mesh size of the gill net is 2.5 inches and it also captures smaller fish due to the selectivity of the gill net. Recently, the artisanal fishers started using overlapped gill nets to further reduce the size of the mesh and therefore not only the shrimp trawlers capture fish before they can mature but also the artisanal fishers thus increasing even more the pressure on the demersal fish resources.

Although the demersal resources are depleting in the coastal areas, there are some resources that are not being exploited sufficiently, such as sardine, anchovy, skip jack, amber jacks and conger eels. The reasons for not catching these species are that there is not a market established for them and that the artisanal fishers do not have enough knowledge on equipment and methods to innovate.

An adequate management of the resources is necessary in order to alleviate this situation and it is also important to turn to the underexploited resources to avoid the excessive pressure on shrimp fisheries and bottom fish species. Therefore, the objective of this Pilot Project is to take the first steps in the right direction.

13.4.2 Design of the Project and Activities Carried Out

The objective of the Project for the diversification of artisanal fisheries is to verify the possibility of using the underexploited resources of the coastal areas. In other words, the purpose is to determine the potential in the utilization of the said resources from the demand (processing and sales promotion) and supply (fishing) point of view.

Four sub-projects have been created in order to implement the project, which comprises major tasks with a limited amount of time: Study on the current utilization of underexploited fisheries resources; testing of new fishing methods; development of methods for processing fisheries resources, and promotion of processed fisheries

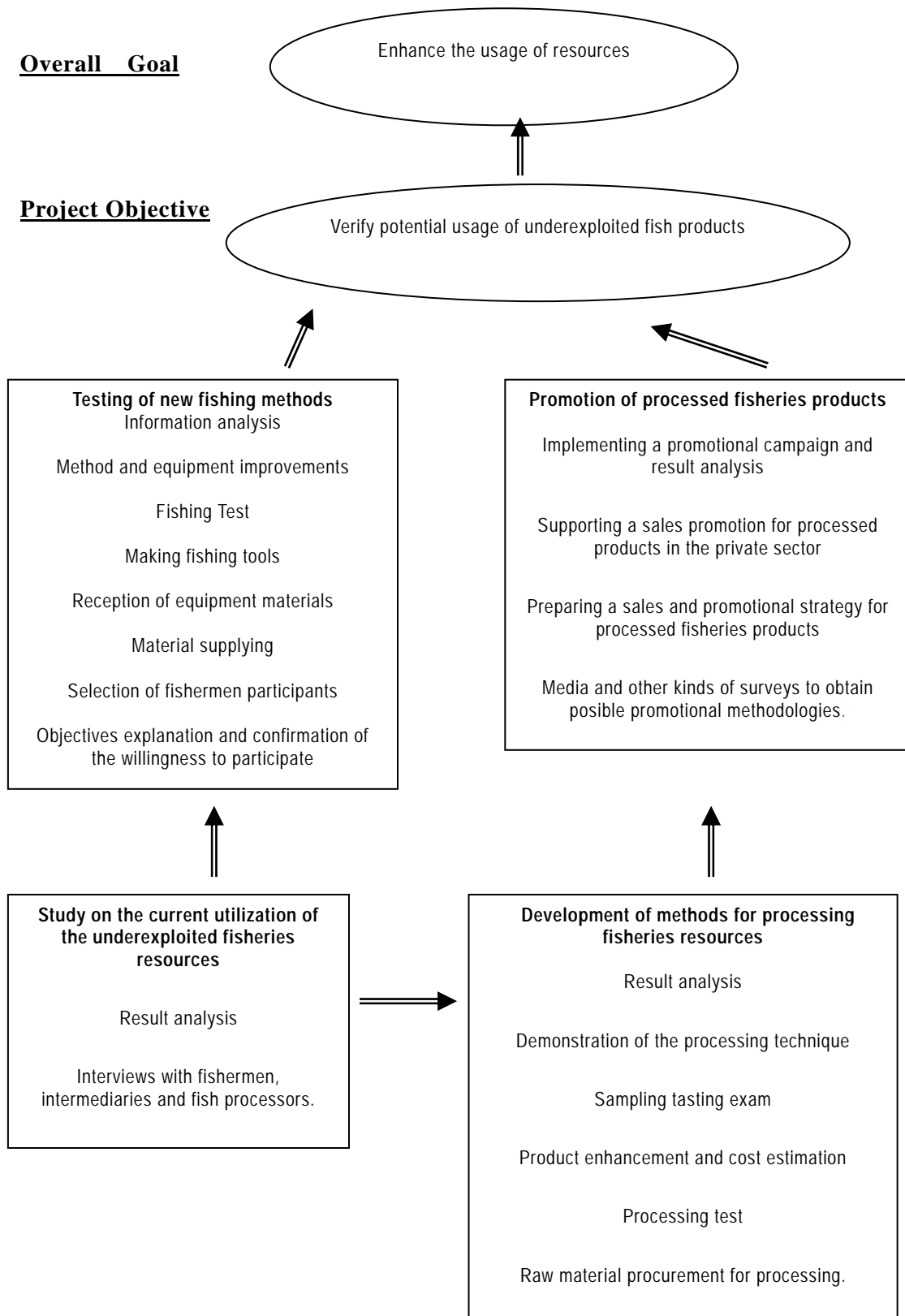
products. The results of these sub-projects become the output of the Project design matrix (PDM).

The indicators for the Project evaluation are described in the PDM, although given the research and development nature of the Project, we feel that it was difficult to establish the objective goals with their indicators since the evaluation can be considered satisfactory if the necessary issues are clarified without having to depend on their results. This evaluation was performed by considering the relevance of the guideline and methodology used for each one of the sub-projects and the compliance with the foreseen activities according to the work agenda.

Since no personnel were assigned exclusively for this area within CENDEPESCA, we have decided to proceed with the Project with the collaboration of the fishers and processors of fisheries products. Nevertheless, the CENDEPESCA C/P participated on the job, during the fishing test, fisheries products processing, and the elaboration of fishing gear. For the sales promotion sub-project, we worked with the counterpart assigned to the Project, as of February 2002.

The flow chart of the Project is shown below:

Figure 13-1 Project Design and Flow Chart



13.4.3 Project Results

(1) Study on the current utilization of underexploited fisheries resources

The following information, shown in Table 13.4-1, on the underexploited resources was obtained as a result of the interviews performed with the fishers, intermediaries and fish processors, and by comparing the records of the intermediaries with the actual disembarkations

Table 13-1 Information on Underexploited Resources

Species	High fishing season	Fishing ground	Fishing method	Annual catch calculation	Application	Colones/lb (at landing point)
Conger eel	Year round (Dec-April)	East of Lempa river	Palangre, Morallas	>600 tons	Dried-Salted	0.5-6
Skip Jack	Year round	All of the coast line	Hand line	Unknown	Bait for setline	0.5-1.5
Amber Jack	Year round	All of the coast line	Hand line	Unknown	Bait for setline	0.5-3.0
Sardines	Nov.-Feb.	All of the coast line	Gill net	Unknown	Bait for setline	0-.51
Anchovies	Nov.-Feb.	All of the coast line	Gill net	Unknown	Consumption, Bait for setline	0.5-3.0
Anchovies	Jul.-Aug.	Bahía de Jiquilisco	Scoop net (encircling net)	>36 tons	Dried	3.0-11.0 (Price of dried fish)

(2) Testing of new fishing methods

A small purse seine net with fish attracting light was introduced in order to capture smaller pelagic fish species while trials were made to improve the gill net preventing accidental captures. As for conger eels, the current methods render large volumes of catch and no trials were planned.

1) Improved Gill Net and shrimp Trap Trials

Improved gill nets have been designed by joining two nets of different mesh size vertically that catch shrimp in the lower section (net height: 2 m; mesh size: 6 cm) and larger fish in the upper section (height: 2.7 m; mesh: 4 – 5 inches). In two days of trials with this gill net in September, the fishers of Barra de Santiago captured 29 Lb

and 256 Lb of fish (mainly butterfish) and shrimp per day. Because the average catch in this area was 124 Lb (¢405 colones, landed price), the capacity of the new net is similar to that of the traditional one. Another trial during the same period performed by the fishers of Los Blancos, achieved 160 Lb. A large portion of the catch is butterfish (*peprilus spp.*). The fishers commented that there were no larger fish in the shrimp fishing grounds and also that the new net required a greater hauling effort because of the increased resistance of the net. It was also found that the net was easy to tear at the joints where the larger mesh meets the smaller one because of the considerable difference in the size of the twines. These trials showed that shrimp is generally caught near the sinker line and the most part was caught within one meter high from the sinker line.

Due to these situations, we assumed that the height of the gill nets is sufficient at 2 meters and decided to use 4 and 5 inch nets separately of the 2.5 inches nets. This enables us to investigate the use of the bottom drift gill net and the encircling gill net for larger fish species. In the trials performed during February and early March in Barra de Santiago, the average catch for 10 days was 99 lb for the 5-inch gill net (average of ¢480 worth of harvest per fishing trip). Surface large mesh gill net is used to capture pelagic fish of a medium size such as skipjack and amber jack. With our recommendation, the fishers have placed fish aggregating devices (FAD) in order to attract pelagic fish species and increase efficiency. The result of the trial was positive. Fishers caught dolphin fish, skip jack, and amber jack. Regarding fishing with traps, blue crabs were reportedly captured in the estuary, however, the effects have not been verified yet.

2) Fishing Trial for Smaller Pelagic Fish Species

The fish attracting light trial was performed in October 2001, and it always attracted smaller fish such as *pajarito saltador*, *tylosurus crocodiles (aguja)*, and *fodiatus acutus (volador)* at the surface. During the trial in the waters around Barra de Santiago, we could observe traces of fish such as sardines with the fish finder at depths of 5 to 10 meters. The depth of the water was 20 meters. In this area, at a depth of 10 meters we were able to capture barracudas and skip jacks with hand line. We were able to observe sardines swimming under the fish attracting light at approximately 5 meters under the surface in the 15 m depth zone, close to Puerto de la Libertad.

Based on the results of the effects of the attracting light, we have proceeded to testing the operation of the purse seine net since the October 29. During the evening trials, we captured 600 lb of sardine and anchovies with only a single operation. In the month of

December, no fish were found near the beach from sunset until 7:00 PM, and it was not possible to obtain positive results for the 6-day trial of that month. For the February trial, we decided to work all night to verify the effects of the fish attracting light. Many fish gathered under the light after 11:00 PM. The capture gradually improved to finally reach 100 lb of jacks (tamalito: *caranx caninus*) and 200 lb of sardine (color maria), as the main species.

During these trials, a new underwater fish attracting light was invented that improved the fishing techniques by using the light separately of the boat. Purse line was often pulled by the light boat to close the net rapidly.

(3) Development of methods for processing fisheries resources

1) Raw Materials

The fish was obtained in La Libertad and Acajutla. Unit price and yield of each fish species are shown in the table 13-2.

Table 13-2 Raw Materials Price

Raw Material	Skip jack	Amber jack	Conger Eel	Butterfish	Sardine
(Price: US\$/Lb)	0.18	0.12	0.13	0.13	0.21

Observation: In general, black tuna and jurel (*caranx caninus*) are sold on a per-unit basis, which was converted to the per-pound price for the calculations. (Price of September 2001)

Table 13-3 Yields of Raw Materials

Species	Weight (whole) (lb)	Weight (gutted) (lb)	%	Weight (flesh only) (Lb)	%
Skip jack	24	20	83	10.6	44
Amber jack	151.3	141.6	93	44.7	30
Conger Eel	212.8	193.2	91	111.7	52
Butterfish (bothidae)	108	94.2	87	70.0	64
Sardine	25	22	88	16.1	64

Note: The flesh was obtained by meat separating machine.

2) Processing methods

The methods utilized for fish processing are two: Based on raw ground meat and parboiled meat. The following products have been developed per species. The recipe and the detailed processing methods are presented in “The Technical Report”.

- Species: Skip jack (parboiled)

- Processed product: fish meat for pupusa, fish croquette
- Species: Amber jack (raw ground meat)
- Processed product: fish burger, fish escabeche, fish sausage
- Species: Conger eel (raw ground meat)
- Processed product: fish ball, fried fish cake

Table 13-4 Production Costs

Product	Meat for pupusa	Croquette	Fish burger	Escabeche	Sausage	Fish cake	Fish ball
Production cost (US\$/Lb)	0.70	0.75	0.48	0.60	0.78	0.24	0.24

Note: Production cost: The cost for the raw materials and ingredients. Basic services and labor costs not included etc.

3) Taste preference test of the Processed Fisheries Products

The data from the taste preference test done on the 28th and 29th of September, 2001, were analyzed and the following preferences of the Salvadoran people on the Processed Fisheries Products were found:

Table 13-5 Results of the Taste Preference Test

Place	1	2	3	4	5
Product	Fish Pupusa	Fish burger	Fried fish cake	Croquette	Escabeche
Degree of acceptance ⁸ (%)	78	61	59	57	45

Meat for pupusa, fish hamburgers, and fried fish cake were selected as the result. These products stand marketing possibilities in the Salvadoran market. From among these products, the fish pupusa stands a better possibility of acceptance given the Salvadoran custom.

4) Training for the Dissemination of the Processing Techniques

Fish processing training was carried out for the participants (restaurant chefs, fish processors, and others) in the processing room of a fish processor. After the demonstration, the impressions of the participants were taken, and the majority of them liked the products. After six months of fish training process, a survey was conducted with the participants of the training program. No one was able to process

⁸ Degree of acceptance: Number of people that like to buy similar products at the same price. For example, in the case of the fish pupusa, the price has been compared to that of a cheese pupusa.

the fisheries products because of problems in the obtaining raw materials.

(4) Promotion of processed fisheries products

Based on the results, a methodology for promoting and marketing the selected products was studied and implemented.

1) Study for identifying possible promotion methods including a study of the media

Information related to the media, utilization procedure and costs was surveyed. Information regarding advertising agencies, two print shops, and mass communication media (9 TV channels, 5 radio channels, 5 newspapers) has been collected and organized.

2) Establishing the promotion strategy for the selected processed products

For efficiently advertising the processed fisheries products, it is necessary to establish a marketing flow, from the procurement of raw materials to the outlets, for which the cooperation of a processing plant that already has its own system for the procurement of raw material, processing and sales was sought and obtained. As experimental sales points for fish pupusa, cooperatives of Olocuilta pupusa restaurants have been selected. Supermarkets and restaurants in San Salvador were chosen for experimental marketing of *surimi* products such as fish burger, and fish balls.

The strategy used for the promotion of the fish pupusas through selling skipjack meat (parboiled) was:

- Celebrating an opening ceremony for the promotion campaign to encourage the involvement of the pupusa restaurants.
- Attracting public attention by calling the press to the event and making contacts for the release of a special newspaper article.
- Preparing and placing banners at strategic locations as well as preparing and distributing posters and table signs as means of advertising.

The following has been proposed for promoting the processed fisheries products in supermarkets:

- A small poster at supermarket entrances and handing out fliers to catch the clients' attention and lead them to the sales points. Inside the supermarket, a promoter wearing a chef outfit and a stand offering original product samples and a dish prepared with the product.
- Providing information on the product and its advantages through sample tasting of processed products, and through the distribution of a recipe book and an oral presentation by the promoter "Chef."

3) Implementation of the Experimental Sales and Promotions⁹

In March 2002, the experimental sales and promotions of fish pupusas were implemented and as a result, 211 fish pupusas were sold (5% of the total sales) during the second day of promotions in a sample tasting of 8 pupuserías (outlets) in Olocuilta. The supplier received purchase orders for 66 pounds of skip jack during the first week alone. As for the *surimi* products, sample distribution to supermarkets will be carried out shortly.

4) Efficiency Analysis for Promotion Methodology

According to the polls performed on 61 consumers leaving the restaurants, 83% knew about the fish pupusas. 31% of them learned about the fish pupusas because they were offered to them at the outlet, 20% read about them through posters, 18% were told about them, 12% through banners, 8% through table signs, 6% through TV and 6% through newspapers. All this indicates that offerings at the outlets and word of mouth had the strongest influence. The reason posters and table signs were not as effective as expected was that many restaurants (pupuserías) were not using them adequately.

Improving this aspect can render better promotion results.

13.4.4 Project Evaluation

The results of the sub-projects are shown in the previous section of this report. All of the Project objectives were covered and the various technical reports were made as a result of the study. The reports are: Report on Catch Volume and Condition of Underexploited Resources Utilization, Report on Improved Gill Net and shrimp trap trials, Report on Fish Attracting Light and Purse Seine Net, Report on Processing Techniques and Sampling Tasting of Underexploited Fisheries Products, and, Report on Experimental Sales and Promotion of Processed Fisheries Products.

13.4.5 Lessons and Recommendations

The Pilot Project explained here consisted of trying new fishing gear and processing new products, and involved a great degree of risk because of its experimental and research nature. It is different from other projects that consisted of the implementation of a system with clear objectives (“Project for the Improvement of the Fisheries Statistics System”) or the strengthening of selected groups (“Fishers’ Organization Formation” and “Project for Increasing the Income of Women in the Fishing Communities”).

Currently, CENDEPESCA does not have units specializing on fishing and processing

⁹ Supermarket sales require a label on the sanitation registry of the Ministry of Health, Product Bar Code and Results of Laboratory Analysis by a trusted laboratory. Regarding the product selected for marketing, the processing company is taking the necessary steps.

techniques, and therefore, little active participation was expected of the C/P, which is exactly how the actual activities took place: Directly with the fishers or companies. The C/P has been dedicated mainly to coordinating and providing support for the activities, and this scheme has permitted the realization of a direct technological transfer and the obtaining of results in a short time, which will allow the sustainability of the Project. This experience will serve as a model for future experimentation and research projects with extra institutional personnel, which would free CENDEPESCA of the need to hire new technical personnel for the field. In order to ensure the continuity and sustainability of the Project, most of the equipment and materials were obtained or prepared locally.

The success of this experimentation will contribute to generating economic gains for the fishers and processors whose example will be transmitted and established by CENDEPESCA also in the adjacent areas. In the case of the fisheries technology, once the idea was proposed, to place low-cost floating reefs in one community, some fishers started catching fish by using this technique, and upon seeing the results, other fishers also followed. The same tendency has also been observed with the use of large mesh size gill nets. These examples show that the idea is valid. The development of artisanal fishing, in many cases, is about reducing poverty, and a project that does not generate real profit would result in an additional burden for the fishers, instead of a benefit.

Because this project was started from scratch, it has not been possible to identify the fishing methods or groups of fishers that can serve as a model for the neighboring countries. However, it is important to prepare the terrain for the coming years for direct contact among the fishers to enable them to follow the successful example of other fishers, locally or from abroad. This is a realistic way of learning in a country where the resources to cover research and personnel expenses are limited.

Regarding the preparation and sale of processed products, the efforts focused on the industry, restaurant owners, and fisherwomen. Special emphasis was given to the awareness and expansion component. The promotion campaign was carried out, consisting of motivating the industrial entrepreneurs and restaurant owners to introduce new processing methods, and advertising through newspapers and attractive commercials, etc. These efforts fructified since the new products are being sold by private companies. Appointing an expert on advertising campaigns has been very effective and it is recommended to include such professionals in future pilot projects.

Artisanal Fisheries Diversification Project

Project Duration: from Sept. 2001 to March 2002

Project Area and Selected Group: fishers in Barra de Santiago, Los Cobanos, San Antonio Los Blancos, La Libertad, as well as fish processing

Project Summary	Indicators	Source of verification	Assumptions
Overall goal Increased number of underexploited resources.	-Number of fishers (boats) using the new fishing techniques.- Landed amount of underexploited fish species.	-Annual report of fishing statistics. - Interview to fishers -Fishing trial.	Underexploited species are adequately administered..
Project Objective Confirm the possibility of using underexploited fishing resources in the coastal area.	- Income estimates will be positive due to operating costs and gross fishing harvest. - Private company will begin selling processed products.	-Fish testing reports -Sales promotion report	- CENDEPESCA will recommend using the new fishing techniques. - CENDEPESCA, fish processors and fishers present initiatives to promote fish consumption.
Results 1. The current situation of the usage of underexploited resources is being identified. 2. Results for testing the new fishing methods to use underexploited fishing resources are reported 3. Processing and preparing underexploited fishing resources customized to the Salvadoran taste have been demonstrated. 4. Adequate promotion methodologies are demonstrated.	1. Usage, price, volume estimation of each species disembarked 2-1 Analysis for the improved gill net and fishing trap tests 2-2 Analysis for purse seine net and the effect of the fish attracting light 3-1 A recipe and processing manual is prepared. 3-2 Result for consumer's taste preference test 4-1 Result for the study to identify possible media. 4-2 Promotional strategy for selected products. 4-3 Implementation and evaluation of activities to promote fishing products.	- Report of the study for the current usage of underexploited resources. - Reports for fishing tests - Report for processing tests - Report of sampling tasting tests - Report of media study - Reports for sampling tasting tests - Report for promotional testing of processed fishing products	
Activities 1. Study to identify the current state for the utilization of underexploited fishing resources 1.1 Surveys for fishers, middle-men and fish processors 2. Trial of new fishing methods for the utilization of underexploited resources. 2.1 Trial of traps and improved shrimp gill net Trial of small pelagic fishing 2.2 Trial fishing of Pelagic fish 3. Development of preparation and processing methods 3.1 Processing trial 3.2 Sampling tasting trial 3.3 Dissemination trial of fishing products processing methods 4. Experimental sale of processed fishing products 4-1 Study for the availability of promotional methods. 4.2 Elaboration of a promotional strategy for the selected products 4.3 Implementation of the promotion and preparation of the report results.	Contributions Japanese consultants: 6 persons/month. Salvadoran counterparts: 10 persons/month Materials to enhance shrimp gill net. Materials for encircling net, Sabiki hand line materials and others		The climate condition will not worsen during the study period. - Fishers' cooperation can be obtained. -Safety conditions in El Salvador will not worsen - There will not be a big natural disaster such as an earthquake or a cyclone - The Japanese government's policy to help El Salvador will not change

13.5 Project for Increasing the Income of Women in Fishing Communities

13.5.1 Context of the Project

In general, the income of the families in fishing communities is decreasing due to the reduction of the catch. Women in fishing communities do not have access to employment opportunities and it is difficult for them to compensate the reduction in their income. To add this situation is the low social and cultural status of the woman in comparison with the rest of the Central American region, and culturally, it is difficult for a woman to increase family income with her initiative.

These circumstances that prevent women from participating in economic activities plus the reduction of the catch, which translates into an increasing obstacle to overcome. In some communities, the women grouped themselves; particularly those who need income to sustain their household economy. such as the case of single mothers, and seeks to develop self-sustainable economic activities and to increase family income. These groups of independent women are still very few, their organization is weak, and their future is not always promising; however, from the standpoint of poverty mitigation, the efforts to achieve independence and the development of women present a great importance. Generally, the income earned by women is used for food, medicine, and education, and so it contributes directly to elevating the level of life their household.

13.5.2 Design of the Project and Activities Carried Out

(1) Design of the Project

The objective of this project is to achieve the independence and development of women by directing support towards the group of women in the fishing communities that are still in an emerging phase. The content of the project is divided into three components: Selecting the target groups, defining the activities for the selected groups, and executing the activities by the groups' own initiative. The Project will be carried out under the guideline of awakening the initiative and awareness of women's autonomy by applying the participative methodology and achieving a greater effectiveness with the least amount of outside investment. The details for the design of the project are explained in the PDM.

(2) Activities Carried Out

1) Activities Carried out in Isla de Mendez

The first pilot project was implemented with the cooperative "Las Gaviotas" which was identified as a very active organization during the Phase 1 Study.

a. Workshop for Project Formulation

Activities were defined through 2 workshops in which women participated enthusiastically, mainly the members of the cooperative. From among the various activities suggested by them, the Project “Strengthening of the Eatery and Ambulatory Food Stands for Tourists” was chosen because of the high potential to be developed in a short time.

b. Strengthening of the Eatery

Guidance was provided for the improvement of the income and expenses control which had not been adequately done since July 2001 when the eatery first started. At first some members did not like or could not keep accounting since they were not used to it but after a few days they knew how to keep the books and understood the importance of record keeping.

Training on how to operate the eatery was also implemented as well as on how to calculate expenses, make an efficient purchase plan for materials, advertise, etc. with the deadline set to Independence Day (September 15, 2001), date on which a large number of tourists was expected. As a result, 92% of the sales goal was achieved, however, after that event, no other plan has taken place. Regarding the necessary equipment and materials, the items were acquired based on the list of priorities elaborated by the members themselves that included pricing information.

The work system was revised in late October and the fortnightly rotation system was changed from one permanent person to two. Up to this date (mid March), fixed salary payments have been made to all persons in charge of the eatery.

c. Training on Fish Processing

With the purpose of diversifying the menu of the eatery and of the ambulatory food stands, training on how to process fish was conducted. After the training, an experimental processing and sampling tasting of the products elaborated with the initiative of the members, was carried out. In order to evaluate their cooking skills and to exchange with a different group of women, the training was held again with the group of San Antonio Los Blancos. During the training, the women acted as trainers using the fish croquette recipe. At the same time they received a training on how to prepare fish pupusas. This was tried as part of the activities in the Project “Pilot Project for the Diversification of Artisanal Fisheries.”

d. Ambulatory Food Stands for the Tourists

The ambulatory food sales for the visitors during Christmas Eve and New Year’s Eve were discussed, the necessary equipment acquired, and the sales plans made. The

ambulatory sales were carried out only on one day since the number of visitors was not as large as expected for Christmas Eve and although the activity did not generate any profit, it will be conducted again during the Easter break.

e. Awareness Event (Barra de Santiago)

Some of the member participated in the event celebrated on October 31, 2001, in Barra de Santiago, with the purpose of presenting and discussing the activities of the Pilot Projects. The members made presentations at their own stands and through 2 illustrated posters explained their activities and sold fish croquette. An experience exchange meeting was also held with other women's groups.

2) Selection of Other Target Groups for the Project

Workshops were held in 4 selected communities. Finally, it was determined that San Antonio Los Blancos and Los Cóbános would be the target groups of the Project.

3) Activities Carried out in San Antonio Los Blancos

a. Workshop for the Formulation of the Project

A workshop for the formulation of the Project was held using the PCM (ZOPP) method in San Antonio Los Blancos. Through this workshop, the establishment of a restaurant was planned considering the tourists as the target clients. The cooperative of San Antonio Los Blancos would provide their building and chalet for the restaurant but the women's committee did not have any funds to obtain the necessary equipment and it was decided then to first start fund raising activities.

b. Fund Raising Activities

When starting with the fund raising activities all members agreed not to collect any profits until a certain amount had been reached. The activities were: selling sodas and food prepared with materials contributed by each member from their own homes. These products were sold "door to door", and at an improvised stand made of palm tree that built by the members themselves in late October. The payment and work shift systems were implemented by the two groups that were formed for this task. A surprise gift was also ruffled as part of the activities that have raised funds - though not a substantial amount - for the gradual acquisition of the necessary equipment.

c. Training on Fish Processing

As has been mentioned in 1) c., training was conducted on fish processing in Isla de Méndez. After that the first training, another training was held in late October with the participation of the members of Los Cóbános. The members of the San Antonio Los Blancos committee prepared recipes for croquettes, meat pies and fish pupusas, and processed these products.

d. Restaurant Operation

In order to open the restaurant, the members paved the floor of a chalet and the path to the site that would be used as restaurant. Without much advertising, the restaurant started out on the first day of the year, unfortunately having little profit at the beginning. However, on July 2002 it became an important source of income for the members of the cooperative.

e. Awareness Event (Barra de Santiago)

Some of the members also participated in this event and had an opinion exchange on their current situation and the challenges they face, through the presentations of two groups of women and a meeting.

f. Service for Tourists

At the end of the year a shack was made out of palm tree that would later be used for dressing rooms or rooms for rent, with chairs and tables. This has generated some profit though it was small.

g. Awareness Event (San Antonio Los Blancos)

On February 8, 2002, the awareness event was held for the activities of the “Pilot Project for Supporting the Formulation of Fishers’ Organization” in San Antonio Los Blancos. The women’s committee sold sandwiches and other snacks made by them the day before. Likewise, the committee made a presentation on their experience stressing that their own initiative is most important.

h. Observation Tour

An observation tour was conducted with the purpose of finding a new possibility to implement other activities. The sites visited were a beach, the handcraft market and a flea market. The objective and checkpoints were discussed before the tour and during the evaluation meeting after the tour, the members proposed their ideas enthusiastically.

i. Flea Market

The planning of the flea market was done in late March. It was implemented for respect of their initiative with the partial collaboration of the Municipality of La Herradura, of which San Antonio Los Blancos is a part, and the Board of Directors of the flea market of Parque Centenario de San Salvador, all of these women have ample experience in the field.

4) Activities Carried out in Los Cóbanos

a. Workshop for the formulation of the Project

As a result of the workshop, the Project for the selling of processed fisheries products was defined in order to use the experience in training on processing that the members had acquired before and the existing donated equipment.

b. Training on the processing of fish

As mentioned in 3) c. the training on fish processing was carried out in San Antonio Los Blancos.

c. Processed fisheries products sale

Experimentally, fish pupusas, meat pies, and croquettes were made as part of the training and sold later in the community. All products were sold as a result but no profit was made.

Selling the products, every weekend was the goal at first but this was not achieved because of the lack of fish at low prices, fishing difficulties and lack of a working facility, once they could no longer use the place free of charge. Some expressed dissatisfaction for the agreement under which no one could receive remuneration for their work until enough funds had been saved. Therefore, they deemed it difficult to continue to work as a group. The C/P and his coworkers tried to find a solution to let them make progress as a group together with the members, however, by the end of several meetings, the conclusion was reached to suspend the group project. Since then the leader has implemented the processing and selling whenever a low prices can be obtained for fish.

13.5.3 Project Evaluation

The objective of this Pilot Project is to “achieve independence and development of the target groups of women,” and in order to fulfill that objective, the Mission and CENDEPESCA have supported the realization of the activities defined by the women’s group itself. The objectives expected with the Project activities are the following:

- That the group of women of Isla de Méndez achieve successful experiences as a result of their own initiative.
- That several women’s groups willing to carry out the activities be selected.
- That the group of women of San Antonio Los Blancos achieve successful experiences as a result of their own initiative.
- That the group of women of Los Cóbanos achieve successful experiences as a result of their own initiative.

The level of achievements is summarized as below. The detailed explanation is presented as an annex in the evaluation summary.

- 1) That the group of women of Isla de Méndez achieve successful experiences as a result of their own initiative.

In comparison with the situation before the Project, the profit of the restaurant increased and fixed salaries were paid to several members; there was even a salary raise. However, regarding motivation, not much has been achieved in comparison with the start of the Project. Although some members may have motivated themselves, this is still not shown in the cooperative activities. Because of the existing differences among the active and non-active members of the group, motivation is considered not well increased until the end of the Project.

In this sense, the level of motivation has been evaluated as “regular.”

- 2) That several women’s groups willing to carry out the activities be selected.

As mentioned above, workshops were carried out with 4 candidate target groups that were selected through information from various sources. Workshops were conducted using the participative methodology and it was possible to confirm this through the willingness shown by the groups when executing the activities. The JICA team and the C/P have selected 2 groups according to the results of the workshop and based on the criteria determined before hand. Therefore, the expected objective was achieved.

- 3) That the group of women of San Antonio Los Blancos experiences success owing to their own initiative.

Thanks to the fund raising activities, profit is already being generated and shared among the members that share a working shift. Renting the shack, tables and chairs to tourists is also a source of profit. The restaurant, considered the main activity of the committee, is also generating income but is still operating in an irregular manner. If the operation of the flea market (scheduled for late March and Easter) attracts tourists, it will be the right time to operate the restaurant on a daily basis, which allows the assumption that the expected objective will be achieved.

On the other hand, all points of view are evaluated thoroughly, for example: Is the level of participation high during meetings and activities? Are they active in learning new knowledge and techniques? Are they trying to maximize the use of their resources? Do they work trying new ideas on their own? Do they become discouraged if they fail to achieve the expected results?

- 4) That the group of women of Los Cóbanos achieve successful experiences as a result of their own initiative.

As has been mentioned in 2), at first, the women's group of Los Cóbanos seemed to work favorably. The members participated actively during the training sessions on processing and they sold processed fish products several times. However, an internal problem developed in the group while the work was in progress, as explained before, and activities were suspended. Therefore, the expected result for the activities developed for the group has not been achieved.

Given the evaluation summary of all the results mentioned above, the objective of the Pilot Project is considered to have been achieved.

13.5.4 Lessons and Recommendations

(1) Importance of the Awareness as "Ownership"

It has been confirmed once more, through the implementation of the Pilot Project, that it is indispensable to awaken the awareness of women as "owners" of the Project in order to identify the activities that will allow the improvement of the family economy. There are very few employment opportunities for women. If they lacked the will to look for and implement constructive solutions whenever they face difficulties in carrying out their activities, they would fail to pursue their efforts and therefore success. Many fishing community members have gotten used to receiving assistance and have a tendency to think that "support comes from outside", creating a culture of dependency. Correcting this way of thinking and awakening their initiative will lead them to an improved reality and further empowerment.

The Project implemented in Isla de Méndez has been successful in economic terms but has been rated as having little success in terms of motivation given the mindset differences among the members. Some felt strongly about "overcoming their reality through their own efforts, without expecting external help" and others continued to exhibit a strong dependency of assistance by a third party.

For the recipients to be aware that they are the owners of the Project it is very important to find the ideal form of external assistance and the relationship between the recipients and the support institutions. An investment project should be designed taking into consideration the capacity of the beneficiary group (entrepreneurial mentality, magnitude, solidarity, financial capacity of the organization, level of maturity, implementation time and content and size of the Project).

(2) Importance of Leadership

In order to give continuity to a project and follow it through to success, leadership constitutes an important component to adequately organize a group. Having a clear

vision of the future constitutes an indispensable requirement but not enough to be a leader. A leader must be capable to listen to the other members to achieve consensus. Of the three groups selected for this project, Los Blancos has had the highest motivation due not only to the quality of its members but also the presence of a patient leader whose efforts have coordinated the opinions of all members. Identifying an adequate leader is also a key element in the success of a project.

(3) Women to women

It is extremely important that women of fishing communities transmit their experience and knowledge directly for improving the level of life of other groups of women. There already are solutions to problems that women can share when living in similar conditions in the fishing communities and the experiences of some women can serve as a model and stimulus for others. In the Pilot Project, women have attended training courses on the processing of fisheries products, and their experience has not only lead them to learn new techniques but also to generate new visions and ideas for the effective use of the available resources and of their own capacity. The same can be applied to the exchanges in the expansion campaigns, the concept of “women to women” constitutes an effective empowerment method through interaction

(4) Need for Interinstitutional Cooperation and the Use of Local Human Resources

The “development of the fishing society” is a task that can be achieved only by CENDPESCA but this is not considered as the mission of the institution. Not only this but other pilot projects have exposed the limitation of financial and human resources of CENDEPESCA, which means that for the implementation of similar future projects, it will be indispensable to coordinate actions with other institutions and organizations including NGO’s. As with the flea market organized in Los Blancos with the cooperation and advice of the board of directors of the flea market of Parque Centenario de San Salvador, the active utilization of the local human resources is an effective way to achieve the sustainability of a project.

Period for the Project: from Sept. 2001 to March 2002
Date of elaboration: March 2002

Project to Increase the Income of Women in the Fishing Communities

Project Area and Target Group: Groups of women in Isla de Méndez, San Antonio Los Blancos, and Los Cóbanos

Project Summary	Indicators	Source of Verification	Assumptions
<p><u>Higher Objective:</u></p> <p>Disseminate the activities carried out by the initiative of target groups of women to other fishing communities.</p>	<p>Until 2003, the movement is observed inviting the target groups of 3 or 4 coastline communities to participate in the activities.</p>	<p>Activities Memories of CENDEPESCA</p>	
<p><u>Project Objective:</u></p> <p>Achieve independence and development of women's target groups.</p>	<p>Until the end of the Project (March, 2002), the level of the activities of the target groups increased more than level B (See annex).</p>	<p>Report of the Pilot Study (Evaluation Summary)</p>	<p>·OJT the position of the counterpart received does not change.·There are some institutions (Mayor's Office, NGO's, etc.) disseminating the experience of the target groups of the Project..</p>
<p><u>Results:</u></p> <p>1. The group of women in Isla de Méndez achieved successful experiences as a result of the actions of its own initiative.</p> <p>2. Several groups of women willingly to participate in the activities are selected.</p> <p>3. The group of women in San Antonio Los Blancos achieved successful experiences as a result of actions of its own initiative.</p> <p>4. The group of women in Los Cóbanos achieved successful experiences as a result of the actions of its own initiative.</p>	<p>1-1. At the end of the Project (March, 2002), profits are increased due to the restaurant sales, compared to before the Project, and the members get paid.</p> <p>1-2. At the end of the Project (March, 2002), the group with a level greater than B is motivated (See Annex)</p> <p>2-1. Candidate target groups of the Project are prioritized taking on account the established criterion.</p> <p>3-1. At the end of the Project (March, 2002), profits are obtained and members are paid.</p> <p>3-2. The same indicator 1-2.</p> <p>4-1. At the end of the Project (March, 2002), profits are obtained for the sale of processed fishing products and members are paid.</p> <p>4-2. The same indicator 1-2.</p>	<p>1-1. Income and outcome memories</p> <p>1-2. Evaluation by criterion with concrete instances and global evaluation per level.</p> <p>2-1. Criterion and results of the selection</p> <p>3-1. Income and outcome memories.</p> <p>3-2. The same source of verification as 1-2.</p> <p>4-1. Income and outcome memories</p> <p>4-2. The same source of verification as 1-2</p>	
<p><u>Activities:</u></p> <p>1-1. Execution of a workshop for the Project in Isla de Méndez.</p> <p>1-2. Strengthening the restaurant.</p> <p>1-3. Execution of training on processing..</p> <p>1-4. Ambulatory food sale is executed for tourists.</p> <p>1-5. Participation in the event of Barra de Santiago.</p> <p>2-1. Other target groups of the Project are considered.</p> <p>2-2. Other target groups for the Project are defined.</p> <p>3-1. Execution of the workshop for the Project in San Antonio Los Blancos.</p> <p>3-2. Execution of activities for fund collection.</p> <p>3-3. Execution of training on processing.</p> <p>3-4. Restaurant operation.</p> <p>3-5. Service for tourists.</p> <p>3-6. Participation in the event at Barra de Santiago.</p> <p>3-7. Participation in the event at San Antonio Los Blancos.</p> <p>3-8. Execution of observation field trip.</p> <p>3-9. Execution of the flea market.</p> <p>4-1. Execution of a workshop to formulate the Project in Los Cóbanos.</p> <p>4-2. Training on processing 4-3. Sales of processed fishing products.</p> <p>4-4. Participation in the event of Barra de Santiago.</p>	<p>Japanese mission < Personal ></p> <p>·Consultant responsible of the fishing Society: 1 (3.83 M/M)</p> <p>·Consultant responsible of Marketing / Processing: 1 (1.67 M/M)</p> <p>·Consultant Assistant: 1 (120 days)+ 1 (60 days)</p> <p>< Equipment and materials ></p> <p>Equipment for kitchen and dining room: 1 unit</p> <p>Equipment for ambulatory food stands: 1 unit</p> <p>Processing devices: 1 unit</p>	<p><u>Investment</u></p> <p>CENDEPESCA</p> <p>< Personal ></p> <p>·Technician of the Social Development Department: 1</p> <p>< Other ></p> <p>·Office (for the Mission)</p> <p>·Telephone (for the Mission)</p>	<p>·Men and their families collaborate with the Project.</p> <p>·Fish catch is not dramatically reduced.</p>
			<p><u>Preliminary condition:</u></p> <p>·The group of women does not oppose to the execution of the Project.</p> <p>·CENDEPESCA's counterpart is placed.</p>

1 . Indicator of the Overall goal

- A. The group of women can execute and develop the activities by their own initiative.
- B. The group of women can execute the activities by their own initiative, receiving partial support from the institutions (CENDEPESCA, or other institutions).
- C. The group of women can execute the activities, receiving partial support from the institutions (CENDEPESCA, or other institutions).
- D. The group of women can execute the activities, receiving total support form the institutions (CENDEPESCA, or other institutions).
- E. It is hard, for the group of women, to execute the activities, receiving total support from the institutions (CENDEPESCA, or other institutions).

2. Indicator of the Project Objective

- A. The group of women can execute and develop activities by their own initiative.
- B. The group of women can execute the activities by its own initiative, receiving partial support from CENDEPESCA (the study team).
- C. The group of women can execute the activities, receiving partial support from CENDEPESCA (the study team).
- D. The group of women can execute the activities, receiving total support from CENDEPESCA (the study team).
- E. It is hard, for the group of women, to execute the activities, receiving total support from CENDEPESCA (the study team).

3. Indicator of Outputs

The following 5 points are evaluated (from to) in concrete issues, and are then globally evaluated from level A to E.

Is the level of participation in meetings and activities high? (Very high: 3, High: 2, Not high: 1)

Are they active to learning new knowledge and techniques? (Very active: 3, Active: 2, Not active: 1)

Do they try to take the best advantage of the resources? (Maximum: 3, Moderate: 2, They do not try at all: 1)

Do they work trying new ideas by themselves? (Very active: 3, Active: 2, Not active:1)

They are not discouraged even though they do not achieve the expected result? (Not discouraged: 3, Discouraged:2, Completely discouraged:1)

- A. No number 1, more than 4 of number 3.
- B. No number 1, more than 2 of number 3.
- C. No number 1, more than 1 of number 3.
- D. Less than 2 of number 1.
- E. More than 3 of number 1.

Part III

Artisanal Fisheries Development Plan

Chapter 14 Concept of Artisanal Fisheries Development Plan in El Salvador

14.1 Introduction

In Part I “Current Situation”, it was reported in detail that Salvadoran fishers are facing an extremely difficult situation both in the industrial and artisanal shrimp fisheries sector. If the necessary measures are not taken, the crisis could get worse with an adverse impact on the national economy and social and political life of El Salvador. Within this context, many artisanal fishers feel weak in the face of an uncertain future. It is also true that there are some fishers, although very few, who are actively working in fisheries resources management and re-supply at community level. Some owners of the industrial fisheries sector have become aware of the seriousness of the situation and are expressing the need for the implementation of effective policies even if doing so implies some degree of sacrifice from the entire sector.

Taking this reality into account, the Study has confirmed that it will not be impossible to look for a solution to this crisis if effective measures such as the utilization of pelagic fish resources, installation of artificial reefs, development of new processed products, development of aquiculture technology, implementation of a fisheries management concept, strengthening of fishers’ and women’s organizations that carry out fisheries activities, dialogue between industrial and artisanal fishers, etc. are set out and executed. In Part II “Pilot Projects”, it was reported that through the pilot projects implemented within the framework of the present Study, it was possible to confirm that the current situation can be overcome.

For the execution of these strategies and policies, the strong initiative of the Government is essential to overcome the crisis and to strengthen CENDEPESCA’s operational structure. In this process it is important to prepare clear and realistic development strategies abandoning the ideal of pursuing everybody’s benefit and being aware of the limitations of the human and financial resources of the Institution. The general framework of the Master Plan is proposed in this Part with a view to achieving the consensus of the different parties involved including the public sector, fishers, donors, etc., and setting out development strategies and an execution methodology.

14.2 Basic guidelines

(1) A concrete but feasible development plan.

It would not make sense to propose development strategies in the Master Plan if idealism with little feasibility is pursued. The present Study proposes a Plan in accordance with the reality of El Salvador. It cannot be assumed that the solution to the present problems is easy and that the path that the artisanal and industrial fishers as well as CENDEPESCA should follow is going to be difficult. However, the present Plan sets out only the actions that are feasible if CENDEPESCA and the other actors seriously address the issue.

(2) Fisheries management: the basis for development.

So far, shrimp, demersal fish and shellfish have been exploited with a total absence of control in El Salvador resulting in the reduction of the fisheries resources. Fisheries management constitutes the basis for sustainable development not only for artisanal fisheries but also for industrial fisheries. The implementation of a development project that does not take fisheries management into account would have little impact. For the next coming years, efforts should be concentrated in three components: resources management, fishing zones management and catch control, and that all available resources should be efficiently used in order to establish a fisheries management system that will sustain the development of artisanal and industrial fishery.

(3) Setting up of a fisheries co-management system.

There are two types of fisheries management systems: top-down and bottom-up. Taking into account the present position of CENDEPESCA as well as its institutional capacity, the top-down resources management would be very difficult to implement. On the other hand, the results of the pilot projects have shown to some extent the possibility to implement a bottom-up fisheries management with the fishers' initiative. It is deemed necessary to strengthen the artisanal fishers' awareness, with daily experience the depletion of the fisheries resources, and to promote fisheries management at their initiative. This study proposes the execution of a fisheries management system that will involve fishers' actions within their capabilities while the public sector complements their efforts through legislative strengthening, monitoring and control system, etc. This management system with the participation of the private and public sector is called "co-management".

(4) Fishers' organizations are vital for fisheries co-management.

In order to consolidate co-management, it is critical to widely promote the formation of fishers' organizations that will make up the promoting body of artisanal fishers'

participation. It is necessary to set up new organizations, whose main objective will be to participate in co-management and which will replace conventional fisheries cooperatives that are weak at the moment.

(5) Strengthening of CENDEPESCA is vital to co-management.

CENDEPESCA is the counterpart of the fishers in co-management. The rationalization and the strengthening of the institutional capacity constitute an important task. CENDEPESCA's reorganization process started in December 2000. The present Study intends to set out the strengthening of the institutional capacity with a view to play an important role in co-management as the goal for the next coming years. Putting the new statistics system that was developed in the pilot project into practice also constitutes an important issue in this process.

(6) Lateral support to strengthen fisheries co-management.

It is likely that upon the regulation of the fishing activities, which so far have not been properly controlled, fishers belonging to the poor sector would concern about obtaining their daily staple becomes seriously affected in the short term. In order to mitigate this situation, there are plans to carry out lateral support projects for the artisanal fishers in parallel with co-management, including the use of resources which are presently underemployed or not used at all (including fishing techniques improvement, product processing and marketing), improvement of the economic level of women, shellfish farming, construction of new infrastructure, etc.

(7) Preparation of specific development projects.

There are plans to prepare development projects for each sub-sector based on the present Plan. Among these projects, the one that deals directly with the setting up of a co-management system is the Fisheries Management Improvement Project. Nevertheless, based on the preceding basic guidelines, it is clear that the Fishers' Organizations Development Project, CENDEPESCA's Restructuring Project and the Fishing Statistics Improvement Project are also closely related to co-management. The other specific projects can be considered as lateral support projects.

(8) Industrial fisheries regulation.

It is needless to say that artisanal as well as industrial fishing should be properly regulated in order to promote the development of artisanal fisheries. However, in this process it is necessary to take into account that as of today the interests of both parties have been conflicting. Therefore, it is considered that the co-management at the artisanal level to promote artisanal fishers strengthening through organization as well as the dialogue with industrial fishers in order to involve the latter in fisheries co-management has been accomplished.

(9) Three phases of the Plan.

There are three phases for the implementation of the present Plan. Phase I (2000-2003) will involve the preparation stage; Phase II (2004-2010) will involve the setting up of a fisheries co-management system and will be the most important phase of the three; and Phase III (as from 2011) will involve the materialization of the artisanal fisheries potential in different sectors with the support of the new co-management system.

(10) Co-management, model for Central America.

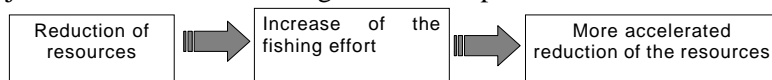
The success of a fisheries co-management system in El Salvador could become a fisheries management model for the Central American region in the future and its impact would be significant. The present Plan should include the search for the most appropriate way of institutionalization and cooperation that will allow the development of this potential (See Box 14-1)

(11) International cooperation for the Plan.

While the present Plan has been designed based on the human and financial resources of CENDEPESCA, its implementation demands that all the parties involved make great efforts. However, its implementation would be expedited with the support of international cooperation. Therefore, some projects will be proposed based on the possibility of using the scheme of the Japanese technical cooperation (since Japan has a vast experience in the field of coastal resources management) as well as funds from international organizations.

14.3 Concept Fisheries management

The objective of fisheries management is to put an end to the following vicious circle,



to improve and stabilize management through an operation that will allow keeping resources in adequate conditions. The following figure shows an outline of the concept of fisheries management proposed in the present Development Plan focusing on the application of fisheries co-management models.

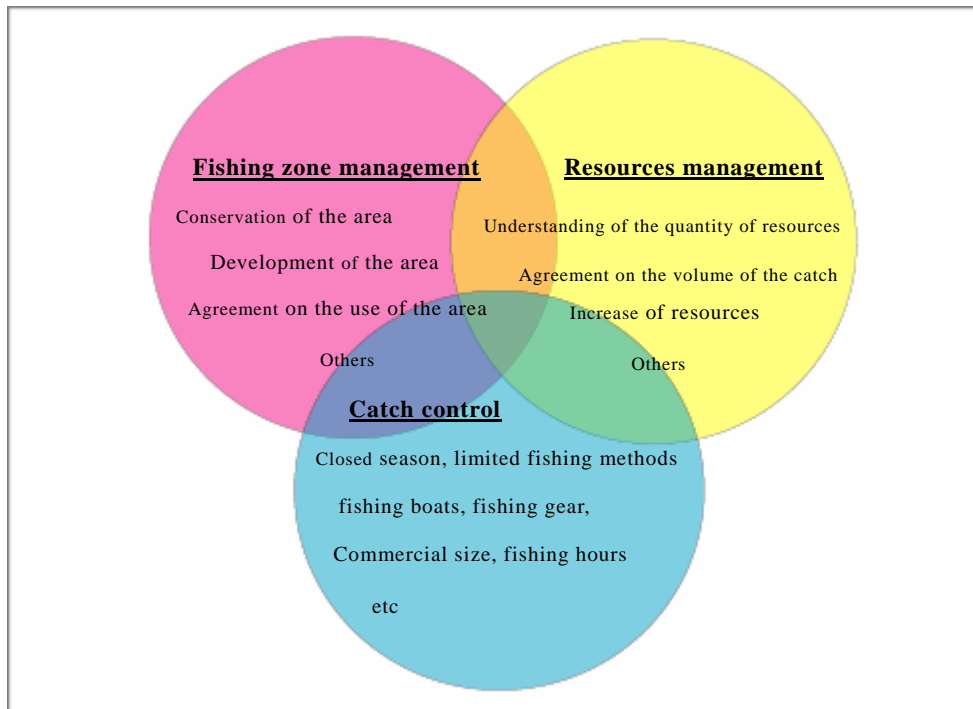


Figure 14-1 Concept of fisheries management

The fisheries management activities are divided into three big groups: resources management, fishing zone management and catch control. The three circles of Figure 14-1 represent these three components and some specific examples of activities have been shown inside each circle. The three components (resources management, fishing zone management and catch control) can be considered independent from one another. However, the adequate balance among them would generate a synergic effect resulting in a more effective management scheme. This is the basic concept of fisheries management and the present Plan gives great importance to the harmonization of the three components with the joint efforts of the public and the private sector (fishers).

The schematic diagram shown in Figure 14-2 shows the general flow of fisheries management development throughout time.

The three cones of Figure 14-2 represent the evolution of fishing zones management (red), catch control (blue), and resources management (yellow). The time is represented by vertical axis is represented from bottom to top (from to), and the area of the circle represents the number of activities. The circles to the right indicate the number of activities of the three components at the level of the time axis. At the level of there are few activities in the three components and there is no link among them. At the level of

the three components begin to relate in accordance with their degree of development. At the level of , more related aspects of the three components start to show. Finally, at the level of , there is a higher degree of development of the components more closely interlinked. Once again, the goal of the present Plan is to achieve this development by way of a joint work between the public sector and the fishers applying the fisheries co-management.

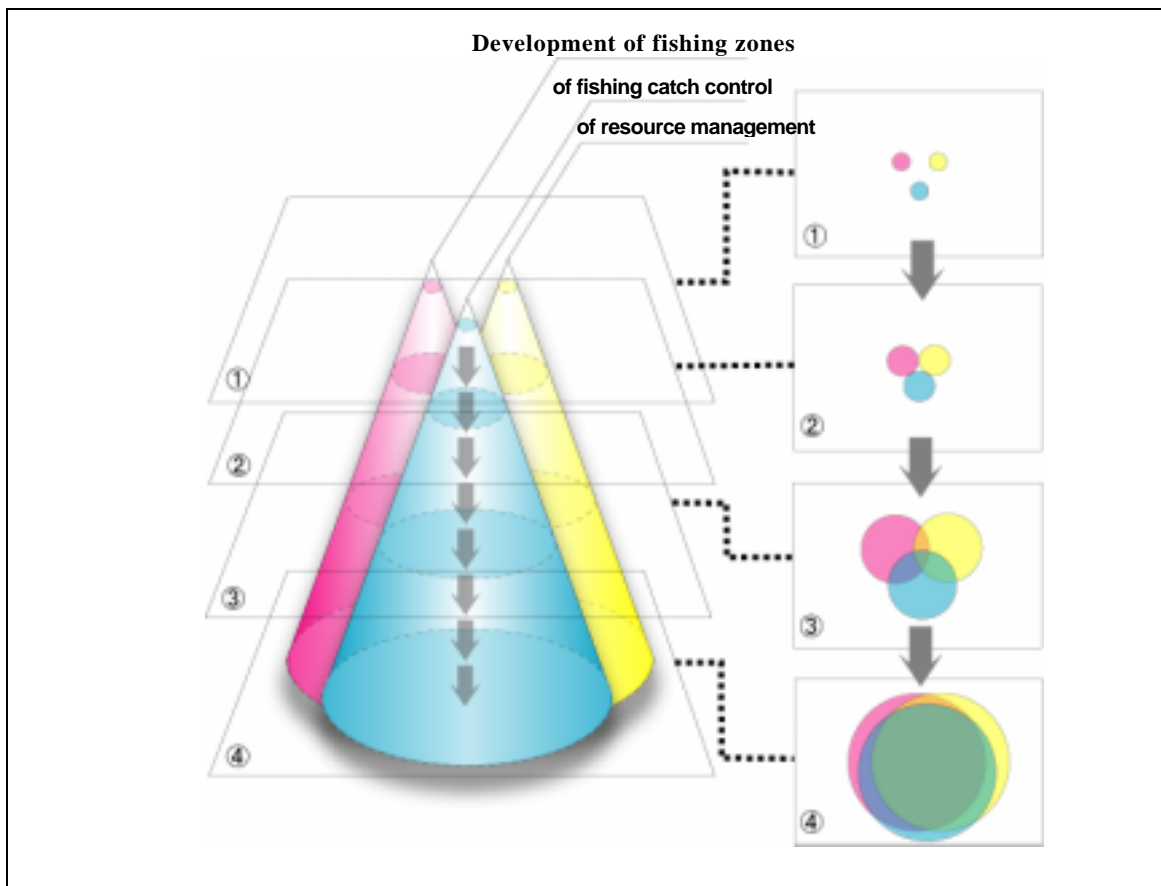


Figure 14-2 Schematic diagram of the fisheries management progress

The conceptual mechanism of the development of fisheries management has been set out up to this point. However, it is very difficult to apply it to the reality of the Salvadoran artisanal fishers since artisanal fisheries involves various fish species that present marked differences. Consequently, the present Plan analyzes artisanal fisheries dividing it into four large groups: demersal fish catch, pelagic fish catch, shrimp catch and shellfish catch.

Position of El Salvador in the Central American fisheries development

When planning the development of artisanal fisheries in El Salvador, it is necessary to take into account the possibility of sharing experience with the other countries of the Central American region in environmental issue, resources conservation, fisheries regulations and other issues that should be addressed at regional level. Following is an overview of the issue.

Technology

Costa Rica has most developed fishing technology for the catch of large-size pelagic fish, which have been underutilized before. Additionally, (even though the consumption is not high) they have succeeded in creating a demand in the domestic market for the portion of the catch while fishing large-size pelagic fish, which cannot be exported to the U.S.

Furthermore, the National Learning Institute (NLI) has a fisheries unit that gives courses on fishing gear and methods, fish processing, etc. As a result, Costa Rica is deemed the technological center of Central America.

Environmental and fisheries resources conservation

Concerning the environmental conservation of the Central American region, the Gulf of Fonseca where the borders of Nicaragua, Honduras and El Salvador meet constitutes an important scenario for the protection not only of mangroves but also of the shrimp post-larvae and a large variety of demersal fish that live there. A conservation project is presently under implementation by these three countries with the support of USAID. However, a co-management system is still far from being implemented due to disputes among the countries involved.

Costa Rica is promoting the conservation of the Gulf of Nicoya in the Pacific coast with the participation of the State, universities, local governments and the environmental organization made up by fishers. However, the activity has been more an initiative of the Government than an initiative of the fishers operating in the Gulf. In this sense, it can be said that El Salvador is starting efforts to set up the co-management scheme with the active participation of fishers.

With regard to the study on shrimp, a resource that will require a joint management in the next coming years, it is extremely important to conduct the work at regional level with the help of Costa Rican and Nicaraguan researchers who have vast experience in the subject, for a specific period of time, and applying the same research methodology to the region.

Fisheries regulation

It has been reported that small size lobsters are forbidden in Nicaragua but not in El Salvador and that the Nicaraguan fishers sell them to the Salvadoran traders. It has also been reported that Costa Rican or Nicaraguan fishing boats illegally catch large-size pelagic fish in Salvadoran waters. In view of this situation, it is extremely necessary to set forth fishing and marketing rules and regulations applicable to the entire Central American region.

Therefore, the following can be concluded: Technologically speaking, it is convenient that El Salvador receives technology transfer from Costa Rica. In terms of resources co-management, El Salvador could become in the future the most advanced country in this issue. With regard to fishing rules and regulations, it is necessary to promote negotiations among the countries of the region and conduct the necessary research on the issue with the assistance of an international organization. Presently, the Organization of the Central-American Integration provides space to the countries of the region to discuss common issues. The future challenges after receiving cooperation from international organizations will be to promote concrete activities.

Chapter 15 Artisanal Fisheries Development Plan

15.1 General framework

This section describes the general framework of the Artisanal Fisheries Development Plan in El Salvador using Figure 15-1 that shows the conceptual scheme of the Plan.

As it was set out in the basic guidelines of chapter 14, the present Plan consists of three phases. The right-hand column represents the division of these three phases while the left-hand column represents the Development Plan itself. The lowest portion of the image began to take place in the year 2000 and phase II is expected to conclude in the year 2010. As of the year 2002, phase I is on its second stage.

The three cones in Figure 14-2 represent the development of fisheries management that are integrated to form the base of the column. In other words, this is the fisheries management system comprises three components (resources management, catch control and fishing zones management), and the progress of each component and the coordination among them constitutes the determining factor of the strength of the column.

In order to unify the column it is indispensable not only to improve the quality of the services provided by CENDEPESCA but also to have the intensive participation of artisanal fishers as the leading players of the Plan. The parts of the column that correspond to Phases I and II are represented in pink and blue. The pink section represents the activities that are strongly related to CENDEPESCA while the blue section represents artisanal fishers. It can be observed that the setting up of the co-management system requires the cooperation between these two big role players. The four thin columns in brown of Phase II represent the lateral support projects that will strongly sustain the central axis of co-management. Furthermore, the eight thin brown columns located in the upper part of the model, which correspond to Phase III, represent some examples of the sub-sectorial development projects that lie on the basis of co-management development. In other words, the basic concept of this Plan consists of coping with the sustainable development of artisanal fisheries through the various development projects that are based on a solid foundation called “co-management”.

Since it is the most important for the implementation of co-management, Phase II was divided into three stages: initial, intermediate and final. Regarding this conceptualization, the following table summarizes the specific profile of the development plan following a temporary sequence: starting with Phase I, Phase II –initial stage, intermediate stage, final stage and Phase III.

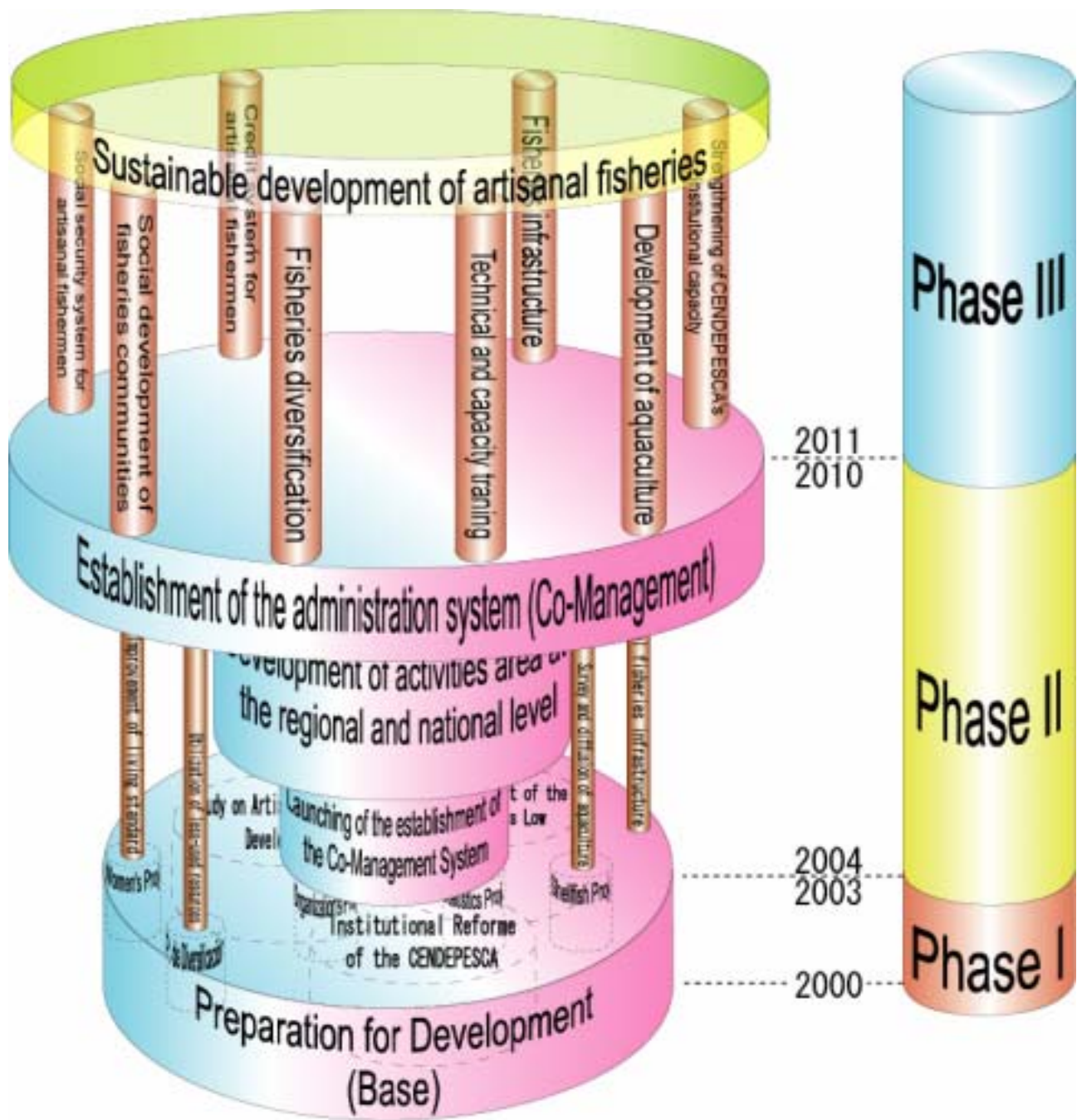


Figure 15-1 Image of the General Development Plan

As it can be observed in the Table 15-1, the outline of the fisheries management plan that constitutes the core of the development plan was prepared, broken down into the following four components, as follows: Demersal fish, Pelagic fish, Shrimp and Shellfish. On the other hand, the present Plan not only consists of fisheries management but there are three additional components that are of significance to put in place the fisheries management. They are: organization (CENDEPESCA and fishers' organizations) and lateral support projects. Therefore, the basic concept of the plan based on these seven components is presented below:

Table 15-1 Fisheries management development outline

	Demersal fish	Pelagic fish	Shrimp	Shellfish
Phase I	Continue the pilot project (installation of artificial reefs)	Continue the pilot project (improvement of fishing gear and methods)	Initial implementation of protected areas and closed seasons (main executor: public sector)	Research through Technical Cooperation such as the JICA Project
Phase II – initial stage	Continue the pilot project (monitoring of artificial reef impact)	Revise development potential or resources and research on shark resources	Expansion of protected areas and closed seasons	Protected areas + farming model (Main Executor: public sector)
Phase II – intermediate stage	Expansion of artificial reefs throughout the country	Drafting of fisheries management plan	Shrimp fisheries optimization study	Expansion of protected areas + farming model (Main executor: fishers)
Phase II – final stage	Self-management of fishing zones (surrounding artificial reefs)	Execution of fisheries management plan	Dialogue between artisanal and industrial fishers	Self-management of fishing zones
Phase III	Development towards the new fisheries management system			

15.2 Phase I

Figure 15-2 represents Phase I that constitutes the foundation of the present Plan. This foundation is made up by the new Fisheries Law enacted in December 2001 that sets forth the legal framework; the reorganization process of CENDEPESCA planned in 2000 and started in 2001; the execution of the present

Development Study and pilot projects; JICA research and development of shellfish; and, other technical cooperation projects. These activities and projects should not be isolated but should be deemed components of the foundation of the present Plan.¹

Figure 15 3 on the right represents the situation prior to and after Phase I, that is, with and without fisheries management. Resources management prior to Phase I was almost inexistent. Catch control represented by the restriction on fishing gear by the former Fisheries Law only existed by name and it was hardly enforced except for TED surveillance. With regard to fishing zones, in some instances artisanal fishers built small reefs at their own cost notwithstanding the scope of the project was reduced. Following is an explanation of Phase I divided into seven components.

(1) Demersal fish

CENDEPESCA will continue with the implementation of the artificial reef installation project that is presently in progress with resources from the Grass roots Grant Aid of Japan. In this way, the resources management basis will be established using the artificial reefs.



Figure 15-2 Image of Phase I

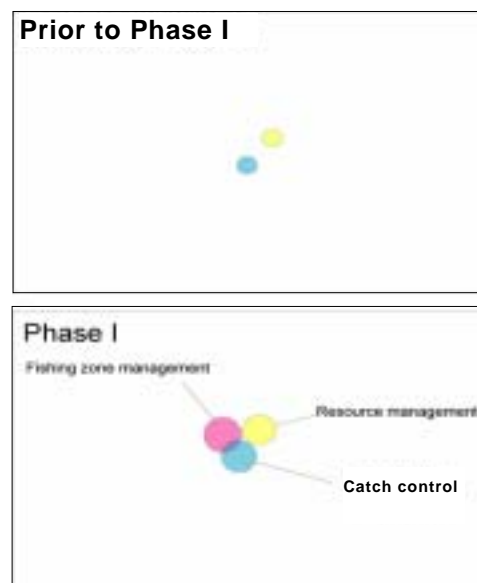


Figure 15-3 Image of the fisheries administration prior to and in Phase I

¹ Usually, the year on which the plan was prepared or the following year in a Development Plan is considered Year 1. In the specific case of the present Development Plan, the year 2000 has been defined as Year 1 of Phase I. At first, this may be strange. However, it has been considered that the preparation of the Development Plan (including pilot projects) is an integral part of the foundation of such Plan.

(2) Pelagic fish

With regard to pelagic fish, CENDEPESCA will continue with the implementation of the pilot project that involves small size pelagic fish and at the same time will start the experimental harvest of tuna and “Amber jack” (*caranx caninus*) with the use of FADs.

(3) Shrimp

In Phase I of shrimp fisheries, the public sector will have to take the initiative to carry out the following activities. Among these activities, the enforcement of the shrimp closed season of is of special significance.

Continue in 2003 with the implementation of the one-month shrimp closed season started in April 2002;

put in place the protected areas system established in the new Fisheries Law; and, control the use of the double net prohibited by the new Fisheries Law.

(4) Shellfish

There are plans to prepare in the near future the technical basis for shellfish harvesting and reproduction based on the experience of JICA’s shellfish farming project. At the same time, based on plans to distribute the larvae produced by this project, it will be necessary to set forth the legal framework for the use of adequate locations to set up the farms as well as the administrative regulations.

(5) CENDEPESCA

CENDEPESCA restructuring process started in 2001 and will be concluded at the same time at Phase I is completed. This process should not be a simple decentralization of personnel but also of the transfer of authority through the strengthening of the existing zone offices. In terms of human resources strengthening, it will be necessary to recruit new personnel and implement a new performance evaluation system. Particularly, the improvement of the capacity of the Social Development and Fisheries Management units is essential to the execution of the present Plan.

(6) Fishers’ organizations

Figure 15-4 represents the evolution of fishers’ organizations. Fishers’ groups were not fully organized in Phase I and therefore, CENDEPESCA, through the artificial reef installation project, will provide support to fishers’ groups who are currently getting organized. Concomitantly, CENDEPESCA will make surveys among fishers in order to find out

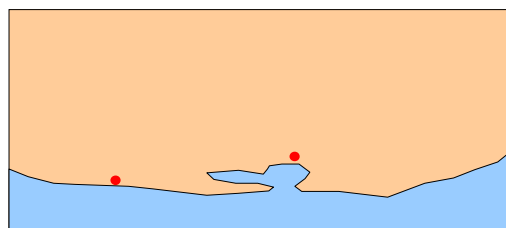


Figure 15-4 Image of the formation of fishers’ organizations in Phase I

about the formation of fishers' organizations.² The results will be used to identify highly motivated fishers or the communities that have groups already organized. The priority of the support project will be defined based on the degree of motivation and the level of awareness among fishers.

(7) Lateral support

Phase I intends to carry out the following activities which economic benefits will motivate fishers' participation in fisheries management.

Continue with the pilot project that comprises the development and experimental sale of new products (fresh and processed) in order to give a better use to products that are not under-utilized;

Continue with the pilot project to improve the economic condition of the population, particularly women in the fishing communities; and,

Continue with the project aimed at rehabilitating the fisheries infrastructures that were affected by the earthquakes, repairing wharfs, etc.

15.3 Phase II – Initial stage

Figure 15-5 represents the initial stage of Phase II. Some co-management elementary activities based on the foundation built in Phase I will be started in this phase. Elementary co-management activities means that the three components of fisheries management will be intensified (resources management, fishing zones management and catch control) and will start correlating with one another as shown in Figure 15-6.

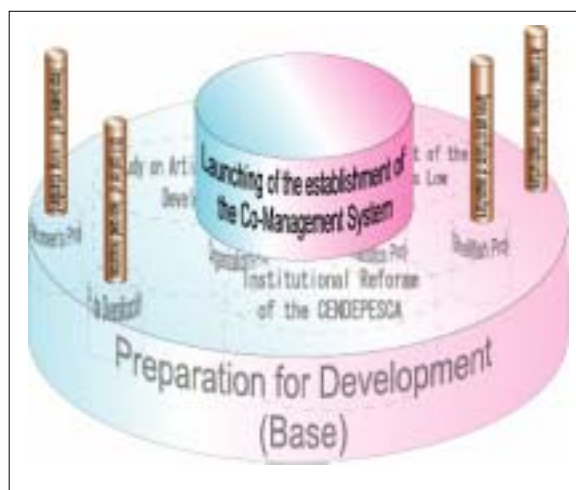


Figure 15-5 Image of the initial stage of Phase II

(1) Demersal fish

Based on the surveys made in Phase I, CENDEPESCA will draft a reef installation plan at national level during the initial stage of Phase II. The project will start in the communities, which have concluded the preparation, and at the same time, an extensive

² The surveys will consist in the investigation of the degree of interest fishermen have on coastal resources management. The staff of the zone offices will visit several communities in their respective area of jurisdiction in order to know the concept they have on the current situation of the resources, activities they carry out (or that have carried out), future challenges, execution methodology, etc. As an integral part of the pilot project, (support to the formation of fishers' organizations), surveys were conducted in two communities, Barra de Santiago and Los Blancos, to know about the interest they had on resources management. The Annex includes the form used in that opportunity that could be used as an example for future surveys.

monitoring of its impact will be executed. Additionally, the study on catch control in artificial reefs and surrounding areas will be started since it will be necessary to enforce harvesting regulations in the areas where these structures were installed in the final stage of Phase II.

(2) Pelagic fish

Based on the experience with experimental operation during the pilot project, the development potential of pelagic fish resources in the coast of El Salvador will be revised taking into account the results of the sale of processed fish products, artisanal fishers' opinions, etc. Furthermore, the research of shark resources will be conducted in order to verify the pertinence of fisheries administration, including the establishment of a closed season.

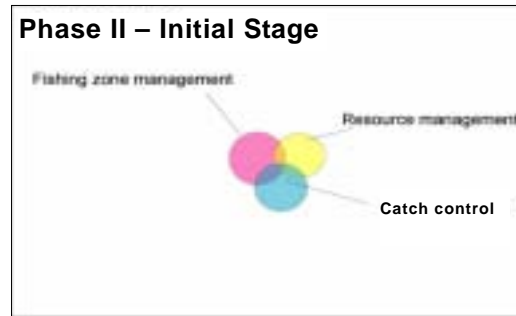


Fig. 15-6 Image of fisheries management at the initial stage of Phase II

(3) Shrimp

During the initial stage of Phase II, the following activities will be conducted as part of a team work between CENDEPESCA and the fishers. The main objective will be to extend the closed season and protected areas.

- Examine the pertinence to extend the shrimp closed season started in 2002;
- Make effective the protected areas established in the new Fisheries Law, and at the same time, approve new provisional protected areas at the request of artisanal fishers. Fishers' organizations that have submitted an application must agree to provide information on their harvesting activities as a condition for approval. This information will be used as the basis to verify the effectiveness of the resources conservation measures, and once their impact has been verified, the possibility to designate the corresponding area as a definite aquatic reserved area will be analyzed; and
- Prepare the study on environmental conservation of estuaries in coordination with the relevant institutions, and conduct a basic study on the arrival of shrimp post-larvae to the estuaries, etc.

(4) Shellfish

The following activities will be carried out in the initial stage of Phase II in order to establish the shellfish harvesting management system.

- Define small aquatic reserved areas within the estuary at the initiative of the public sector;

Implement the pilot project to set up model farms for artisanal fishers with the technical cooperation of JICA;

Conduct a study on larvae distribution as an integral part of the environmental conservation of estuaries; and,

Define oyster-protected areas at the initiative of fishers with the support of the public sector.

(5) CENDEPESCA

The initial stage of Phase II corresponds to the stage during which CENDEPESCA will start an active approach towards artisanal fishers based on the results of the surveys. Particularly, zone offices and the Social Development Unit should provide mutual assistance to establish a scheme to provide support aiming CENDEPESCA efforts at the highly motivated communities by fisheries management.

(6) Fishers' organizations

The initial stage of Phase II intends to form the fishers' groups in the various communities as shown in Figure 15-7. The fishers' groups to be formed in this stage will constitute the point of departure of the different activities proposed in the Plan. CENDEPESCA should be aware of their significance and should dedicate sufficient time to this stage. Specifically, the staff of

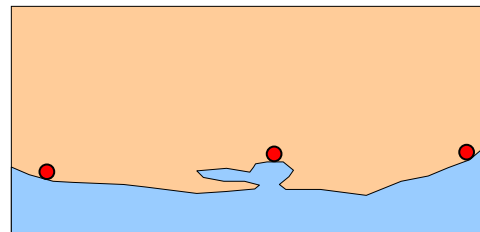


Figure 15-7 Image of the formation of fishers' organizations at the Initial Stage of Phase II

the zones offices will organize workshops in highly motivated communities considered as high priority to induce fishers to form a group with the purpose of executing fisheries management activities. One of the various activities that they could start could be the installation of an artificial reef. By carrying out this task at community level (with the participation of the community in general), this activity will also have the effect of creating fishers' sense of joint responsibility. Since the organization process requires a lot of time, it would be convenient to create a flexible group of fishers sharing the same objective instead of intending to form an organization as such.

(7) Lateral support

Even though fishers fully understand the significance of fisheries management, they must wait some time to enjoy the benefits that it will bring. The initial stage of Phase II intends to bring several types of lateral support to fishers' groups in order that they do not lose interest in their participation in fisheries management that somehow implies some sacrifice on their part. Lateral support will comprise the following activities:

Expand and apply new fishing techniques including small seines, FADs, etc;
 Provide support to fish products processing and sale; and,
 Continue with the project to improve the economic situation aimed at the women of the fishing communities.

15.4 Phase II – Intermediate stage

Figure 15-8 represents the intermediate stage of Phase II. This stage will broaden the coverage of fisheries management started in the preceding stage at national and regional level. The public sector's initiative will be gradually replaced by the initiatives of fishers' organization.

The public sector will be increasingly involved in the lateral support and in achieving a more advance management that will comprise the decrease of shrimp fishing boats, comprehensive study of the shrimp fisheries management in general, etc. In general, it will increase the volume of the activities of each component of fisheries management as can be observed in Figure 15-9.

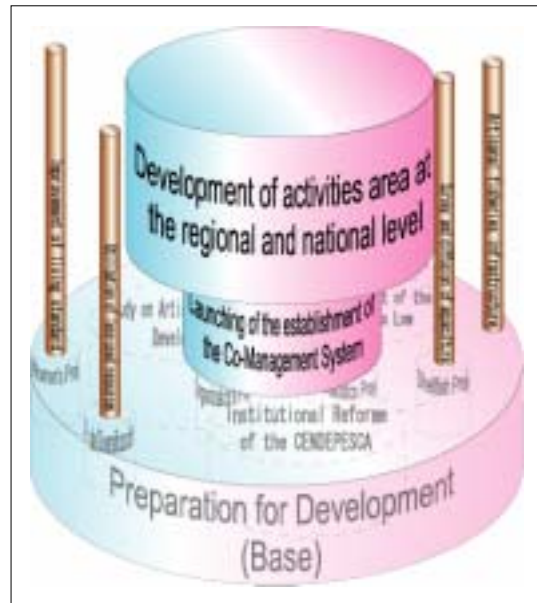


Figure 15-8 Image of the intermediate stage of Phase II

(1) Demersal fish

The results on monitoring of the impact of artificial reefs built during the intermediate stage of Phase II will be analyzed and after verifying their biological and social impact, the plan to expand the coverage of the artificial reef construction project throughout the country will be prepared and executed.

(2) Pelagic fish

A plan for the comprehensive management of pelagic fish harvest including the impact of artificial reefs or off shore FADs will be formulated.

Phase II – Intermediate Stage



Figure 15-9 Image of the fisheries administration at the intermediate stage of Phase II

(3) Shrimp

The diagnostic of the current situation of shrimp fisheries (industrial and non industrial) and shrimp reserve is essential to the proper management of this activity. The study to optimize shrimp fisheries will be started in the intermediate stage of Phase II with external support or other financial sources.

(4) Shellfish

The small aquatic reserve area will be expanded for the protection of resources within the estuary during the initial stage of Phase II at the public sector's initiative. Furthermore, efforts will be made to disseminate the model farms managed by artisanal fishers.

(5) CENDEPESCA

The management of demersal fish and shellfish harvesting and catch will be passed on from the public sector to the fishers as the main executors during the intermediate stage of Phase II; on the other hand, projects that imply a new challenge for CENDEPESCA, such as “the study for the optimization of shrimp fisheries”. It is required that CENDEPESCA improve its institutional capability even more through various efforts including external support. It is important that CENDEPESCA become the catalyst in the process of formation of fishers' organizations, for example, through the construction of artificial reefs.

(6) Fishers' organizations

Figure 15-10 represents the evolution of fishers' organizations. The intermediate stage of Phase II intends to broaden the area of action of fishers' groups at canton level³ joining efforts between fishers' groups and CENDEPESCA. Furthermore, groups should increase their size. The preparations for the consolidation of a national organization (federation) of artisanal fishers will be started in this stage.

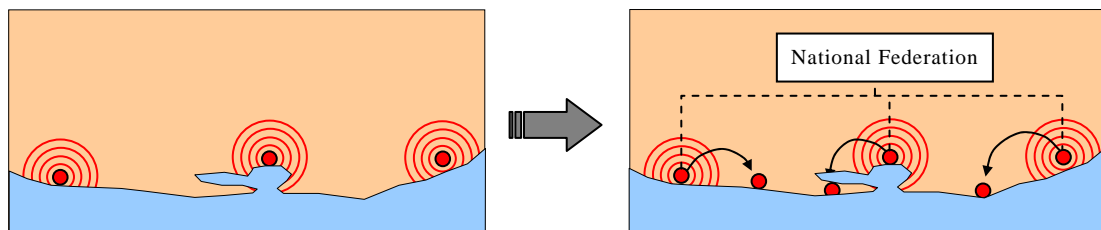


Figure 15-10 Image of the formation of fishermen's organizations in the Intermediate stage of Phase II

³ In El Salvador, several communities make up a “canton. It is not an administrative unit but traditionally it is an instance higher than a community.

(7) Lateral support

In addition to the lateral support projects implemented so far, the following new activities will be started. They are of great significance in the sense that the efforts made will have an impact not only on fishers' groups but also on neighboring communities.

- Install offshore FADs at more depth as a new fishing option for demersal fish;
- Build small fisheries infrastructures of community interest including fish product collection centers;
- Start the operation of small processing plants in artisanal fishing communities in order to take care of the increase in demand; and,
- Prepare credits for the productive activities of fishers' organizations.

15.5 Phase II –Final Stage

As shown in Figure 15-11, there are plans to conclude the setting up of a co-management system in the final stage of Phase II. Catch control including the management of protected areas or closed seasons, would have been implemented with the collaboration between fishers and CENDEPESCA. The fisheries management coverage regarding the construction of artificial reefs will also be increased at the municipal and national level thus putting in place a strong co-management system. Not only the activities of each component of fisheries management will be intensified but they will increasingly interrelate as shown in Figure 15-12. Additionally, the national artisanal fishers organization (federation) that was already started in the intermediate stage of Phase II will be strengthened (See figure 15-13) thus enabling a three party fisheries management, that is including small and industrial fishers and CENDEPESCA.



Figure 15-11 Image of the Final Stage of Phase II

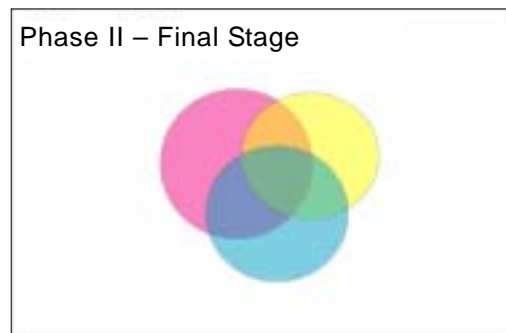


Figure 15-12 Image of the fisheries administration in the last stage of Phase II

(1) Demersal fish

Due to the need to regulate harvesting activities in artificial reefs and surrounding areas, efforts will be made to implement the real management of the fishing zones through self-management by the fishers involved. It is expected that as the creation of new fishing zones through self-management increases, it will be possible to implement catch controls also through self-management.

(2) Pelagic fish

A comprehensive pelagic fish resources management plan prepared in the intermediate stage with the approval of fishers will be put in place.

(3) Shrimp

While it is true that shrimp resources management is the most complex and the hardest of all tasks, a dialog between artisanal and industrial fishers will be conducted based on the scientific results from the “study on shrimp fisheries optimization” conducted during the intermediate stage of Phase II. Both parties analyze the main issues of a comprehensive fisheries management that will comprise the waters to be protected, closed seasons, number of ships, fishing quota, fishing gear, etc.

(4) Shellfish

Based on the experience with model farms managed by fishers as well as on the definition of protected areas, comprehensive self-management efforts of shellfish harvest areas in estuaries and coastal reefs will be made.

(5) CENDEPESCA

It is expected that in this stage, CENDEPESCA had become a very efficient institution in terms of supply of services through the implementation of the co-management process. Efforts will be made to turn it into a model organization within MAG.

(6) Fishers’ organizations

The final stage of Phase II will reinforce even more the regional organization of artisanal fishers, strengthening the lateral link among fishers’ groups of the same zone. The National Artisanal Fishers Federation formed during the intermediate stage of Phase II will provide advice to fishers’ groups of the various zones in their efforts to form regional organizations. As shown in section (3), artisanal fishers through their national federation will be able to start negotiations with industrial fishers.

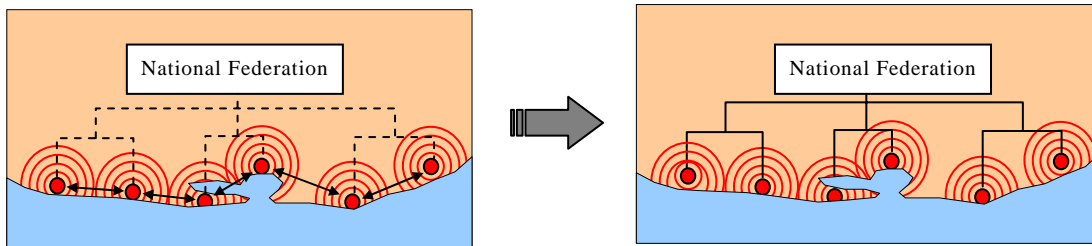


Figure 15-13 Image of the formation of fisher's organizations in Phase II, Final Stage

(7) Lateral support

Lateral support in the final stage of Phase II could include the following activities:

- Provide support to the purchase of boats with internal engine by some artisanal fishers;
- Build port infrastructure in accordance with the offshore fisheries development; and,
- Provide support to the development of small processing plants as well as other alternative industries in fishing communities.

15.6 Phase III

Phase III corresponds to the phase where the sustainable development of artisanal fisheries takes place in different fields based on the co-management system established through the national network of fishers' organizations and CENDEPESCA, as shown in Figure 15-14. Figure 15-15 represents the ideal fisheries management model in this Phase. Fisheries management at this stage is based on the close coordination among the three components: resources management, fishing zones management and catch control.

In this Phase it is expected that CENDEPESCA would have acquired

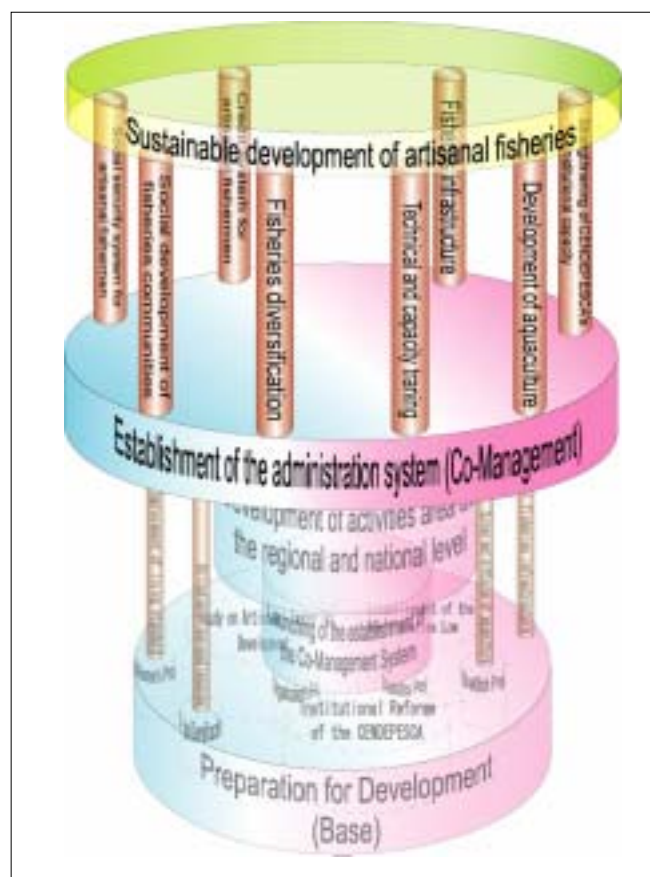


Figure 15-14 Image of Phase III

sufficient organizational capacity to execute different multilateral strategies required for the sustainable development of artisanal fishers, including the financing system, fishing society development, technical assistance of different types; aquaculture development, etc.

Furthermore, it is expected that the National fishers' federation will assume not only fisheries management, but that it becomes a true institutional basis for the multilateral development of artisanal fisheries. However, fishers' groups should continue with the great challenge of acquiring entrepreneurial capacity in addition to fishing and aquaculture techniques.

The eight columns shown in Figure 15-14 continue to be only examples of the specific projects for artisanal fisheries development. It is going to be necessary to plan specifically which projects will be implemented, where and what investments will be made with which program and what the magnitude will be. At this moment, it is still too early to establish a concrete image of what could be made at that time. It would be ideal that CENDEPESCA and fishers' organizations could accurately identify the needs based on the experience accumulated through co-management in order to disseminate the co-management philosophy in the different fields of artisanal fisheries.

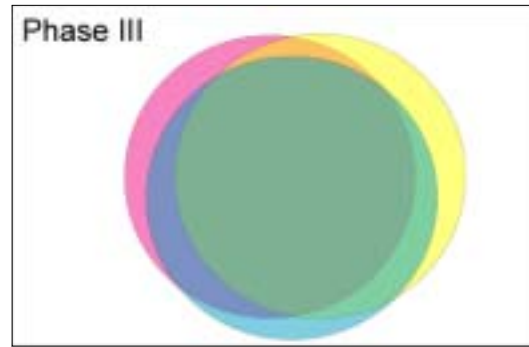


Figure 15-15 Image of the fisheries administration in Phase III

Chart 15-2 Matrix of the Development Master Plan

	Resource management (demersal fish)			Resource Management (pelagic fish)			Resources management (shrimp)				Resorce Management (molluscs)			fishers organizations		Sections in charge of the activieites CENDEPESCA
	Resources	Fishing grounds	Catch	Resources	Fishing grounds	Catch	Resources	Fishing grounds	Catch	Resources	Fishing Grounds	Catch				
Phase I	Study on the impact of medium size artificial reefs (Grass roots grant aid project of Japan: Main Executor is the public sector)	Installation of small artificial reefs and FADs (Main Executor: fishers) Conservation of fishing grounds through self-management by groups of fishers. Installation of medium size reefs (co-management)	Elaboration of the rules for the installation of artificial reefs (Main executor: public sector)	Catch estimate for the main pelagians according to statistics	Installation of small FADs	Elaboration of rules for the installation of FADs	Survey of shimp resources (Main Executor: public sector(Mr. Ulloa and, etc.) Study on the impact of the closed season (NGO)	Definition of the protected areas (New Fisheries Law) Planning of the water body study for post-larvae of shrimp (coordinate with relevant institutions)	Definition of the closed season Prohibition of the use of overlapped shrimp gill nets and the height restriction for shrimp gill nets accroding to the Fisheries Law.	Development of larvae collection techniques through the Technical Cooperation of JICA Experimental cultivation of Anadara spp (Main Executor: public sector)	Elaboration of the rules for the establishing farms (Main Executor: public sector) Study on protected areas (Main Executor: public sector) Agreement on the use of the farms (co-management)	Size restrictions according to the Fisheries Law (Main Executor: public sector)	(21) Surveys of fishers on the interest in resources management, mainly by personnel of the local offices. Selection of the communities for the self-management project (22) Execution of the preliminary study (23) Accumulation of objective data on the expected impact of the project	Diagnosis on the awareness of the fishers on resource management.	Zone offices: ~ (21) Social Development: (21)(22) Fisheries administration: Planning: Statistics: Fisheries: (23) Promotion:	
Phase II Initial	Planning of artificial reef installation throughout the country.	Installation of medium size reefs (public and private sectors) and FADs (public sector and fishers groups) Definition of protected areas in addition to those designated (Main Executor: public sector)	Implementation of the study on the legal framework, including the regulations on the use of artificial reefs. Management of the reefs installed by the groups of users (fishers and public and private sectors)	Study on shark resource situation	Defining the rules for the use of the small FADs	Study on shark longline	Study on the inflow of shrimp post-larvae resources into estuaries (public sector and fishers)	Study for the expansion of protected areas (Main executor: public sector) Support request for the water body study (public sector and international aid organizations)	Artisanal Fisheries Extension of the closed season for artisanal fisheries (3 to 6 months)	Industrial fishing	Implementation of the study on larvae distribution with the cooperation of the fishers (public and private sectors)	Defintion of the rules for installing farms. Definition of the protected areas of mollusks.	Definition of the closed season (Main Executor: public sector) Surveylance by fishers' initiative.	Making artisanal fishers aware of the importance of coastal resources management Achieving consensus among the fishers and groups of fishers for the project Elaboration of a concrete action plan for the management of coastal resources. (21) Implementation of defined actions. (22) Intermediate evaluation.	Strengthening of artisanal fishers' awareness for self-management. Forming of the groups of artisanal fishers	Zone offices: ~ (21) Social development: ~ (21) Fisheries administration: ~ Planning: Statistics: Fisheries: Promotion:
Phase II Intermediate		Installation of Medium size artificial reefs (public and private sectors)	Establishment of the system related with the reefs by the fishers	Verification of the impact of off shore FADs (with the collaboration of the fishers)	Installation of off shore FADs (Main Executor: public sector)	Planning of the management of shark resources	Survey of shrimp resources (public sector and fishers)		Raising awareness in the communities of the area on the regulation of operations (Main Executor: fishers)	Study of the possibility to reduce the number of shrimp trawlers (IQ, TAC, Buy back, etc.) (Main Executor: public sector)	Larvae distribution study by the fishers (Main Executor: fishers)	Expansion of farms (Main Executor: fishers)	Closed season during spawning season (Main Executor: public sector) Compliance with the size regulations in the community	Study on the results (impact) of the activities Increased participation of the fishers from other communities and groups (expansion of the geographic area within the zone)	Increasing growth of the groups of fishers	Zone offices: ~ Social development : ~ Fisheries administration : Planning: Statistics: Fisheries: Promotion:
	Recording of capture data by the fishers using the artificial reefs	Installation of small FADs by the initiative of the community	Control of the use of shimp gill nets near artificial reefs (Main Executor: public sector)					Control of waters related to the use of shrimp by the aid organizations (aid organizations and public sector)	Approach of the artisanal fishers representatives to the industrial fishers			Discussion among the neighboring communities on the adequate site for the installation of farms		Starting awareness campaign for other communities of the area Achieving consensus of the fishers and groups of fishers for the project Planning concrete actions for managing the coastal resources Implementation of the defined actions Intermediate evaluation Study on the lateral coordination system with other project executing communities (base organization of the national federation)	Expanding the fishers organization forming to other communities of the area	Zone offices: ~ Social development : ~ Fisheries administration : Planning: Statistics: Fisheries: Promotion:
Fase II Final							Defining fish quotas		Dialogue with industrial fishers	Dialogue with artisanal fishers	Defining catch quota through the fishers's self-management, under the advise of the public sector	Defining the protected areas by initiative and self-management of the fishers	Starting self-management for the operation (fishing), season (spawning season), operation days, sizes, etc.	Lateral coordination with the other project executing communities (in parallel with the implementation of actions) Expanding activities to other fishers and groups of fishers in the same project executing community Forming the national federation with the representatives of the artisanal fishers	Forming a higher local organizato in for the groups of fishers Increase in size of the groups of fishers	Zone offices: ~ Social development : ~ Fisheries administration : ~ Planning: Statistics: Fisheries: Promotion:
	Defining fish quotas for the fishers under the direction of the public sector	Defining the operation method for artificial reefs (defining locally who and when to use)	Compliance with the shrimp gill net fishing regulations around the artificial reefs	Analysing data on the capture in off shore FADs	Installation of off shore FADs by the fishers	Early obtention of capture data	Discussion on fish quotas by artisanal and industrial fishers	Discussion among the neighboring communities for defining the protected areas for self-management (Main Executor: fishers)	Continuing the dialogue among the players involved in shrimp fishing					Coordination of actions among the groups of fishers locally Forming the national federation of artisanal fishers representatives	Establishing the national artisanal fishers federation (forming a representing organization of the artisanal fisheries sector)	Zone offices: Social development: ~ Fisheries administration: ~ Planning: Statistics: Fisheries: Promotion:
Phase III	Delivering catch data by fishers's initiative	Installing medium size FADs and artificial reefs through self-management by the fishers (Main Executor: fishers)					Compliance with fisheries quotas	Defining the self-management protected areas, under the advise of the public sector	Definition of operation areas		Recovery of natural resources	Agreement on the use of the natural fishing grounds (expansion towards outside of the Jiquilisco Bay)	Stabilization of self-management for the operation (fishing), season (spawning season), days of operation, size limit, etc.			Zone offices: Social Development : Fisheries administration : ~ Planning: Statistics: Fisheries: Promotion:

Chart 15-2 Matrix of the Development Master Plan (2)

	Fishing technology	Processing	Marketing	Fishing society	Fisheries statistics	Fisheries infrastructures	Person in charge by CENDEPESCA
Phase I	<p>Experimental fishing with small encircling nets at in the small floating reefs</p> <p>Experimental fishing with improved gill nets and alternate fisheries</p> <p>Experimental coast fishing in small floating reefs</p> <p>Verifying the impact of the above</p> <p>Eel resource inventory</p>	<p>Experimental development of new processed products acceptable to the local population</p> <p>Starting preparation by some processors (tuna flake)</p> <p>Starting preparation by some fishermen (tuna flake)</p>	<p>Elaboration of a sales strategy for the new processed products</p> <p>Partial implementation of the promotion campaign for the selling of processed fish (tuna pupusas, fish burger, fried pasta, fish balls)</p>	<p>Execution and monitoring of the project for improving the economic level in the model communities</p> <p>Strengthening of the Social Development Unit of CENDEPESCA</p> <p>Identifying other groups</p> <p>Promoting efor coordination with other organizations</p>	<p>Diagnosis of the current system for the recolection and processing of fisheries statistics</p> <p>Developing the data base for the statistics system</p>	<p>Rehabilitation of infrastructure damaged by the earthquakes: repairing the piers of El Triunfo and La Libertad</p> <p>Construction of new landing points: Isla Tasajera and El Colorado</p>	<p>Zone offices: ~</p> <p>Social Development:</p> <p>Fisheries administration:</p> <p>Planning:</p> <p>Statistics: ~</p> <p>Fisheries: ~</p> <p>Promotion: ~</p>
Phase II Initial	<p>Extension of arternative fishing (capturing anchovies with small encircling nets, catpturing medium size pelagians in small floating reefs, capturing demersales around the artificial reefs).</p> <p>Taking advantage of loans for the acquisition of fishing gear.</p>	<p>Selling dry anchovies.</p> <p>Stable supply of tuna flake</p> <p>Greater supply stability because of the reduction in unit price for the preparation of jurel (<i>caranx caninus</i>) burgers and Eel meatballs.</p> <p>Experimental processing of salmoneta and jack mackerel</p>	<p>Intensification of the promotion of fish consumption.</p> <p>Beginning fish supply of fish processed at the Healthy School.</p> <p>Increase and stabilization of the supply of tuna flake.</p> <p>Increase in the sales of jurel (<i>caranx caninus</i>) burger, fried fish pasta and eel meatballs.</p>	<p>Monitoring the activities of the existing groups</p> <p>Beginning of the activities of other groups</p> <p>Strengthening coordination with other organizations</p>	<p>Greater accuracy of the fisheries statistics with the collaboration of the fishermen.</p> <p>Analysis of the resource status.</p>	<p>Construction of the Public Fish Market La Libertad (with the reconstruction of the pier in Phase I, the market will be moved from the pier to the former customs facility site).</p>	<p>Zone Offices:</p> <p>Social Development:</p> <p>Fisheries Administration:</p> <p>Planning:</p> <p>Statistics:</p> <p>Fisheries:</p> <p>Promotion: ~</p>
Phase II Intermedia	<p>Installation of te floating reegs in the high sea fishing areas.</p> <p>Experimental operation of the medium size boats with onboard engines</p> <p>Income stability through catching demersales in the artificial reefs.</p>	<p>Increase in the number of processors</p> <p>Starting operations of the small processing plants in the artisanal fishermen's communities.</p>	<p>Greater awareness of the population about the consumption of fish.</p> <p>Starting the export of fresh products by the groups of artisanal fishermen.</p>		<p>Starting the intensive data collection at some of the major fishing ports</p>	<p>Constructing gathering centers for the fisheries products (introducing equipment and materials according to the capacity of the organizations of fishermen at every community - solidarity, accounting, marketing, etc.). The equipment can include: ice makers, freezers, processing machinery, vehicles, outboard engine and fishing gear repair shop, etc.).</p>	<p>Zone Offices:</p> <p>Social Development:</p> <p>Fisheries administration:</p> <p>Planning:</p> <p>Statistics:</p> <p>Fisheries:</p> <p>Promotion:</p>
	<p>Manifesting the impact of resource management and recovery of the capture in the coast.</p>					<p>Releasing the fisheries statistics through Internet</p>	
Phase II Final	<p>Partial replacement of outboard engines with onboard engines for artisanal fishing.</p> <p>Using loans for .</p>	<p>Preparing new processed products with the peculiarities of each community.</p> <p>Increase of small processing plants in the artisanal fishing communities.</p>			<p>Reconstruction of the fisheries statistics system (transition towards the Web database).</p>		<p>Zone offices:</p> <p>Social development:</p> <p>Fisheries administration:</p> <p>Planning:</p> <p>Statistics:</p> <p>Fisheries:</p> <p>Promotion:</p>
	<p>Installation of high sea reefs through self-management by the fishermen.</p> <p>Using the financing system for the fishermen.</p>	<p>Better quality of fisheries products.</p>					<p>Improvement of the port facilities in order to address the development of high sea long lines (expansion of the Acajutla port and reconstruction of the existing facilities)</p>
Phase III	<p>Better and stable capture due to resource management.</p> <p>Greater choice of fishing methods according to season and resource availability.</p> <p>Stable improvement of the economic level of the artisanal fishermen.</p>	<p>Greater involvement of the processing sector in the economy of the artisanal fishermen's communities.</p>	<p>Effective us of fisheries resources due to the increase in the national demand and exports.</p>	<p>Intensification of the project</p> <p>Expansion of the project to national and regional levels.</p>	<p>Greater certralization of the landing points.</p> <p>Feedback on the analysis results and statistical study on policy creation.</p>	<p>Ditto</p> <p>Construction of wharf in Tamarindo.</p> <p>Installation in El Triunfo of disembarkation equipment for large pelagians.</p>	<p>Zone offices: ~</p> <p>Social development:</p> <p>Fisheries administration:</p> <p>Planning: ~</p> <p>Statistics: ~</p> <p>Fisheries: ~</p> <p>Promotion:</p>

Chapter 16 Development Plan

16.1 Fisheries Management Improvement Plan

16.1.1 Basic Guidelines

Up to this point, reference has only been made to the system required for the implementation of fisheries management. However, a management plan will not have a significant positive impact if its design does not take into account the biological properties of the fisheries resources, the environment and the social conditions. This Chapter deals with resources management guidelines dividing such resources in demersal and pelagic fish, shrimp and shellfish. The corresponding execution plan will include proposals related to the legislation and some supplementary activities based on the community participation principle and will specify the executing organizations.

(1) Demersal fish resources

There are plans to promote a project to create fishing zones through the construction of artificial reefs in order to recover deteriorated fishing zones as a new method that will replace shrimp fisheries. Reefs are not merely “production capital” but they constitute “social capital” allowing poverty reduction through fishers’ organizations → resources conservation awareness strengthening → collective sale of the harvest and collective management of projects. The restriction on the size of shrimp gill nets and its authorize methods constitutes a way of resources management that allows reducing the by-catch of demersal fish.

(2) Pelagic fish resources

Pelagic fish with the exception of sharks are hardly exploited in El Salvador. It is necessary to investigate the current situation of shark fishing. With regards to shrimp boats that could use gill nets to extract sardines and anchovies, monitoring of the catch and the number of boats operating will be controlled in order to prevent an excessive number of boats. The use of FADs in the coast as well as offshore could induce to the exploitation of pelagic fish but a reef management system should be set up in advance and fishers should participate in the preparation and the installation of FADs.

Tuna species and other large offshore pelagic fish are highly migratory and move in vast areas, therefore, it is required to coordinate actions with neighboring countries in order to manage such species. Currently, the Inter-American Commission of Tropical Tuna in the East Pacific Ocean that includes Central and South American countries takes on this responsibility as an international organization for the management of tuna and marlin. The Central American countries are members of this Commission but long-line fishing at local level is not subject to regulation by this Commission. In the future, it will necessary to

do so at Central American level.

(3) Shrimp resources

Shrimp are significant resources from the economic point of view. However, its number has been increasingly reduced in the last years and therefore the catch control management of this resource is a high priority. On the other hand, it has to be taken into account that shrimp is distributed in wide coastal areas and there are conflicts of interest between artisanal and industrial fisheries. The catch control management of this resource is a very difficult task because it encompasses a wide area, and due to the need to look for a harmonic coexistence between artisanal and industrial fisheries.

Consequently, in view of the difficulty to implement the co-management of the resources in the initial phase, it will be necessary that the public sector takes the initiative to carry out such actions as to expand the closed season, define fishing restricted areas, prohibit the use of double nets, and to restrict the height of shrimp gill nets, through a dialogue with fishers.

However, at medium and long term it is required to implement a comprehensive fisheries management that includes the conservation of estuaries which are the birthplace of shrimp, the reduction of the shrimp fleet to optimize this resource, and the execution of a shrimp production diagnostic in the Gulf of Fonseca in joint cooperation with the neighboring countries. These are some of the actions needed to take place.

(4) Shellfish resources

In order to restore the shellfish population, the development of larva extraction techniques carried out by the Project-Type Technical Cooperation of JICA and the distribution of larvae among people carrying out aquaculture by CENDEPESCA are the key. Such resources management efforts should be combined with the fishers' organization process with the use of the fishing zones for shellfish similar to demersal fish management. As a priority, it is necessary to promote the strengthening of the legislative framework for the organization of shellfish collectors, the use of fishing zones, the construction of aquaculture farms, and the definition of protected areas.

16.1.2 Execution plan

(1) Phase I (2000-2003):

1) Demersal fish

Resources management

- Artificial Reef Construction Project

The construction of reefs within the framework of the small-scale grant assistance scheme of Japan at small scale and the study of their impact will be executed by CENDEPESCA

and NGOs. Specifically, it is necessary to include an awareness campaign among the activities in order to gather a higher number of fishers to collaborate with the construction of the reefs, to collect data related with the catch by the reef users, to provide assistance to fishers' organizations, etc.

Management goal: One year after installation in Barra de Santiago

Fishing zone management

Small artificial reefs¹

Activities started in Barra de Santiago, and Los Blancos

Estuary conservation started by the fishers' group in Barra de Santiago

Construction of medium-size artificial reefs

Construction of reefs with funds from the small-scale grant assistance scheme of Japan (Barra de Santiago, Los Blancos, Isla Tazajera and Colorado). While Los Blancos has not been identified as an aquatic reserved area, CENDEPESCA will authorize the construction as a provisional conservation area.

Goal: Conclude the construction of artificial reefs in the aforementioned communities by the end of March 2003.

Control of fishery regulations

- Definition of regulations on the construction of artificial reefs

The regulations for the construction of artificial reefs will be defined based on the procedures and norms to be followed on the structure specifications. The procedures are described below.

Fishers' groups interested in the construction of reefs will submit the corresponding plan to the zone office of CENDEPESCA. The document should specify the objective of the construction, operating and maintenance methods (delivery of harvesting records, expected impact, operating and maintenance organization, etc.) as well as the location of the structure. Since it is difficult for fishers alone to prepare such document, they will receive assistance from the local staff of CENDEPESCA or NGOs upon request.

CENDEPESCA will evaluate the plan.

Once the preliminary authorization has been issued, CENDEPESCA will consult and hear the National Fisheries Commission and the National Scientific Consultative Council in order to approve or disapprove the plan.

The authorized fishers' group will request the approval of the plan to build the reef to the Ministry of the Environment and the Navy with CENDEPESCA's support.

¹ This report assumes that small artificial reefs are built by small-scale fishermen and that they can be moved with their small boats. On the other hand, the size of medium artificial reefs is 1m³ and big boats or barges are necessary to move them.

Once all the necessary procedures have been completed, the interested group will obtain the official authorization and will proceed to build the structure under the supervision of the corresponding zone office of CENDEPESCA.

The fishers' group will carry out the monitoring in accordance with the proposed plan and will report the results to CENDEPESCA.

Goal: by the end of December 2002

2) Pelagic fish

Resources management

To know the volume of the catch of the main pelagic fish species based on fisheries statistics.

Goal: By the end of 2003

Fishing zones management

- Construction of small FADs.

Fishers will install low-cost FADs in the coast. Similar reefs have already been installed in Barra de Santiago and Los Blancos on an experimental basis.

Goal: Conclude the construction of ten reefs before 2003

Catch control

- Definition of regulations on the installation of FADs.

The provisions on FADs will also be included in the items related to the installation of artificial reefs.

Goal: By the end of 2002

3) Shrimp

Resources management

- Shrimp population study.

The results of the study on the impact of the closed season will be published. The outcome of the study will be used as the basis to formulate the policy to extend the closed season of the following year.

Goal: by the end of 2002

Fishing zones management

- Plan of the hydrological system study related to shrimp post-larvae.

In order to recover shrimp resources, it is necessary to conserve the rivers that flow into the estuaries where the larvae grow. This action should be preceded by a basic study on the quality of the water, flora, etc. and such action could not be implemented by CENDEPESCA alone. As a consequence, there are plans to conduct this study in

coordination with other institutions through the National Fisheries Commission (see Chapter 17.2 “Projects” of Part III).

Goal: By the end of 2002

Catch control

Regulations of shrimp gill nets.

The mesh size of the gill nets used by Salvadoran artisanal fishers is the smallest of all Central American countries and therefore the by-catch includes small fish. While it is difficult to fully prohibit the use of these nets, it is necessary to analyze the impact that the restriction of the depth of the nets to less than 2 m high would have in order to alleviate the pressure on small fish that are currently caught in the upper section of the nets.

Goal: By the end of 2002

Preparation for the use of fishing boat registry data for resources management purposes.

Based on the current registry of fishing boats implemented in the pilot plan, a monitoring of the registry in fishing communities selected for the sampling will be conducted. These data will provide the situation of the boats at a long term and by comparing them to the unloading data, the information thus obtained could be used as the basis to deduct whether the migration is due to social factors or to the variation of the resources according to the zone.

Goal: By the end of 2003

4) Shellfish

Resources management

Development of larva production of ark shell (*anadara spp.*) and rock oyster technology through the Technical Cooperation of JICA.

Goal: By the end of 2003

Experiment of ark shell culture

The results of the field experiment implemented through the Technical Cooperation of JICA for Projects should be published.

Goal: By the end of 2003

Fishing zones management

- Regulations on the use of sea areas for the cultivation of shellfish.

It is expected that the larva collection technology developed by JICA cooperation will stabilize the supply. However, since the preferable area for the cultivation is limited, it

is likely that there will be competition for farming areas in the future among fishing communities, and it will be necessary to identify any problems that could be solved through the enforcement of laws on the use of the land and any problems that would require new legal instruments on the use of sea areas, during the preparation of the project implementation phase.

Goals:

Ark shells– Study of the coastal zone of the Bay of Jiquilisco, organization of the board of intermediaries and study of the social background (up to the end of 2003)

Oysters –Study similar to the study of ark shells in the oyster fishing zones between La Libertad and Acajutla (up to the end of 2003)

Catch control

- Regulations on size by the Fisheries Law .

An unscheduled inspection of public markets, intermediaries and landing wharfs will be conducted with the cooperation of the Police.

Goal: 3 samplings /year in the rural zone and 12 samplings /month in San Salvador up to the end of 2003.

(2) Phase II – Initial stage:

1) Demersal fish

Resources management

- Drafting of the plan to install artificial reefs throughout the country.

Based on the results of the interviews with fishers on resources management at national level during Phase I, candidate sites for the construction of reefs will be selected on a preliminary basis, from the social point of view. This study will consist in selecting candidate sites from the oceanographic point of view. (See Section 17.2 “Projects” of Chapter 17, Part III).

Fishing zones management

Construction of medium-size and FADs.

The installation of medium-size reefs will continue the same as in Phase I. This work will contribute to strengthen the organizational capacity of fishers’ groups in the selected communities. On the other hand, the impact study of the reefs installed in Los Blancos was concluded before this zone was designated as conservation area. CENDEPESCA will play a catalyst role in the transition stage from efforts at organizational and group level to efforts at community level.

Goal: Fishers’ groups will place small reefs around the medium-size reefs. This activity will promote the participation of those new members who had not participated in the installation of the first reef. They will also contribute to the

voluntary construction of the FADs since it is necessary to wait some time before the reefs start attracting fish. (Half of the fishers of each community will join the project).

Expansion of conservation areas.

CENDEPESCA is authorized to define, on a provisional basis, specific aquatic reserve areas for one season in addition to those designated in the new Fisheries Law, at the request of the fishers' organizations. In this event, the organizations are obliged to collect and report the statistical data. Whenever the need for designating a provisional aquatic reserve area is recognized, the National Fisheries Commission will also evaluate the possibility and the pertinence of designating it as an official aquatic reserve area. In this regard, it is recommended to conduct an oceanographic study of the fishing zones as scientific support for the installation of artificial reefs. (See section 17.2 "Projects" of Chapter 17, Part III).

Goal: CENDEPESCA will define two or more aquatic reserve areas, at the request of the fishers. If possible, it is recommended to define one area in the jurisdiction of the zone offices of CENDEPESCA in El Triunfo and in La Unión, taking into account the possibility for future expansion.

Catch control

Study of the legal aspects including regulations on the use of artificial reefs.

It should be taken into account that there always will be disputes with the fishers who did not participate in the project or with the fishers of other communities with regard to the use of the reefs. In view of the above, CENDEPESCA should anticipate a study on the problems that are likely to arise and the possible measures to be taken based on the local socio-cultural characteristics. Solutions could be sought through the enforcement of legal instruments on the use of the structures or through negotiations among communities.

Goal: Keep control in fishing communities where reefs are presently under construction, up to the end of 2002.

Self-management of the group of users of installed reefs.

The internal regulations on the use of installed reefs will be defined with the assistance of the zone office of CENDEPESCA.

Goal: Define the internal regulations in three of the four communities that have installed reefs, in common agreement with the members.

2) Pelagic fish

Resources management

In order to know the situation of shark resources, a study on the variation of the catch per unit of effort and unloading volume will be carried out, based on the statistical data.

Goal: Complete the analysis of the data up to 2006.

Fishing zones management

The purse seine operation will be studied in order to prevent a conflict of interests with other fishing activities. The regulations on the use of small FADs in the coast will be defined.

Goal: year 2006

Catch control

A study will be conducted on the number of boats, size of fishing gear and days of operation of the shark long-line.

Goal: year 2006

3) Shrimp

Resources management

- Study on the migration of the shrimp post-larva population to the estuaries.
The most adequate and cost efficient method to measure the impact of the shrimp fisheries closed season is measuring the quantity of shrimp post-larvae that arrive to an estuary. Besides, technically this method allows that fishers collaborate more easily. CENDEPESCA will make fishers aware of the need for resources conservation and their collaboration through training courses aiming at obtaining data on the total population of shrimp post-larvae.

Goal: Conduct the study in the Bay of Jiquilisco for a minimum of six months prior to or after the closed season when the fishers and the zone offices of CENDEPESCA will be technically available to cooperate.

Fishing zones management

Study for the expansion of aquatic reserve areas.

The study will be conducted in other reserve areas in addition to the areas mentioned in the section addressing demersal fish.

Request the support for the water body study related with shrimp post-larvae
(See Section 17.2 “Projects” of Chapter 17, Part III)

Catch control

- Closed season expansion and enforcement of marine shrimp
The closed season will be enforced for at minimum of three months, prior to, during

and after the peak season of spawning.

4) Shellfish

Resources management

- Study on the distribution of shellfish larvae with the collaboration of fishers.

The system to carry out the resources survey with the collaboration of fishers will be set up. To this end, CENDEPESCA will choose fishers interested in participating in the collection of statistically significant data and will provide the necessary training.²

Goal: For monitoring purposes, select five sites in the Bay of Jiquilisco (ark shells) and one site in El Maculis (oysters) which have been under study by the Technical Cooperation Projects (it is necessary to consult with the expert of this cooperation)

Fishing zones management

Definition of the regulations for setting up farms.

Farms will be progressively expanded once the larva production technology is developed through the Technical Cooperation of JICA. CENDEPESCA should conduct the pertinent study and define the regulations for the use of sea areas in order to anticipate the problems which may arise concerning the use of sea areas for purposes other than fishing as well as how the limit between two adjacent communities will be managed.

Goal: Define the regulations draft using the Bay of Jiquilisco Project as model.

Definition of shellfish resources protection areas

Define ark shells and oyster protection areas with the participation of the community. The procedures will consist of the approval of the application submitted by the fishers' organizations to CENDEPESCA, the same as in the construction of reefs.

Goal: For monitoring purposes, select five sites in the Bay of Jiquilisco (ark shells) and one site in El Maculis (oysters) which have been under study by the Technical Cooperation (it is necessary to consult with the expert of this cooperation).

Catch control

Definition of the closed season

The most convenient closed season will be defined based on the results of the study conducted through the Technical Cooperation for Projects.

Fishers' groups will carry out self-management surveillance activities

² For example, natural shrimp post-larva buyers for farming purposes know how to estimate empirically the approximate amount of larvae contained in a recipient of a specific volume and they make the purchase and sale using this method. It has been considered that it is possible to have the collaboration of these buyers in the transfer of technology.

In the fishing communities with beaches, surveillance of the farms will be made with the self-management groups growing larvae provided by CENDEPESCA. This institution will participate as needed as surveillance advisor in fishers' meetings; at the same time, it will conduct an awareness campaign on the need to watch fishers of nearby communities.

Goal: Implement self-management in farms of five communities in the Bay of Jiquilisco.

(2) Phase II – Intermediate stage:

1) Demersal fish

Resources management

- Harvesting data analysis made by the fishers using artificial reefs.

The study on the impact of artificial reefs made by the NGO in Phase 1 will be progressively implemented by the fishers' groups that built them. Fishers will receive technical assistance from the NGO on how to complete the registration forms. Once the NGO has retired, the impact study will be continued by the fishers with the support of CENDEPESCA. The data obtained will be processed and analyzed by CENDEPESCA.

Goal: Make a continuous study on the impact of the reefs in the four fishing communities where such structures will be installed. CENDEPESCA will have access to these data. Additionally, full training in data registration will be given by the NGOs and CENDEPESCA in the remaining fishing communities where there are plans to install reefs.

Fishing zones management

Installation and expansion of medium-size artificial reefs.

The areas where reefs are to be installed mainly by the international cooperation will be expanded based on the results of the surveys regarding resources conservation made to fishers in Phase I. It will be implemented in the areas selected in the reef installation plan prepared in the initial state of Phase II. The main executors will be the fishers' groups of the corresponding areas as well as the four communities mentioned above while CENDEPESCA will be the coordinator to request external support in order to obtain the necessary economic resources with the collaboration of the NGOs.

Goal: It is recommended to install medium-size reefs in two or more communities of the respective jurisdiction of the zone offices of El Triunfo and La Unión, in addition to the four communities mentioned above of the adjacent zone.

Installation of small FADs in each community with fishers' self-management.

In the preceding stage, small FADs were installed by a specific group of fishers of a

community. This scheme will change towards a general community work at the fishers' own initiative.

Goal: In addition to the four communities where artificial reefs were installed in Phase I, the number of communities that will install FADs at group level will be increased (10 communities).

Catch control

Setting up of the reef surveillance system through fishers' self-management

Basically, fishing zones surveillance will be the responsibility of the fishers. However, CENDEPESCA will grant a specific legal authority to the fishers' organizations responsible for this task after they have received some training in the Fisheries Law.

Goal: Fishers will watch the four communities where reefs were installed in Phase I.

Regulations on the use of shrimp gill nets in the surroundings of artificial reefs.

CENDEPESCA will regulate fishing operations with gill nets within one nautical mile in the corresponding seawaters and in the 9 square miles in the aquatic reserve areas.

Goal: Four communities where artificial reefs will be installed in Phase I.

2) Pelagic fish

Resources management

The impact of the installation of FADs will be reported based on the harvesting data (with the collaboration of fishers). The body length distribution of sharks per species will be investigated in Acajutla.

Goal: Complete the analysis of the data up to 2008.

Fishing zones management

FADs will be installed in the off shore at the initiative of the public sector. Such installation is experimental and fishers will be able to conduct free harvesting operations in these reefs on the condition that they provide the harvesting data. For further detail, see Chapter 16.4 "Fishing Technology Development Project".

Goal: Install ten reefs in 2006 and 2007.

Catch control

A shark resources management plan for small scale as well as industrial fisheries will be prepared. It is likely that some shrimp boats will shift to long-line operations, and therefore, it is necessary to define in advance the total tonnage and the number of boats.

Goal: year 2007

3) Shrimp

Resources management

- Study on the spawning of shrimp resources
Shrimp fishers will provide CENDEPESCA, at their own initiative, with the data on the full development of spawning shrimp, incubation conditions, etc. To this effect, CENDEPESCA will train fishers in this activity.

Goal: Zone offices will train fishers (at least one in the respective area of jurisdiction making a total of 4 fishers) in data reporting.

Fishing zones management

- Execution of the water body study related to shrimp post-larvae. (See Section 17.2 “Projects” of Chapter 17, Part III).

Catch control

Awareness campaigns for the regulation of the operation in adjacent communities by small- scale fishers.

With CENDEPESCA’s support, fishers’ groups or representatives of the communities highly motivated in resources management will start people awareness activities in adjacent communities.

Goal: Under the leadership of the 4 communities where artificial reefs were installed in Phase I, 12 communities will give a positive response to this initiative.

Shrimp fisheries optimization study.

Shrimp is a resource that requires adequate management but at the same time it is the most difficult resource to manage. At the beginning, the public sector must take the initiative and follow procedures to expand or define the closed season and the closed area, and implement a suitable co-management system. With the support of the international organizations, a thorough study on the current situation of shrimp harvesting by small scale and industrial fisheries will be conducted to later draft an optimization plan involving such fishers. (See Section 17.2, Chapter 17, Part III).

The representatives of small-scale fishers approach the industrial fishers to invite them to participate in resources conservation.

Dialogue on concrete issues of resources conservation through small scale and industrial fishers self-management.

Goal: The leaders representing 10 or 15% of all small- scale fishers will negotiate with the industrial fisheries companies. It is expected that meetings will be held on a continuous basis.

4) Shellfish

Resources management

- Study on larva distribution to be conducted by fishers.
Fishers will conduct a larva distribution study using the larva identification technique acquired in the preceding phase. CENDEPESCA will provide ongoing technical advisory.

Goal: Three of the five fishing communities of the Bay of Jiquilisco that will operate the farms will conduct the study.

Fishing zones management

Expansion of farms through fishers' self-management.

Fishers' groups or the communities will request to CENDEPESCA the construction of farming ponds.

Goal: Five communities will decide on the installation of farms in addition to those already designated to operate farms through self-management.

Discussion between adjacent fishing communities on the possible candidate sites to install the farms

In the event that a farm extends over two adjacent communities, the fishers of both communities will gather at their own initiative to deal with relevant issues under the supervision of CENDEPESCA.

Catch control

Closed season during the egg-laying season.

CENDEPESCA will define the closed season by species based on the biological data obtained through the Technical Cooperation. Particularly, oyster collectors are very aware and it is deemed that they will comply with this measure.

Compliance with the regulations on size by the fishing communities.

Fishers play a leading role in this regard. CENDEPESCA will make the necessary coordination with markets, intermediaries, policies, etc. in order that shellfish smaller than the regulated size are not marketed.

Goal: Participation of 10 communities.

(4) Phase II – Final stage:

1) Demersal fish

Resources management

- Definition of the fish quota in accordance with the size and effectiveness (power to attract fish) of the artificial reefs.

Based on the result of the analysis of the data of the catch in the reefs installed by CENDEPESCA up to the intermediate stage of Phase I, the adequate catch quota and fishing effort will be recommended.

Goal: Four communities where reefs were installed in Phase I.

Fishing zones management

- Definition of the method to use artificial reefs.

Fishing zone users will start discussions to define the order and dates of operation, etc. for each boat, based on the fishing quota and fishing effort recommended by CENDEPESCA.

Goal: Four communities where reefs were installed in Phase I.

Catch control

- Compliance with the operating regulations of shrimp gill nets in the surroundings of the artificial reefs.

Fishers will comply with the operating regulations of gill nets on their own initiative.

Goal: Four communities where reefs were installed in Phase I.

2) Pelagic fish

Resources management

Timely and constant analysis of the catch data in offshore FADs.

Goal: Between 2009 and 2010

Fishing zones management

Installation of offshore FADs at deeper waters by organized fishers. Compliance with regulations on exploitation.

Goal: year 2010

Catch control

Early detection of the variation of the catch and timely and adequate regulation of the fishing efforts (reduce the operating period, regulation of the number of boats, etc.)

Goal: year 2010

3) Shrimp

Resources management

Definition of the fishing quota.

Fishers will comply with the fishing quota and operating period set forth for in accordance with the ideal catch effort, based on the results of the resources survey made by CENDEPESCA. However, CENDEPESCA will have to ensure compliance

with the quota through the top-down system in the communities that do not have a sound fishers' organization.

Goal: 30% of the shrimp fishing communities will enforce the regulations through self-management.

Definition of the catch quota by small scale and industrial fishers

A catch quota per shrimp fishing boat and per small scale fishing boat will be recommended based on the resources survey conducted by CENDEPESCA. The dialogue between both parties will be opened based on scientific information.

Goal: The delegate fishers representing 30% of the fishers will act as one of the main members of the National Fisheries and Aquaculture Council (CONAPESCA).

Fishing zones management

- Discussions on the definition of aquatic reserve areas through artisanal fishers self-management.

New protected aquatic reserve areas will be defined based on fishers' experiences in addition to those designated as of this date by CENDEPESCA. To this effect, exhaustive discussions will be held with the participation of the communities of the zone. CENDEPESCA will be the catalyst expediting these discussions.

Goal: Fishing communities of the rural zone, mainly the four communities where the reefs were installed in Phase I.

Catch control

- Dialogue between small scale and industrial fishers on shrimp resources conservation. A comprehensive dialogue between both parties will be started and will continue without the intervention of intermediary institutions such as CENDEPESCA or CONAPESCA.

Goal: Dialogue between both parties in order to expedite the setting up of the Board of Directors of CONAPESCA.

4) Shellfish

Resources management

- Definition of the catch quota through fishers' self-management.

With CENDEPESCA's assistance, the adequate catch quota will be defined in accordance with the farm size, the quantity of larvae that has been planted, and the number of user fishers.

Goal: Participation of ten communities.

Fishing zones management

- Definition of aquatic reserve areas through fishers' self-management
CENDEPESCA will request the designation of aquatic reserved areas in waters that are used for larva growth, which will be identified through the experience of fishers.

Goal: Recommended areas in accordance with the results of the study conducted by the Technical Cooperation for Projects

Catch control

- Operating regulations to be implemented by fishers using the self-management method
Fishers will regulate the operation in the spawning season, will plan the days of operation, and will control the size of the fish to be harvested through self-management method with the assistance of CENDEPESCA.

Goal: Five communities of the Bay of Jiquilisco

16.1.3 Fisheries management and local characteristics

Resources management can be classified in four typical types of fishing areas in accordance with the characteristics of the Salvadoran coastline.

(1) Fishing communities with sandy beaches facing open sea (mainly shrimp and fish)

This is the most representative zone of the Salvadoran artisanal fisheries. In this zone, it is necessary to take different actions articulated on the public sector's initiative, including shrimp fisheries management through the construction of artificial reefs, recovery of demersal fish resources, exploitation of pelagic fish, improvement of the economic level of fishers through new fish products processing, etc.

(2) Fishing communities with natural rocky reefs (mainly shellfish) at open sea

This zone is made up by diving fishers mainly engaged in the extraction of oysters from rocks. While there is a possibility to recover the production up to a certain level through the extension of larva extraction techniques, it is necessary to diversify the activities in addition to oyster extraction in order to improve the economic level of fishers.

(3) Estuaries

In El Salvador there are many estuaries, including big estuaries such as the Bay of Jiquilisco and very small ones. The main productive activity is the extraction of ark shell, which has been dramatically reduced in the last years. The poorest women and children are the main participants in this extraction activity. The development of farming techniques is required in order to recover these resources and to improve the economic level of the population.

(4) Gulf of Fonseca

The Gulf of Fonseca is an important space for shrimp fishing and shrimp post-larva growth,

and therefore, resources management becomes highly important. However, at the same time it is a very complex area from the international policy point of view since the border with Nicaragua and Honduras is within the Gulf. It is expected that El Salvador will become aware of the need for fisheries management in territorial waters in order that these efforts have an effect on the neighboring countries. If this occurs, El Salvador will become the leader in international management.

The following Table shows the most representative zones. The resources have been classified in big groups according to their economic value, and the corresponding goal and management method have been proposed. While some species live in different zones, this Table takes into account that it is necessary to adopt different resources management methods depending on the zone.

Table 16-1 Issues that should be taken into account in fisheries management per region and in a future development plan

Geographic division	Geographic characteristics	Regions	Species	Economic value	Basic goal of the management	Items subject to management	
1	Open Sea	Only shores	West of Costa Azul – Pimental	Shrimp (white)	High	Recovery	Fishing zones and fishing gear
			East of El Espino - El Maculiz	Demersal fish (snapper and curvinas)	Medium	Sustainable development	Fishing zones
				Pelagic fish (mackerel)	Low		Fishing zones
				Pelagic fish (shark)	High		Fishing zones
2	Open Sea	Rocky Reefs	Los Cóbano	Demersal fish (snapper)	Medium	Sustainable development	Resources and fishing gear
			West of Acajutla – La Libertad East of Las Tunas	Rock oysters		Recovery	Resources, fishing zones and fishing gear
3	Estuaries	Large scale	Jiquilisco	Shellfish (<i>Anadara spp.</i>)	Medium	Recovery	Resources, fishing zones and fishing gear
			Herradura	Estuary fish	Low	Recovery	Fishing zones
			Garita	Sardines and small anchovies	Low	Sustainable development	Fishing zones and fishing gear
			Palmera	Crabs	Low	Sustainable development	Fishing zones and fishing gear
			Barra de Santiago	Shrimp post-larvae	High	Recovery	Resources and fishing zones
4	Gulf	International	Fonseca	Shrimp	High	Recovery	Fishing zones and fishing gear
				Shrimp post-larvae	High		Resources and fishing zones

Notes:

1. Shaded cells indicate the important items.
2. Recovery: Zones which resources have been seriously affected and required recovery procedures.
3. Sustainable development: Species which haven not been sufficiently developed and should be harvested

through the sustainable development method.

Estimated budget of the Fisheries Management Improvement Plan

Total amount (US \$): 197,000

Converted into ¥: 25,610,000

(US \$1 = ¥130)

Activities		Cost (\$)
Phase I	Study of the impact of artificial reefs (Barra de Santiago, etc.)	US \$0
	The study of the impact of the installation of artificial reefs within the framework of the Grass Roots Grant Aid Project of Japan will be conducted by the NGO, which is the promoting entity of the project. CENDEPESCA will support the activities, as required.	
	Regulations on the use of sea areas for shellfish farming (Bay of Jiquilisco, etc.)	US \$0
	Drafting of the regulations on the use and field trips by the personnel of the zone offices (during ordinary visits to the fishing communities)	
	Environmental study on shrimp post-larvae growth	US \$0
	This work may be executed as part of CENDEPESCA management activities	
	Regulation on the size of the shrimp gill net	US \$0
	This work could be carried as part of CENDEPESCA management activities	
	Definition of the rules for the installation of artificial reefs	US \$0
	This work may be executed as part of CENDEPESCA management activities	
	Preparation for the use of the registry data of fishing boats for resources management	US \$0
This work may be executed as part of CENDEPESCA management activities		
Phase II	Study on the distribution of shrimp and shellfish post-larvae with the cooperation of the fishers	US \$0
	Seminar for fishers interested in collaborating with the project (on the initiative of the zone offices)	
	Expansion of areas beings conservation areas	US \$0
	This work may be executed as part of CENDEPESCA management activities	
	Definition of shellfish resources protection areas	US \$0
	Field trips by the personnel of the zone offices of CENDEPESCA (during the ordinary visits to the fishing communities)	
	Setting up of the reef surveillance system on the initiative of the fishers	US \$0
	Seminar for fishers interested in collaborating with the project (on the initiative of the zone offices)	
	Study on shrimp fisheries optimization	US \$197,000
	Personnel expenses	Environmental study expert (Level B* ¹ x2M/M) US \$30,000 Local environmental study expert (Level D* ¹ x4M/M) US \$24,000 Resources inventory expert (Level B* ¹ x2M/M) US \$30,000 Local resources inventory expert (Level D* ¹ x4M/M) US \$24,000 Socio-economic study expert (Level A* ¹ x3M/M) US \$54,000
	Cost of equipment and facilities	Boat rental (60 days) US \$15,000
Operating and administrative costs	Car rental, etc. US \$20,000	

*1 Level A: Senior international consultant (US \$18.000 M/M); Level B: Expert (US\$15.000 M/M); Level D: Intermediate level international Salvadoran consultant (US \$6.000 M/M)

16.2 CENDEPESCA Restructuring Plan

16.2.1 Basic guidelines

The preceding chapter defined the goal of the project for the following seven years in the setting up of a co-management system. At the same time, it proposed the execution of other complementary actions to achieve this goal within the framework of the lateral support project. Five basic guidelines for CENDEPESCA restructuring are proposed below in order to reach the goal.

(1) Give the highest priority to zone office strengthening.

One of CENDEPESCA limitations is the lack of institutional capacity to grasp the current situation as it was set out in the recommendations on institutional restructuring that were made earlier or as shown in Figure 12-4 “Diagram of the Challenges”. Without the capacity to make a diagnostic of the current situation, it is extremely difficult to formulate policies or to make an evaluation. The lack of trust between the institution and beneficiary fishers is another big limitation of CENDEPESCA. In this regard, acquiring the diagnosis capacity and setting up a relationship based on mutual trust through the organizational strengthening of the four zone offices are the highest priority tasks. As it was stated in the basic guidelines of the Development Plan, the activities to be carried out by the zone offices directly related to the establishment of the co-management system that include the study of fishers interest, resources management, awareness, definition of protected areas, artificial reef impact evaluation, among others. With regard to lateral support, it is required that these offices take the initiative to establish a good relationship with the fishers.

At present, the zone offices deal with administrative actions as well as with actions related to industrial fisheries, continental water fisheries and aquaculture. It is necessary to analyze the work load give to zone offices. In any event, it is deemed necessary to assign additional human resources to the social development as well as statistics and information area.

(1) Introduce the planning methodology and the management of operations with goal oriented approach (solutions to identified problems)

The PCM (Project Cycle Management) and logical framework methodology not only allows the identification of the tasks that should be implemented by each unit and zone office but also provides the means to make a performance evaluation of the staff. The following aspects should be taken into account for its implementation.

Incorporate systematically the annual operating goals of each unit and zone office into the annual and strategic goal of CENDEPESCA.

Define the order of priority of the goals with a realistic view. It is already known that there are numerous challenges and that each of them has its own importance but even so it will be necessary to define their order of priority in order to make an efficient use of the resources at disposal.

The indicators to be defined should be quantifiable. The use of abstract expressions such as “improvement of...” should be avoided. It is necessary to use expressions that help employees to have a concrete idea of the goal to be achieved.

It is necessary to set up the monitoring system. While the effectiveness of the activities will be evaluated at the end of each year (period), the progress should be followed up periodically.

In the future, it will be convenient to implement a performance evaluation of each employee. However, in the initial phase, it is advisable to implement a performance evaluation of each unit and each zone office in order that the staff becomes familiar with the evaluation concept.

- (3) Assign coordinators to be in charge of the resources survey activities in order to increase the efficiency of the studies and research

The study and research component is one of the most important functions for an institution specialized in a specific sector. In this case, such activities will provide the necessary scientific information to prepare resources management policies. However, taking into account the existing financial and human resources of CENDEPESCA, these activities should be focused on those for which the services of a third party could be retained (universities, research centers, NGOs, international cooperation projects, etc.) or should be conducted with the collaboration of the fishers. At present, the main office of CENDEPESCA does not have a unit specialized in research and the Fisheries Unit does not have specialized staff. Therefore, it is recommended that a research coordinator should be assigned to this unit. The responsibility of the coordinator will not be limited to making plan for resources survey but will also be in charge of coordinating the data collection activities and the studies made by the zone offices in the fishing technology field. He will also be in charge of processing the results and coordinating the technical training courses. It is advisable to assign a “senior” expert as coordinator since he will be in charge of drafting a plan for the investigation of important resources and retaining services to this end.

- (4) Create the fish consumption promotion and expansion teams.

At present, CENDEPESCA does not have a specialized unit for fish processing and marketing. The formation of the “Fish Consumption Promotion and Expansion Team” (suggested name) during Phase I is proposed. It is not about creating a new unit within the institution but forming

a Project team with the staff of the Communications and Fisheries-Business units, taking into account that 50% of the activities carried out by these two units consist in the promotion and expansion of fish consumption. There are some officers in CENDEPESCA that received fish processing technology training in Peru but their expertise is not being used in the current units. It is proposed that these staff join the Team as technical advisors for the promotion of small processing projects in the various fishing communities.

- (5) Conduct intra and extrainstitutional advertising campaigns on the progress of the restructuring process.

Many employees are not familiar with the restructuring process. Since this problem is relevant to personnel management issues, it may cause uncertainty, distrust or individualism (selfishness) within the institution. For example, performance evaluation can be considered a good system to fairly evaluate the performance of each employee, but on the other hand, it can also be the cause of distrust or uncertainty. In order to prevent that the low morale affects the restructuring in general, the use of bulletins or e-mails as efficient instruments for the dissemination of the objective and for the progress of restructuring inside and outside the institution is proposed.

16.2.2 Execution plan

- (1) Phase I (years 2000-2003):

Phase I intends to revise CENDEPESCA restructuring plan, particularly, in terms of strengthening the functions of the zone offices within the framework of the present Plan. Based on the results of such revision, a new restructuring plan (draft) will be submitted not later than the end of 2002. Some actions proposed in such plan will be started immediately and a clear restructuring framework will be defined in 2003. Since it is also necessary to establish the performance evaluation system as soon as possible, the relevance of hiring experts in organizational strengthening to provide support to the Director of CENDEPESCA should be considered. Additionally the research coordinator should be appointed and the Fish Consumption Promotion and Expansion Team should be set up.

- (2) Phase II (years 2004-2010):

An intensive dissemination campaign of the institutional restructuring progress should be carried out in this Phase. The organizational strengthening of the type of “operation with few but competent personnel” will be promoted through the PCM (project cycle management) methodology as well as through the planning methodology.

Estimated budget for CENDEPESCA Restructuring Plan

Total amount (US \$): 624,800

Converted into ¥: 81,224,000

(US \$1 = ¥130)

Activities		Cost (\$)	
Phase I	Organizational strengthening (2003)		US \$240,000
	Personnel expenses	Adviser in organizational strengthening (Level B*1x12M/M)	US \$180,000
	Cost of equipment and facilities	Vehicles, computers, etc.	US \$50,000
	Operating and administrative cost	Expenses of activities (for 1 year)	US \$10,000
	Appointment of research coordinators		US \$4,800
	Personnel expenses	Re-appointment of the existing personnel	US \$0
	Cost of equipment and facilities	None	US \$0
	Operating cost	Expenses of activities 24 months x \$200	US \$4,800
	Setting up of the fish consumption promotion and expansion team		US \$0
	Personnel expenses	Will be included in the fish product marketing and processing costs	US \$0
	Cost of equipment and facilities	Will be included in the fish product marketing and processing costs.	US \$0
	Operating cost	Will be included in the fish product marketing and processing costs.	US \$0
	Phase II	Continuity of the organizational strengthening (2004-2005)	
Personnel expenses		Adviser in organizational strengthening (Level B* ¹ x 24M/M)	US \$360,000
Operating and administrative cost		Expenses of activities (for 2 years)	US \$20,000

*1 Level B: Adviser (US \$15,000 M/M)

16.3 Fishers' Organizations Development Plan

16.3.1 Basic Guidelines

So far, the fisheries resources of the coast have not been properly managed in El Salvador. This situation is owed not only to the weakness of CENDEPESCA that lacks sufficient administrative and guiding capacity but also to the absence of artisanal fishers' organizations. The main objective of the Fishers' Organizations Development Project is to promote the formation of organizations for artisanal fishers.

The conventional formation and strengthening methods of fishers' organizations include fish products processing, collective sale of the catch, search of export channels, technical assistance to increase productivity and profitability, etc. All of them rely on stable volume of catch. However, in the case of El Salvador this same premise is under threat. Consequently, the present Project considers fisheries management in the coastal area as the core of the fishers organization process. Several artisanal fishers, who have started resources management activities voluntarily although incipiently, have been identified. The results of the pilot project have also shown that the potential of these fishers is high. The initial phase intends to provide support to this group of fishers in order to increase their awareness as owners until positive results are obtained, as it can be observed in the pilot project, and then disseminate the model of success throughout the country.

CENDEPESCA should clearly define the duties and faculties of the fishers with regard to self-management, wait that the fishers' organizations reach a certain degree of development, and grant the rights to manage and use the coastal waters, and by doing so, implement the co-management system. For this purpose, the following basic guidelines are proposed.

- Promotion of artisanal fishers awareness with regard to resources management.
- Strengthening of artisanal fishers initiative with the support of CENDEPESCA.
- Creation of models of success through focusing support on fishing communities in favorable conditions.
- Coordination of the efforts of the fishers' organizations through the exchange of experiences among communities.
- Once the organizations capable of taking on the management of resources have been formed, grant them fisheries management rights of the coast.

Although there are some fishers' cooperatives as artisanal fishers' organizations, they are weak as administrative bodies due to their high degree of reliance on external aid. The basic guidelines of the Project in Support to the Formation of Fishers' Organizations intend to use the existing cooperatives. It intends to make surveys of the cooperatives that are presently

operating (a list is included in Chapter 9) in order to identify those cooperatives that can be made aware of the use of resources and will be later incorporated into the new fishers' organizations that are proposed. Otherwise, cooperatives that cannot change their attitude of dependence will be excluded from the benefits of all kinds of external assistance.

16.3.2 Execution plan

(1) Phase I (years 2000-2003): "Preparations for resources management on the fishers' initiative"

Taking advantage of the results of the zone offices strengthening carried out in 2001, it is proposed that the personnel make frequent visits to the fishing communities of their jurisdiction. In such visits, they will hold conversations with fishers as a means to find out about their interest in management resources. At the same time, fishers' groups will be interviewed in order to gather information about their objective, the type of activities, the number of members, external organizations with which they relate, etc.

The results of the studies will be analyzed in each zone office and the order of priority of the external assistance will be defined.

Based on the results of the surveys and interviews on the interest and difficulties of fishers' groups, the execution methods of the fisheries self-management project will be defined on a preliminary basis (installation of reefs, regulation of mesh size, definition of closed season and areas, regulation of the size of fish to be harvested, etc.) and the necessary information will be collected (the data collection will be taken on by the Planning and Strategies Unit and by the Computing and Statistics Unit). Currently the reef installation project is being implemented by an NGO with small-scale grant assistance funds, and it is a source of real data on the impact of reefs. This information will be of great use for future projects and should be collected and kept with the collaboration of the NGO.

(2) Phase II (years 2004-2010): "Setting up the bases of the activities and formation of organizations based on them."

1) Initial stage (years 2004-2005)

This stage intends to organize workshops for individual and organized fishers (including cooperatives) in the communities that have been considered a priority in Phase I. Workshops will be participatory and will be organized in one or two communities per each zone office.³ Concerning the diagnosis of the current situation,

³ The expert in the organization of workshops will provide advice on the planning method with application in the logical framework and on the method of application of the different valid tools for each occasion. The period during which he will provide his services is 1M/M. With regard to the expert in social studies,

CENDEPESCA will prepare in advance the necessary information and will explain the present situation openly to the participants of the workshops. After this information has been reported, the actions to be taken in the next coming years will be thoroughly discussed with the fishers. This is the “awareness” process in which the participants will analyze the current problems, their possible solutions, the possibilities and limitations of fishers, etc.⁴ After the analysis has been completed and a consensus for the solution to the problems among participants has been reached, three representatives will be elected who will be in charge of the negotiations with CENDEPESCA and other relevant institutions.

The draft of the self-management plan will be prepared through analysis between fishers’ representatives and CENDEPESCA.⁵

With regard to self-management, CENDEPESCA should analyze the type of support that can be provided. For example, for the installation of reefs, the support will include the supply of information on the procedures that fishers have to follow for the installation of structure, the necessary lateral support to that effect, CENDEPESCA permits for the use of installed reefs, submission and coordination of the various lateral support projects.

Once the general framework of the action plan has been defined, the consensus of the fishers on the draft of the self-management plan and the lateral support that will be provided by CENDEPESCA will be sought. Once a consensus has been reached, responsibilities for each activity will be defined.

The self-management plan will be implemented. It is necessary that fishers’ representatives and the personnel of the corresponding zone office of CENDEPESCA are in close contact in order to look for timely and flexible measures in the event that any problem arises. This scheme will allow fishers to feel that they can count on CENDEPESCA’s support and this will help them gain self-confidence in the execution of their tasks.

he will transfer technology for the execution of interviews, use of different interview tools, study through workshops, etc. through the OJT method (On-the-Job Training). He will be appointed for a period of 2M/M. In both cases, the Salvadoran counterpart will be working full-time.

⁴ During the debate, it is necessary to be careful in terms that it does not become a political debate. Historically workers’ and producers’ organizations in El Salvador have clashed with the Government, giving origin to political conflicts. While an organization is a way for small producers to acquire the capacity to compete with big producers, it is important that in the workshops CENDEPESCA is aware of the fact that there is a risk that an organization of small producers can turn violent if it loses control.

⁵ Specific resources management activities are described in the section “Fishing Management Improvement Project”.

The progress of the activities should be monitored on a periodical basis with the joint effort of fishers' representatives and the personnel of the zone offices. The evaluation of the results of the activities will be made upon conclusion of a cycle. This evaluation will be made mainly by CENDEPESCA.⁶

2) Intermediate stage (years 2006-2008)

This phase intends to give continuity to the project implemented in the "base communities" and at the same time, to start similar projects with other fishers' groups of the same community. There are two methods of approach to invite other fishers to start a project: 1) through the members of the first group that started the project; 2) through CENDEPESCA.⁷

Project promotion and extension and field trips will be organized. The personnel of the Communication Unit of CENDEPESCA have the necessary know-how for this process based on the experience obtained through the pilot project.

After the organization of these events, individual and organized fishers will be invited to participate in the project. In the event that their response is positive, meetings with fishers will be organized and similar procedures to those implemented in the first group of participant fishers will be applied to start a project with new groups. This phase intends to involve 80 communities throughout the country (20 communities in each zone of the jurisdiction of the zone offices of CENDEPESCA).

An exchange of experiences among highly developed groups will take place in order to prepare the base for the national organization of artisanal fishers.

3) Final stage (years 2009-2010)

This phase intends to organize the regional board of fishers' representatives per area of jurisdiction of each zone office. Member participants will exchange experiences and opinions in order to gain a broader view of fisheries management. At the same time, the necessary coordination will be made in order to achieve a more effective management.

This phase intends to organize the national board of fishers' representatives that will

⁶ The evaluation is highly important to set up the self-management system of fishers in the future. The reasons for the success and failure of a project should be defined and analyzed in future projects. At the same time, these data will be useful to carry out similar activities in other communities. Consequently, the data should be systematically centralized and stored in CENDEPESCA.

⁷ No. 1) is valid when the first group of fishers of the "base community" plays the leading role over the other fishers. On the contrary, when there are several groups of fishers competing among themselves, this system is of little benefit.

be over the regional boards. CENDEPESCA will take the initiative for the creation of such board. The National Board of Artisanal Fishers will be the space to address issues which cannot be solved at community level; for example, the management of the estuary as a whole; common rights in seawaters; shrimp fisheries; etc., as well as the negotiation and coordination of industrial shrimp fishing activities. Representatives for the defense of the interests of all artisanal fishers in CONAPESCA will be elected.

Estimated budget of the Fishers' Organizations Development Plan

Total amount (US \$): 818,200

Converted into ¥: 106,366,000

(US \$1 = ¥130)

Activities		Cost (\$)
Phase I	Surveys of the interest on resources management in fishing communities (in all coastal zones)	US \$45,000
	Personnel expenses	Expert in the social study (Level B ^{*1} x 3M/M)
	Cost of equipment and facilities	Pilot project + Grass Roots Grant Aid Project of Japan
	Operating and administrative cost	Pilot project + Grass Roots Grant Aid Project of Japan
Phase II	Organization, planning and implementation of community workshops (Initial stage)	US \$171,600
	Personnel expenses	Expert in the social study and workshop organization (Level B ^{*1} x 3M/M x 2 years)
	Cost of equipment and facilities	Cost of materials and labor for the construction of reefs (including fuel cost)
	Operating and administrative cost	Office stationery, car rental + fuel cost, etc. for the study
	Planning and implementation of the management of and support to the formation of fishers' organizations (continuation / Intermediate stage)	US \$319,800
	Personnel expenses	Expert in the organization of workshops and formation of organizations (Level B ^{*1} x 3M/M x 3 years)
	Cost of equipment and facilities	Cost of materials and labor for the construction of reefs (including fuel cost)
	Operating and administrative cost	Office stationery, car rental + fuel cost, etc. for the study
	Planning and implementation of the management of and support to the formation of fishers' organizations (continuation / Final stage)	US \$281,800
	Personnel expenses	Expert in the organization of workshops and formation of organizations (Level B ^{*1} x 3M/M x 2 years)
	Cost of equipment and facilities	Cost of materials and labor for the construction of reefs (including fuel cost)
	Operating and administrative cost	Office stationery, car rental + fuel cost, etc. for the study

*1 Level B: Expert (US \$15,000 M/M)

16.4 Fishing Technology Development Plan

16.4.1 Basic Guidelines

At present, it is difficult to appoint experts in fishing technology in CENDEPESCA, and as a consequence, the role the institution will play in technological development is defined as: sectorial diagnosis, identification of fishers' needs, and the coordination of the national and international cooperation for the diversification of artisanal fisheries. To this effect, the research coordinator (previously described in Chapter 16.2) will be in charge of coordinating these activities.

Regarding the transfer of new fishing techniques, there are several methods to implement. First, it will be done through technical assistance from fisherman to fisherman (extension of the pilot project). If this is not possible, fishers from neighboring countries will be invited; and for new techniques that are not known yet in the region, foreign experts will be invited.

During the initial stage of the development, it is suggested to concentrate in the coastal area to develop underutilized resources. Offshore (approximately 30 nautical miles) or 100 m deep water should be developed later. Simultaneously, the use of medium-size boats with internal engine will be gradually increased.

16.4.2 Execution plan

(1) Phase I (years 2000-2003): "Pilot project follow up."

This Phase intends to conduct a study on the potential of the diversification of artisanal fisheries and on the follow up of the impact of the experimental artificial reefs installed through the pilot project as well as of small FADs, gill nets with big mesh size, small encircling nets, etc.

Some fishers are already using artificial reefs, FADs and gill nets with big mesh size and their data should be collected. These data should include: the location of the reef (fishing zone), the number of users, frequency of use, harvested species, fishing volume and value.⁸

With regard to the experimental operation of small purse seine, the fishers of La Libertad are currently in charge of their maintenance and use. In this case, it is important to encourage them to harvest using these nets on an experimental basis.

⁸ It is important to verify the potential of skipjacks and amber jacks harvested in the small FADs placed in the coast to offer them in the market as ingredient to prepare fish "pupusas".

Given the difficulty to operate during the rainy season, this phase proposes to manufacture more gill nets during this season and to conduct operations during the dry season (from October to March). The relevance of extending length of the nets by an additional 30% is being analyzed. CENDEPESCA, on its part, should look for a market for the catch establishing the link between the big intermediaries of La Tiendona and the fishers. The data to be gathered in this regard include fishing zones, dates, frequency and hours of operation, catch species and volume of the catch.

Conger Eel resources survey (study of the catch during the rainy season)

Through the pilot project it has been verified that the catch of conger eels is extremely high during the dry season. At present, the demand for this species is only as filet or dried and salted fish during the dry season. However, in case that fish ball processing is implemented the demand would remain throughout the year. Consequently, the potential of the catch during the rainy season should be investigated with the collaboration of the processors. Additionally, if the data on the development of the gonads are taken during the processing, the size of the maturity as well as the spawning season could be determined.

- (2) Phase II – Initial stage (years 2004-2005): “Phase of expansion of successful results to other communities”

It will be verified that the installation of artificial reefs will favor the catch of large size snapper and croakers with fixed gill nets with big size mesh or with hand line around the reefs. The economy of pelagic fish fishing skipjack, amber jack (*caranx caninus*), dolphin fish (*coryphaena hipurus*), etc. with the use of small FADs should be investigated. The success of fisheries diversification in some fishing communities will be presented to other communities through research visits. Zone offices will identify the leaders of each community through the promotion of fishers’ organizations and the lateral support project in order to incorporate them into the project of extension of fishing techniques diversification.

With regard to small purse seine, once the success of the operation in the coast of La Libertad has been verified, a demonstrative operation will be carried out. Such operation will consist of convening fishers from different locations of the country to whom the effects of screens for night fishing as well as purse seine will be explained, providing them with information on such fishing gear and preparation method. Later, at the request of the fishers, the demonstrative operation will be conducted in different zones of the country. Intermediaries will also be invited to participate in these activities to secure the market. Once the economic effect of these techniques has been

demonstrated, CENDEPESCA will provide support to fishers so that they can get credit for the purchase of such fishing gear (from BMI, etc).⁹

- (3) Phase II - Intermediate stage (years 2006-2008): “Phase of expansion of the operation to offshore.”

Based on the experiences with the use of FADs in the coast, once the link between fishers’ organizations with adjacent fishing communities has been strengthened, this phase proposes the installation of off shore FADs.¹⁰ Once the reefs have been installed, participating fishers will collect the data of the experimental operation to verify their impact. The fishing methods that will be used are long-line and trolling, encircling gill net, etc. The first year will be basically experimental operation, the research visit (V&T) will be planned and artisanal fishers of adjacent communities will be invited.

Prior to the expansion of artisanal fisheries expansion to off shore, a financing plan will be prepared to replace conventional boats for medium-size boats with internal engine (40 feet, 200 HP, approximately). In order to prepare the plan, the profitability of the investment will be verified based on the results of the experimental operation mentioned before aside from giving importance to the achievements of a safe and efficient offshore operation (boat stability, internal engines, school of fish detector, GPS).

This phase intends to promote the off shore artisanal fisheries. Experts will be hired and medium-size boats will be rented for six months during two years, in order to install off shore FADs and to train fishers in off shore navigation and fishing.

⁹ The objective of these techniques is the transition to an eco-friendly fishing and the stabilization of the income of fishers through the diversification of the operation that would favor the applicants in channeling the credit from the BMI and from other cooperation organizations for the purchase of fishing gear. CENDEPESCA will assist fishers to demonstrate the profitability and to process their credit applications.

¹⁰ Off shore FADs could be subject of abuse because it is difficult to watch them on a permanent basis. For this reason, sufficient experience should be gained in the coast and a co-management system should be put in place. Initially, CENDEPESCA will provide the necessary resources to cover the cost of construction materials for ten to twenty FADs.

- (4) Phase II - Final stage (years 2009-2010): “Phase of expansion to off shore operation expansion.”

Based on the experience obtained in the preceding phase, financing sources will be sought in order that fishers’ organizations can install offshore FADs at their own expense. It will allow artisanal fishers (in groups) to expand their scope of action at off shore. This phase intends to start activities with ten boats taking into account the capacity of the fishing ports.

- (5) Phase III (years 2011-): “Phase of artisanal fisheries sustainable development.”

The off shore fishing operation and the expansion of the wharfs will have been started in this phase. Fishers would choose among different fishing methods depending on the season and resources availability.

Estimated budget of the Fishing Technology Development Plan

Total amount (US \$): 345,200

Converted into ¥: 44,876,000

(US \$1 = ¥130)

Activities		Cost (\$)	
Phase I	Improvement and experimental operation with the encircling net (by November 2002)	US \$600	
	Cost of equipment and facilities	Rental of fishing boats with purse seine (2 pairs x 5 days)	US \$500
	Operating and administrative cost	Preparation of purse seine Communication and coordination with purse seine fishers (This work may be executed as part of CENDEPESCA management activities)	US \$100
	Conger Eel resources survey (catch during the rainy season and biological data)		US \$0
	Personnel expenses	Free services with the collaboration of university students of the School of Biology	
	Cost of equipment and facilities	Free services with the collaboration of the processors	
	Operating and administrative cost	Communication and coordination (This work may be executed as part of CENDEPESCA management activities)	
Phase II	Expansion of artificial reefs and small FADs in the coastal area (Initial stage)		US \$1,600
	Personnel expenses	Free services with the participation of artisanal fishers	
	Operating and administrative cost	Per-diem, etc. of the fishers for V&T (visit and training in more advanced communities (4 zone offices: 2 times x 2 years) Communication and coordination (This work may be executed as part of CENDEPESCA management activities)	US \$1,600
	Expansion of the use of the small purse seine (Initial stage)		US \$3,500
	Cost of equipment and facilities	Rental of boats with encircling net (2 pairs x 2 days) Rental of observation boats (2 pairs x 2 days) Rental of boats with encircling net (5 days)	US \$1,000
	Operating and administrative cost	Boarding and per-diem of the crew of the boats with encircling net (except La Libertad) Observation of the operation of La Libertad (4 days) Communication and coordination (This work may be executed as part of CENDEPESCA management activities)	US \$2,500
	Preparation of the small purse seine network (Initial stage)		US \$18,500
	Cost of equipment and facilities	Materials for making small purse seine (credit) 5 nets x \$3,500 = \$17,500	US \$17,500
	Operating and administrative cost	Leaders of the most advanced fishers (10 days) Communication and coordination (This work may be executed as part of CENDEPESCA management activities)	US \$1,000
	High-sea fishing experimental operation: 3 months x 2 times (Intermediate stage)		US \$171,000
	Personnel expenses	Expert in fishing (Level B ^{*1} x 6M/M)	US \$90,000
	Cost of equipment and facilities	Manufacture of FADs 10 units x \$2,000 = \$20,000 Rental of boats for the installation of FADs: 2 boats x 5 days x \$100 = \$1,000 Rental of medium-size boats with long-line: 6 months x \$10,000 = \$60,000	US \$81,000
	Operating and administrative cost	Communication and coordination (This work may be executed as part of CENDEPESCA management activities)	

Activities		Cost (\$)
Financing of medium size boats with internal engines (Final stage)		US \$150,000
Cost of equipment and facilities	Procurement of small-size boats with internal engine (credit): 5 boats x \$100,000 Procurement of medium-size boats with internal engine (credit): 5 boats x \$50,000	US \$150,000
Operating and administrative cost	Communication and coordination (This work may be executed as part of CENDEPESCA management activities)	

*1 Level B: Experts (US \$15,000 M/M)

16.5 Fish Processing and Marketing Development Plan

16.5.1 Basic Guidelines

A lot of resources in El Salvador are not used or are underexploited due to lack of market. Promotion and experimental sale activities of new processed products were conducted during the pilot project in collaboration with private enterprises through the use of the mass media. This experience has shown that there is great potential in the national market fish pupusas. In such way, if we could find proper utilization of the fish, it would be possible to offer new protein sources to the population. Besides, fisheries diversification will contribute to reduce the pressure on shrimp resources. The objective of the Fish Processing and Marketing Development Plan is to look for new uses for the unused or underexploited resources through the development of new processing techniques and thus increase the consumption of fish products throughout the country. The guidelines of the Project are the following.

- Form the Fish Consumption Promotion and Expansion Team in CENDEPESCA.
- Expand the new processing techniques and promote the consumption of the products.
- Used the new processed products in the “Healthy School” campaign.
- Strengthen the quality control system and the hygiene of raw materials and processed products.

16.5.2 Execution plan

(1) Phase I (years 2000-2003):

Formation of the Fish Consumption and Expansion Team

Form the project team with the staff of the Communication and Fisheries-Business Units of CENDEPESCA defining the promotion of fish consumption as the main mission of these two units. The Team will prepare an action plan including the different promotion activities and the estimated budget for its implementation. It will also promote the positive aspects of fish consumption (nutritional value, healthy food, etc.). With a well-planned strategy, promotion campaigns can be conducted through the use of mass media such as TV, newspapers, radio, etc. at low cost.

Promotion of new processed fish products

The activities for the promotion of processed fish products that private processing companies are conducting are of significance and they should receive lateral support and follow up (monitoring). The success of these campaigns will be the model for the promotion of fish consumption for future projects that will be implemented by other companies of the sector.

Support to small processing plants

The potential for development of small processing plants is high among fishing communities with easy access to low cost raw material. The staff of CENDEPESCA should provide the technical information that they have stored¹¹ throughout the pilot project to local restaurants, fishers' groups, processors, vocational training centers, etc. It is necessary to coordinate the activities with local consultants and NGOs.¹²

(2) Phase II (years 2004-2010):

This Phase intends to monitor the small processing plants and companies in order to identify and solve the present problems. Currently, CENDEPESCA has five officers who have trained in technical centers or who are capable of giving advice on sanitary controls. It also intends to share technology through the experience and knowledge of these human resources.

Participation in the "Healthy School" Program

In order to change the eating habits, it is easier to start the task with children than with adults. Therefore, the participation in the "Healthy School" program is a useful long-term strategy. This strategy intends to change the eating habits starting with the young generation.¹³ Since Healthy School is a program supported by an international organization, it will be difficult that one single private company participates in this project. Therefore, CENDEPESCA will have to take the initiative.¹⁴

As an integral part of the fish consumption promotion, educational materials on the benefits of fish products will be prepared (nutritional value, healthy food, etc.). Youngsters will be made aware of such benefits. If CENDEPESCA does not have the adequate human resources, consider the possibility to bring foreign experts within the framework of external assistance.

The fish product quality improvement and hygiene is an important factor for the promotion of fish consumption. The reaction of consumers during the Red Tide in

¹¹ The information prepared by JICA and PRADEPESCA can be used (recipes, etc.)

¹² Once the production system is in place, the possibility to export products to the U.S. that offers a big market for fish dough, would be open. Private processing plants with great potential are FORMOSA y SUPER MARINO.

¹³ The safety, the nutritional value and the low price of the processed food should be proven.

¹⁴ At present, there is a company interested in participating. It is necessary to invite other companies and coordinate the production in order to avoid giving the impression that specific companies are receiving support.

September and October 2001 was proof of the importance they give for safe food. Furthermore, the international market will require from exporters compliance with the strictest sanitation standards (including HACCP). In order to cover the demand, CENDEPESCA should strengthen the link with the General Director's Office for Animal and Vegetal Sanitation (DGSAV) and improve the quality control and hygiene of fish products.

(3) Phase III (years 2011-):

It is important to appoint qualified personnel to be in charge of fish products quality control and hygiene (advisory on HACCP and measures against the Red Tide) if there are plans to increase the exports of these products.¹⁵

The Healthy School campaign will be conducted throughout the country.

¹⁵ Human resources can be chosen from the counterpart of the Technical Cooperation for Projects. The two laboratories of the MAG, which are public agencies, could be hired for hygiene control.

Estimated budget of the Fish Processing and Marketing Development Plan

Total amount (US \$): 141,200

Converted into ¥: 18,356,000

(US \$1 = ¥130)

Activities		Cost (\$)	
Phase I	Development and experimental sale of processed fish products		\$0
	Personnel expenses	The implementation of the pilot project was concluded	
	Cost of equipment and facilities	The implementation of the pilot project was concluded	
	Operating and administrative cost	The implementation of the pilot project was concluded	
	Expansion of processed fish consumption and participation in the Healthy School campaign (2002-2003)		US \$1,800
	Operating and administrative cost	Communication and coordination: 18 months x \$100	US \$1,800
	Advertising campaigns		US \$1,800
	Operating and administrative cost	Communication and coordination: 18 months x \$100	US \$1,800
	Support to fish product processing plants		US \$3,600
	Operating and administrative cost	Communication and coordination: 18 months x \$200	US \$3,600
Phase II	Support to processing plants (2004-2005)		US \$4,800
	Operating and administrative cost	Communication and coordination: 24 months x \$200	US \$4,800
	Expansion of small processing plants (2004-2005)		US \$2,000
	Cost of equipment and installations	Kitchen utensils for simple demonstrations	US \$2,000
	Operating and administrative cost	There will not be any cost because the activities will be executed with the collaboration of processing plants and zone offices	
	Fish consumption expansion and promotion campaigns (2004-2009)		US \$127,200
	Personnel expenses	Expert in audiovisual educational materials: 24 months x \$4,500 = \$108,000	US \$108,000
	Cost of equipment and installations	Housing: 24 months x \$200 = \$4,800	US \$4,800
Operating and administrative cost	Communication and coordination: 72 months x \$200 = \$14,400	US \$14,400	

16.6 Plan to Improve the Livelihood of Women in Fishing Communities

16.6.1 Basic Guidelines

The pilot project included work with women's groups of three communities in order to identify potential activities to improve the household economy. Some of the groups had started from scratch and have managed to develop intensive activities. The activities investigated included restaurant management, fish product processing, tourism (rental of beach clothing, tables, etc.), and free market (clothes recycling). While the study period was short, it verified that the potential for development was high among highly motivated groups with the minimum lateral support with small investments. The pilot project has proven the potential of Salvadoran women and has taught valuable lessons. The Plan to Improve the Livelihood of Women in Fishing Communities is prepared based on these experiences.

The project will be promoted in coordination with the development stage of the resources co-management system and the development of fishers' groups. However, this Plan will focus on women based on the consideration that most of the individuals involved in fishing activities are men and the fishers' groups will be focused on resources management efforts. The basic guidelines of the project will be the following:

- Start the activities inform the communities that already have fishers' groups.
- Give due importance to the sense of "ownership" of the project the women of the fishing communities.
- Give due importance to the transfer of technology and experiences from women to women.
- CENDEPESCA will provide lateral support to the activities carried out by women.
- Coordinate efforts with relevant institutions and use local human resources to the extent possible.
- Take advantage of the experiences of success in extension campaign.
- Promote the exchange of experiences among communities and expand the scope of the action.

16.6.2 Execution plan

(1) Phase I (years 2000-2003):

This phase intends to identify the models of success of the activities aimed at improving the economic level and carried out women's groups of the fishing communities, including the success of the pilot project. It also intends to provide assistance to women's groups highly interested in improving their economic level.

The Social Development Unit and the zone offices of CENDEPESCA will be the main promoting entity of this project. Particularly, the zone offices should establish the social development data collection system managed by those in charge of the organization of fishers. It is expected that they clarify the present situation of the fishing communities and become the liaison between the women of these communities and CENDEPESCA. Specifically, they will follow up the activities of the groups of initiated during the pilot project and will collect the data of the models of success achieved by other existing groups as well. It is advisable to identify the current limitations and the lessons learned.

It intends to collect data on highly motivated women's groups. The communities where new fishers' groups will be organized, in accordance with the results of the surveys on resources management as well as the group of Tasajera Island that has shown interest in participating in the project, will be included among them. In case it is possible to provide specific support, the procedures will be started on a timely basis. Details of the support actions are given in Phase II.

Actions will be coordinated with the Ministry of the Governance (former Ministry of the Interior), National Family Secretariat and other institutions, local governments (municipalities) and NGOs engaged in community development and vocational training. It is essential to establish a liaison at main office level since the work will include not only data collection but also the drafting of the action plan through joint collaboration.

(2) Phase II (years 2004-2010):

Along with the formation of fishers' groups, this phase intends to identify and organize groups of women to exchange information on the models of success and experience and to carry out specific activities aimed at improving the economic level of women. As stated in the section of the lessons learned from the pilot project, it is important not only to identify the members who are interested but also the individuals who can play leading roles. The monitoring of the existing groups will also be implemented to the extent possible.

The action plan agreed to by the female members through field visits and participatory workshops will be drafted. For planning purposes, the priority order of the actions to be carried out will be defined taking into account not only the interest and the initiative of the participants but also the geographic conditions, accessibility, product availability, municipal development plan, etc. In addition to the activities carried out in the pilot project, aquaculture, clothes making, craft production and sale, eco-tourism, family orchards (in group), poultry and pig farming, hair salons, etc. will also be considered.

The necessary technical assistance could be requested from the institutions included in the table below. Efforts will be made to increase the scope of action to other groups and communities through project presentation events, exchange of experiences among groups, etc.

Activities	Technical assistance beneficiaries
Activities conducted by the existing women's groups	Existing women's groups of the pilot project <ul style="list-style-type: none"> · Méndez' Island (Las Gaviotas Coop.) · San Antonio Los Blancos
	Other existing women's groups <ul style="list-style-type: none"> · Barra de Santiago (Coop. Barreñitas) · El Espino (Vencedoras Coop.)
	Organizations providing support to the existing women's groups <ul style="list-style-type: none"> · Board of Directors of the flea market located at Centenario Park in San Salvador · OXFAM AMERICA
New activities (Assistance from different techniques)	Organizations providing training and assistance to groups and small businesses <ul style="list-style-type: none"> · Fundación Salvadoreña de Apoyo Integral (FUSAI) · Instituto Salvadoreño de Formación Profesional (INSAFORP) · Women's Association Mérida Anaya Montes (M.A.M)
	NGOs providing support to field activities in other communities <ul style="list-style-type: none"> · PLAN International · World Vision
(Farming and Forestry Training)	· Centro de Tecnología Agropecuaria y Forestal (CENTA)
(Eco-tourism)	· Corporación Salvadoreña de Turismo (CORSATUR)

(3) Phase III (years 2011-):

This Phase will intend to increase the scope of the action the same as the preceding phase and intends to form a federation of women's associations at regional and national level, parallel to the formation of the national board of fishers' groups. New activities will be started in order to contribute to improving social infrastructures, such as latrines, water reservoirs, health centers,

educational centers, community halls, etc. The access roads between these social infrastructures and health centers, schools¹⁶, etc. will be built in accordance with the development of fishers' organizations at regional level.¹⁷

The financing granted to the fishers by the BMI by mid- 2001 could be used to fund the project (for further details, see Chapter 2). Furthermore, the following micro-credits currently granted by the various organizations can be used.

Implementing Organizations	Type of credit
FUSAI	Upon implementation of the micro-credit project for several years, created "Integral Foundation" and continues managing the micro-credit service. Beneficiaries include individuals as well as groups.
CARE	Upon implementation of the micro-credit for several years, created "Campo Foundation" and continues managing the micro-credit service. Beneficiaries include individuals as well as groups.
ENLACE	Community bank that manages savings and credit services through periodical meetings. The members of the mutual group are the beneficiaries but it also has a program that benefits individuals.
FUNSALDE	Joint program with World Vision. Beneficiaries include individuals as well as groups.

¹⁶ Concerning educational centers, it is advisable to analyze the possibility to improve the curriculum by incorporating basic vocational training, fish product processing practices, etc.

¹⁷ Highly developed fishers' groups (with legal capacity, etc.) can execute social infrastructure construction projects on their own initiative. Specifically, they can channel funds from the Non Reimbursable Financial Cooperation for Community Projects or from USAID for small social infrastructure projects, or the FISDL (for public subscription). Meanwhile, for the big social infrastructure works it is required that local government (the municipality) take the initiative. The Ministry of the Governance and the FISDL offer a program for strengthening the capacity of the decentralized governments for the formation of development projects.

Estimated budget of the Plan to Improve the Livelihood of Women in Fishing Communities

Total amount (US\$): 142,000

Converted into ¥: 18,460,000 (US \$1 = ¥130)

Activities		Cost (\$)
Phase I	Identification of the interested groups in the fishing communities (in all of the coastal zones)	US \$72,000
	Personnel expenses	Expert in social studies (Level B* ¹ x 3M/M): It will be conducted at the same time with the surveys on the interest in resources management for fishers' organizations. Young volunteers (Level C* ¹ x 24M/M)
	Cost of equipment and facilities	The implementation of the pilot project was completed
	Operating and administrative cost	The implementation of the pilot project was completed
Phase II	Monitoring of existing groups	US \$0
	Personnel expenses	Zone offices staff
	Cost of equipment and facilities	None in particular
	Operating and administrative cost	Cost of fuel for vehicles
	Community workshop organization and planning	US \$0
	Personnel expenses	Workshop organization (Level B* ¹ x 3M/M): paralleled with the surveys on the interests in management resources related to fishers' organizations.
	Cost of equipment and facilities	None in particular
	Operating and administrative cost	Office stationery, car rental + fuel cost, etc. for the study
	Execution of the activities	US \$0
	Personnel expenses	Local and NGO human resources will be used. Funds collected by the groups or from micro-credits will be used to pay salaries and training costs. (The same will be done for the subsequent items)
	Cost of equipment and facilities	Varies according to the type of activity.
	Operating and administrative cost	Same
	Creation of the space for the exchange of experiences	US \$70,000
	Personnel expenses	Social Development Unit, zone offices and Communications staff
Cost of equipment and facilities	None in particular	
Operating and administrative cost	Office stationery, car rental + fuel cost, etc. for the study (US \$10,000 x 7 years = US \$70,000)	
Phase III	Social infrastructure construction and improvement	
	Personnel expenses	The funds from micro-credits will be used, including funds from BMI credits, Non Reimbursable Financial Cooperation for Community Projects, FISDL, etc.
	Cost of equipment and facilities	Same

*1 Level B: Experts (US \$15,000 M/M); Level C: international volunteers (US \$3,000 M/M)

16.7 Fisheries Statistics Improvement Plan

16.7.1 Basic guidelines

For the purposes of fisheries management, it is important to have the statistical data that will become the basis for policy-making. The Fisheries Statistics Improvement Project is one of the essential projects to set up the co-management system. The objective of this project will be to conduct a thorough revision of the fisheries statistics and ensure the effectiveness the new system implemented in the pilot project, and further improve it. The fisheries statistical data and the fisheries statistical system should be defined and designed in accordance with the progress of the fisheries management of each stage as well as with CENDEPESCA's capacity.

The basic guidelines of the present Project are the following.

- Define the area of coverage of the fisheries statistics system in accordance with CENDEPESCA's capacity.
- Improve the efficiency of the fisheries statistics system minimizing the cost.
- Set up a system that will allow the collection of accurate data on fishing boats, intermediaries, etc. and update them in a sustainable way.
- At long term, increase the accuracy of the statistical data in order that they can be used in resources management.
- At long term, increase the coverage and collect data from the main fishing ports.
- Readily provide the necessary statistical data as the basis for analysis of the conditions of the resources.
- Provide advice to other units based on the results of the analysis of the conditions of the resources.
- Publish the fisheries statistical data in order that the entire population is aware of the conditions of the fisheries resources.

16.7.2 Execution plan

(1) Phase I (years 2000-2003):

This phase intends to improve the accuracy of the data and the efficiency of the fisheries statistical system taking into account the existing limitations of CENDEPESCA. The collected data will include only the production and harvest.

Sustainable statistical data collection and processing

Zones will be defined to estimate the unloading volume, grouping the fishing communities depending on the species that make up the harvest. By doing so, the monitoring points will be centralized and will provide sampling continuity. In the event that the data collection

personnel are not sufficient to implement the task, personnel from outside will be hired. It is advisable to set up twenty sampling points.

Obtain the exact number of fishing boats through the boat registry system

The unloaded volume of the communities that were not included in the sampling communities will be estimated based on the data of the communities included in the sampling. To this end, it is necessary to know the exact number of fishing boats of the communities not included in the sampling. The zone offices should complete the marking of the boats included in the registry (approximately 4,300 boats) that was started in the pilot project in order to obtain the number of boats operating in each community.

Simplification of the database collection, processing and development

The collected data will be entered in the computer of each zone office using the program developed with MS Access. These data will be transmitted via the Internet to the Statistics Unit of CENDEPESCA to be processed. Efforts will be made to simplify the work by systematizing this flow of procedures.

(2) Phase II (years 2004-2010):

In order to further improve the degree of accuracy of the fisheries statistics, the zone offices will make efforts to obtain data on the frequency with which the boats are operating with the collaboration of the fishers of the communities presenting a high degree of organization. The collection of real data will be intensified in some of the main fishing ports.

Improve the accuracy of the fisheries statistics with the collaboration of the fishers.

Efforts will be made to increase the degree of accuracy of the fisheries statistics by collecting data on the rate and frequency of operation of the boat with the collaboration of the fishers of communities having fishers' organizations. The collaboration provided by the fishers will contribute to strengthen their awareness of resources management making them think directly about self-management. In addition to collaborating to collect the data, they will receive training in the analysis of the data with a view to fisheries management.¹⁸

Collection of real data in some big fishing ports

Fishers in the main fishing ports such as Acajutla, La Libertad and El Triunfo, are obliged to get a permit from the Navy to operate their boats. By obliging authorized boats to report the harvest upon their return to the port, it is possible to obtain real data.

¹⁸ It does not consist in giving training in the complex analysis of the data but its main objective is to make people aware of resources management providing them with information on the variation of the availability of the resources per species. Each zone office of CENDEPESCA already started the training to fishers upon renewal of the fishers registry booklet (as of March 2001). Therefore, it is believed that the awareness of fishers on resources conservation could be strengthened through a similar training.

Analysis of the conditions of the resources

The Statistics Unit will start the analysis of resources availability per species and zone based on the database. This phase proposes to know the overall availability of resources through the thorough observation of the monthly variation of the volume of the catch per species and sampling points. The analysis will include the data of the volume of the catch as well as biological data such as size, weight, sex, and degree of maturity of the gonads per species. It is necessary to assign an expert for this task capable of transferring biological analysis method technology.

Publication of fisheries statistics through the Internet

A project to provide fisheries statistical data to the main actors of the sector through the Internet has been started (PESCANEGOCIO, February 2002). However, these data are underexploited because their content is unattractive and due to the lack of techniques to make an efficient use of the Internet. Consequently, this phase proposes to design a Web Page. To this effect, an expert in Internet technology will be required.

Reconstruction of the fisheries statistics system

When the communications technology improves in El Salvador and the broadband service, which allows permanent connection at low cost, is put in place it will be necessary to replace the conventional database system by the on-line system. Taking into account the magnitude of the fisheries statistics of El Salvador, it will not be required to develop an excessive system but to use the database system in the Web, which has a low implementation cost and is easy to maintain. In view of the fact that there are few experts in the field in El Salvador, it will be necessary to look for foreign experts in the development of a database system with Web technology.

(3) Phase III (years 2011-):

Once Phase II has been concluded, there will be sufficient data justifying the resources management actions and the time required from the data collection through obtaining results will be shorter. Subsequently, efforts will be made to intensify and further improve the accuracy of the data through the gradual incorporation of new monitoring points in addition to the main fishing ports.

Estimated budget of the Fisheries Statistics Improvement Plan

Total amount (US \$): 514,500

Converted into ¥: 66,885,000

(US \$1 = ¥130)

Activities		Cost (\$)	
Phase I	Diagnosis of the current situation of the fisheries statistical data processing and collection system (Statistics Unit)	US \$0	
	It was concluded in Phase I of the Development Study	--	
	Fisheries Statistics System Improvement Project (Statistics and Computing Unit / zone offices)	US \$0	
	It was concluded in the pilot project	--	
	Operation of the fisheries statistics data collection and processing system (Statistics and Computing Unit / zone offices)	US \$56,700	
	Personnel expenses	Data collectors in 20 locations (after the pilot project – 2003: 21 months)	US \$52,500
	Admin. and operat. cost	Data collection expenses (after the pilot project –2003: 21 months)	US \$4,200
Phase II	Operation of the fisheries statistics data collection and processing system (Statistics and Computing Unit / zone offices)	US \$226,800	
	Personnel expenses	Data collectors in 20 locations *1 (2004-2010: 84 months)	US \$210,000
	Admin. and operat. cost	Data collection expenses (2004-2010: 84 months)	US \$16,800
	Resources condition analysis (Statistics Unit / zone offices)		US \$45,000
	Personnel expenses	Fisheries experts (Level B ^{*2} x 3M/M)	US \$45,000
	An intensive data collection in some big ports will be started		US \$0
	Only by CENDEPESCA		--
	Publication of fisheries statistics through Internet		US \$26,000
	Personnel expenses	Systems engineer (Level E ^{*2} x 2M/M)	US \$6,000
	Equipment and facilities	6 global computers and software	US \$20,000
	Reconstruction of the fisheries statistics system		US \$160,000
	Personnel expenses	Systems expert (Level B ^{*2} x 6M/M)	US \$90,000
		Systems engineer (Level E ^{*2} x 12M/M)	US \$36,000
Equipment and facilities	Communications infrastructure in Statistics Unit and 5 bases	US \$10,000	
Admin. and operat. cost	Operation of the Statistics Unit and 5 bases (after the implementation –2010: 24 months)	US \$24,000	

Notes: *1 Savings in costs will be achieved by centralizing the collection points. The execution of a constant sampling in twenty points has been proposed in this phase.

*2 Level B: Expert (US\$15,000 M/M), Level E: local intermediate- level consultant (US\$ 3,000)

16.8 Fisheries Infrastructures Improvement Plan

16.8.1 Basic Guidelines

The main administrators of the Fisheries Infrastructures Improvement Project will be: user fishers if the project consists in the implementation of equipment and infrastructure (wharfs, jetties, etc.) in order to improve the efficiency of the fishing operation; and public institutions if the project deals with the construction of infrastructures of public interest such as fish markets. The guidelines of the present Project are the following:

- Take into account the progress of the organization of fishers.
- Give priority to the setting up of fishers' organizations using the infrastructures.
- Standardize the planning process of the administration and operation of the infrastructures with the participation of the fishers.
- Infrastructures of public interest such as fish markets could be managed by the State or by local governments. However, as a general rule, private companies will be contracted to operate them and new public institutions will not be created to operate and give maintenance to such infrastructures.

16.8.2 Execution plan

(1) Phase I (years 2000-2003):

The rehabilitation works of the infrastructures affected by the earthquakes, currently executed by CENDEPESCA (see Chapter 8), will be completed in the next coming months. Once the pier of El Triunfo (Pirayón) is rehabilitated, there are plans to grant the Navy's authorization to monitor to all the fishing boats. At the same time, there are plans to centralize the departure and arrival of the boats of the zone in this pier and to oblige them to provide statistical data. However, the zone offices of CENDEPESCA should conduct a study to analyze the possibility to have the collaboration of the fishers in this regard. On the other hand, for the execution of the reconstruction works of the wharf of La Libertad, user boats and fish product merchants will be obliged to temporarily retire from the facilities. Currently, CENDEPESCA is planning to build a fish market in an idle property at the entrance of the pier and will conduct the corresponding feasibility study.

Small fishing communities such as Tasajera and Colorado can only be accessed by sea. CENDEPESCA, the same as the other communities, should make a study on the progress made in the organization of the fishers in order to find out the potential to strengthen the existing organizations or to integrate several organizations into one, as the case may be, so that they operate, give maintenance, and watch the infrastructures. At the same time, CENDEPESCA will study the possibility of organizing the fishers of other communities giving access to the

use of the infrastructures as an incentive.

(2) Phase II - Initial stage:

If the feasibility study proves the pertinence of building the fish market in La Libertad, the works to this end will be started in this phase. In addition to the local government, CENDEPESCA will become an important member in the operation and management of such market. Upon implementation of the project, CENDEPESCA will use it as a model and detailed information on the problems and measures taken to solve them will be gathered in order to use this experience to implement similar projects in other zones. Candidate zones for the implementation of similar projects are El Triunfo (central region) and La Unión (eastern region).

If the cost of the project ranges from ¥300 to 600 million, it is going to be necessary to channel external cooperation for its implementation. On the other hand, in order to develop the isolated fishing communities in the Gulf of Fonseca and improve their living standards, it will be necessary to build small collection centers, access roads, etc. in addition to wharfs. Therefore, it is deemed necessary to conduct a study on the needs at national level.

(3) Phase II - Intermediate stage:

As the fishers' organization process progresses, the infrastructure construction works will be executed taking into account the different local characteristics and the capacity of each organization. There is a possibility to start the off shore large pelagic fish fishing (dolphin fish (*coryphaena hippurus*), tuna, shark, etc.) with the use of boats equipped with internal engines. In that case, it will be necessary to build new port facilities. However, it is very likely that commercial infrastructure work for fisheries products will be mainly executed.

(4) Phase II – Final stage:

It is likely that in this phase off shore long-line fishing will intensify with boats equipped with internal engine the same as in other countries (Costa Rica and Nicaragua). However, this phase does not intend to build shipping ports investing large sums; instead, the needs of the existing ports will be taken care of. Particularly, it is likely that Acajutla will have an increase in the number of boats of this type¹⁹, in such case, the existing breakwater could be expanded and the new space could be used as jetty for the boats with internal engine. Additionally, there are plans to build mobile stairs in the pier and small cranes for the jetty.

(5) Phase III:

El Tamarindo (Gulf of Fonseca) is a natural anchoring ground due to the geography of the

¹⁹ As a matter of fact, three long-liners equipped with internal engine were introduced by private investments in Acajutla during the period of this study.

estuary. This phase intends to build a small jetty for long-line boats and a collection center that will be the fishing base of the eastern region. On the other hand, an analysis is being made of the possibility to build facilities to unload large pelagic fish in El Triunfo. The existing jetty is presently used only for outboard engine boats. The depth of the high side of the jetty is sufficient to anchor 2 m deep by 40-50 feet long boats with internal engine. Improvements to this port such as the installation of a floating jetty at the end of the existing jetty, etc., can be made with a small investment.

Estimated budget for the Fisheries Infrastructures Improvement Plan

Total amount (US \$): 3,390,000

Converted into ¥: 440,700

(US \$1 =¥130)

Activities		Cost (\$)	
Phase I	Rehabilitation of the infrastructures in the zones of the Pacific coast affected by the earthquakes	--	
	This work is under execution as part of CENDEPESCA management activities	--	
Phase II	Construction of the fish market in the former property of La Libertad Customs Office (Use de 3,000 m ² out of 14,800 m ²)	--	
	Personnel expenses	International consultants for works design and supervision (F/S has to be executed in order to determine the cost)	--
	Equipment and facilities	Market, management office, meeting room, parking lot, purification tanks, refrigerators, etc. (F/S has to be executed in order to determine the cost)	--
	Construction of small fish collection centers (the cost is per each center)		US\$ 75,000
	Personnel expenses	Local consultants for works design and supervision	US\$ 7,500
	Equipment and facilities	Collection center (50 m ²), ice manufacturer (0,5 TM/day), fish conservation boxes, etc.	US\$ 67,500
	Fishing port expansion (expansion of the breakwaters of the Port of Acajutla)		US\$ 1,500,000
	Personnel expenses	Local consultants for works design and supervision	US\$ 100,000
	Equipment and facilities	Expansion of breakwaters (80 m), installation of elevators in the existing wharf	US\$ 1,400,000
	Phase III	Construction of wharfs in El Tamarindo	
Personnel expenses		Local consultants for works design and supervision	US\$ 15,000
Equipment and facilities		Collection center (50 m ²), concrete wharf (2m x 20m)	US\$ 135,000
Construction of unloading facilities in Puerto El Triunfo		US\$ 1,665,000	
Personnel expenses		International consultants for works design and supervision	US\$ 165,000
Equipment and facilities		Floating wharf (5m x 30m, steel barge, support posts x 4)	US\$ 1,500,000

16.9 Aquaculture Development Plan

16.9.1 Basic Guidelines

Aquaculture is an alternative source of income for the fishing communities along the coast. It could be an incentive to the formation of new groups similar to the placing of artificial reefs.

As it was indicated in Chapter 7, the species that can be the object of farming in El Salvador include shrimp, ark shells (*Anadara spp.*), oysters, other bi-valve species, grouper (*Serranidae*), róbalo (*Centropomus spp.*), snappers (*Lutjanus*), croakers (*Cianidae*) and crabs. Analyses have been made on the adaptability of the species for cultivation, potential areas, economic return, and complexity of the techniques. However, the analyses do not include fish because they have been considered inadequate for farming at present situation.

The analyses have proven that the most adequate species for farming is white shrimp. While the pertinent technology is not yet very popular in El Salvador, some countries of the region such as Honduras and Ecuador already implemented this technology. On the other hand, there is local staff with training in shrimp farming at the Los Cóbano Center of CENDEPESCA; consequently, it is deemed that the implementation of this technology is feasible. There are about 2.800 ha. Of potential farming area. In view of the above and due to its high return, it is concluded that shrimp is the most adequate species for farming

Fish and shellfish species farming qualifications

Species	Target area for development	Economic Return	Farming techniques complexity
Shrimp	2.805 Ha	High	Medium
Ark shell	53 Ha ^{*1}	Low	Easy ^{*2}
Oyster and mussel	Unknown	Unknown	Easy ^{*2}

Notes:

1. Since the demand for Ark shell is unknown, the annual production volume in the Department of Usulután and a surface of 53 Ha necessary for the production of 38 million pieces of shellfish have been used.
2. In addition to the above, it is necessary to develop larva production techniques.

The surface can be used for aquaculture development for the distribution of ark shells is along mangrove shores. However, large areas should not be used for this purpose taking into consideration the size of the market for ark shells as well as the competition among fishers that earn their living through shellfish extraction. Since it was not possible to obtain accurate data, the present Study based its calculations on the surface of water required for the farming of 38 million shellfish that is the annual production of ark shells in the Department of Usulután (August 1998 – July 1999). However, it is deemed necessary to recognize the benefits of aquaculture as a means for resources recovery and conservation. As for oysters, their potential will be high once the natural larva production technology has been developed even though at

present there are no sufficient data because the experimental extraction recently started.

In conclusion, white shrimp, ark shells and oysters are recommended as the three species suitable for aquaculture: white shrimp because the appropriate technology already exists and it has a high return added to the fact that it has been verified that there is sufficient space to develop farms; ark shells because there is great need to recover and conserve this species; and oysters because they have high potential for development.

(1) Promotion of semi-intensive shrimp farming using salt works

In most cases, shrimp farming in El Salvador consists of farming without nourishment or fertilized farming. In these extensive cultivation methods, the unit yield is low and highly dependent on the variation of the natural conditions, requiring very complex techniques based on the experience of the particular farmer. Nevertheless, most shrimp farmers have very little experience or knowledge.

On the other hand, the semi-intensive farming implemented in some farms of the Bay of Jiquilisco use a balanced nourishment and pumps to change the water. While semi-intensive farming requires initial investment for the construction of the facilities (pumps, gates, etc.) as well as nourishment, they are easy to regulate and their efficiency is high.

Therefore, this Study proposes the promotion of a policy providing for the conversion of the existing salt works and extensive farms into semi-intensive farms in order to increase the return of shrimp farming without the need to build or develop new farms. The basic design of the facilities should be outlined and a semi-intensive model to regulate the necessary techniques should be set up as the first step, and these tools should be passed on to the farmers. However, since the implementation of a new system in all of the farms of the country within a short period of time would have a high cost and would require labor, this Study proposes the setting up of two farming models, semi-intensive and intensive, so that farmers can choose between them in accordance with the needs of their farms.

(2) *Ark shells* farming for natural resources recovery

Larva supply is one of the factors limiting ark shells farming. The promotion of the farming of this species without developing the mass production technology of natural larvae could cause the depletion of the natural resources. Therefore, ark shells farming should be made in small farms and on an experimental basis while the mass larva production technology is not in place.

The farms that are presently in operation should be considered a model for aquaculture promotion once the pertinent technology has been developed and authorizations for the construction of new farms should not be granted.

The project implemented by JICA Technical Cooperation has obtained good results in the production of natural larvae of ark shells. It is expected that this technology will be disseminated to open new possibilities. Ark shells' farming is also a valid tool to recover natural resources. It should not be limited to farmed shellfish for marketing, but a mechanism should be introduced in the system to leave part of shellfish for reproduction.

Based on the techniques developed by the JICA team for the collection of natural larvae, this Study intends to stabilize the oyster production by implementing the oyster reproduction project through the creation of a habitat by placing stones and/or rocks in sandy bottom area around natural rocky zones and resources management activities in the seashore. The experimental farming of oysters could be started in estuary and lagoons (native species and new species from Mexico, for example) to ensure an alternative source of income for the fishers.

16.9.2 Execution plan

(1) Phase I (years 2000-2003):

Expansion of shrimp farming techniques

In this phase, the Los Cóbano Center and zone offices will jointly identify the farmer's demand for training. At the same time, data on needs of the NGOs' working in the development of fishing communities through shrimp farming will be gathered. Additionally, two types of farming handbooks (semi-intensive and extensive) adapted to the Salvadoran environment will be prepared.

Development of natural larva extraction techniques

Natural larvae are the key to the success of ark shells and oyster farming. In addition to making experiments with JICA's Technical Cooperation, it will be necessary to select, on a preliminary basis, the areas suitable for the development of shellfish farming and protection areas.

Social study of the fishing communities

For the ark shells and oyster farming, natural larvae will be supplied basically to the fishers' groups that will operate the farms. For the selection of candidate areas, it is required to make an investigation of the possibility to form fishers' groups that will be the entity in charge of promoting the project as well as to build the necessary social infrastructures for the project.

(2) Phase II (years 2004-2010):

Expansion of shrimp farming techniques

This Phase intends to expand the techniques developed in Phase I. The staff of Los

Cóbanos Center could take on this task and make visits to the various communities. However, taking into account the budget and time constraints it would be more convenient to give technical training to the staff of the NGOs working in each zone and incorporate them to this task.

Experimental shellfish farming in model communities

The experimental shellfish farming will be started by selecting several communities offering favorable conditions for the growth of these resources and where the consensus of the fishers' group (or community) has been reached. The data on the conditions of the habitat, variation in the quality of the water, adequate size of the larvae to be supplied, growth test, nourishment conditions, etc. will be collected in order to develop the pertinent techniques. Data on the variation of natural shellfish availability near the farms will also be collected with the collaboration of the fishers. Efforts will be made in order to avoid harvesting all the shellfish; instead, some seed of stock will be left for their reproduction in the farms.

Shellfish extraction control

Candidate areas will be selected and protection areas will be defined under the supervision of the State. In order to define these areas, it is important to hold exhaustive talks with the fishers in order that they fully understand the benefits of this measure. The conditions for an easy surveillance and control are also criteria for the selection of the areas. Once fishers have realized the benefits from the protection areas in the second half of Phase II, it will be possible that they carry out this task joining several communities. Furthermore, the minimum harvesting size will be defined verifying that shellfish reach their sexual maturity and the closed season will be defined during the peak-spawning season. The State will be responsible for surveillance in the initial phase but fishers will gradually participate in this activity and at their own initiative they will comply with the regulations in the most advance phase.

(3) Phase III (years 2011~):

Once the shrimp farming semi-intensification has been achieved, an eco-friendly technology would be set up. As the next step, it will be necessary to develop a fish disease diagnosis and control technology. Concerning ark shells and oyster resources, the awareness of the sustainable use of the natural resources through the experiences of Phase II would have been achieved and the fisheries management system will be gradually set up.

Estimated budget of the Aquaculture Development Plan

Total amount (US \$): 5,000

Converted into ¥: 650,000

(US \$1 = ¥130)

Activities		Cost (\$)	
Phase I	Extension of shrimp farming techniques		US \$0
	Personnel expenses	Included in the budget of CENDEPESCA for ordinary management activities	--
	Cost of equipment and facilities	Included in the budget of CENDEPESCA for ordinary management activities	--
	Operating and administrative cost	Included in the budget of CENDEPESCA for ordinary management activities	--
	Research on shellfish farming techniques		US \$0
	Personnel expenses	Included in the budget of JICA's Technical Cooperation Projects and CENDEPESCA's	--
	Cost of equipment and facilities	Included in the budget of JICA's Technical Cooperation Projects and CENDEPESCA's	--
	Operating and administrative cost	Included in the budget of JICA's Technical Cooperation Projects and CENDEPESCA's	--
	Social study of the fishing communities		US \$0
	Personnel expenses	Included in the budget of JICA's Technical Cooperation Projects and CENDEPESCA's	--
	Cost of equipment and facilities	Included in the budget of JICA's Technical Cooperation Projects and CENDEPESCA's	--
	Operating and administrative cost	Included in the budget of JICA's Technical Cooperation Projects and CENDEPESCA's	--
	Phase II	Expansion of shrimp farming techniques	
Personnel expenses		Included in the budget of CENDEPESCA for ordinary management activities	--
Cost of equipment and facilities		Included in the budget of CENDEPESCA for ordinary management activities	--
Operating and administrative cost		Organization of workshops	US \$5,000
Expansion of shellfish farming techniques		US \$0	
Personnel expenses		Included in the budget of JICA's Technical Cooperation Projects and CENDEPESCA's	--
Cost of equipment and facilities		Included in the budget of JICA's Technical Cooperation Projects and CENDEPESCA's	--
Operating and administrative cost		Included in the budget of JICA's Technical Cooperation Projects and CENDEPESCA's	--
Shellfish resources protection		US \$0	
Personnel expenses		Included in the budget of JICA's Technical Cooperation Projects and CENDEPESCA's	--
Cost of equipment and facilities		Included in the budget of JICA's Technical Cooperation Projects and CENDEPESCA's	--
Operating and administrative cost		Included in the budget of JICA's Technical Cooperation Projects and CENDEPESCA's	--

Chapter 17 Need for External Cooperation

In order to implement the Artisanal Fisheries Development Plan and the specific projects that are part of it, we propose to use of various external cooperation schemes including the dispatch of experts and conducting research activities. As a matter of reference, the proposals have been classified in three categories as follows: [A] (extremely necessary), [B] (very necessary) and [C] (necessary). However, it is needless to say that their degree of importance or need may vary depending on the progress of the development. The necessary cost for each proposal has also been estimated.

17.1 Technical assistance provided by experts, etc.

(1) Social development volunteer (2 years from December 2002) [A] Estimated cost \$ 112.800

Providing support to the project aimed at improving the economic situation of women's group in Los Blancos and nearby communities. During the implementation of the pilot project in Los Blancos, a new group of women was organized to start the ambulatory sale of snacks and a restaurant. Their activities are gradually diversified and it is expected that this group will become the main effort to improve the economic level of women and local development. The mission of the volunteer will be to provide lateral support for sustainable activities of this group are sustainable. Furthermore, he/she will provide support to the formation of new groups in the communities of the zone where there is no fishers' group. Volunteers will have their site in CENDEPESCA – La Libertad Office and will take part in these activities as facilitators.

Volunteers must have Spanish conversation skills. Since fish products processing will be one of the components of the fishing community development, he/she should have experience in some simple processing such as fish cleaning and cutting, preparation of *surimí*, fish balls and fish dough. Their work will also involve accounting. If possible, knowledge in the management of small business is very useful.

Personnel expenses:	Foreign volunteers 24 months x US \$4,500/month = \$108,000
Equipment and facilities:	Housing 24 months x US \$200/month (CENDEPESCA cost) = \$4,800
Administrative:	The cost of the necessary vehicles for the project will be covered by CENDEPESCA

(2) Social study expert (2003, 2004 and 2005, three months each year) [B] Estimated cost \$144,000

The expert will provide support to the staff of the local offices in their visits to the fishing communities to conduct research on the interest of the population in fisheries management and make a fishers' groups profile (objectives, type of activities, number of members, state and NGOs support, etc.), through direct dialogue with the people. Based on this information, the highly motivated communities or fishers' groups will be selected in order to increase and intensify the activities of fishers' organizations. During his second visit to El Salvador, the expert will provide advice and assistance to the staff of the Social Development Unit and zonal offices in the drafting of a fisheries management plan per community through the conduction of participatory workshops in the selected communities.

Personnel expenses:	Foreign expert 9 months x \$15,000/months = \$135,000
Equipment and facilities:	-
Administrative expenses:	9 months x \$1,000 = \$9,000

(3) Organizational strengthening advisor (3 years, starting April 2003) [A] Estimated cost \$620,000

CENDEPESCA has been promoting the restructuring process since December 2001 however, it is not an easy task to improve the efficiency and quality of the services. The tasks to be developed for the implementation of the present Artisanal Fisheries Development Plan are also demanding. Particularly, in order to set up the co-management system, it will be necessary to strengthen the capabilities of the institutional staff and implement a performance evaluation system and this is a very difficult task to be implemented by the current CENDEPESCA internal staff alone. Furthermore, it will be necessary to coordinate efforts and actions with other national state-owned institutions, research centers, NGOs, as well as with multilateral assistance organizations. Therefore, the presence of an expert is required to provide advice to CENDEPESCA's Director on organizational strengthening and setting up the performance evaluation system. The appointment will be for three years. If possible, an expert with knowledge of the current situation of artisanal fisheries in Central America is preferable.

Personnel expenses:	Foreign expert 36 months x \$15,000/month = \$540,000
Equipment and facilities:	Vehicles of exclusive use, computers, etc. \$50,000
Administrative expenses:	3 years x \$10,000 = \$30,000

(4) Artificial reef installation expert (approximately 5 months starting October 2003) [A]

Estimated cost \$114,000

The selection of the sites to build reefs on a scientific basis is essential to the well-planned promotion of the creation of new fishing zones. Therefore, CENDEPESCA will require an expert for the selection of sites. His work will include the preparation of maps of candidate sites for artificial reefs and conduct a survey on the following aspects in selected sites (more than 20): 1) quality of the bottom of the sea (including hardness); 2) predominant current and tide directions as well as flow velocity; 3) navigation routes of big ships; 4) fishing zones environment, etc. The necessary equipment for the study include: 1) current meter; 2) fish finder; 3) diving equipment; 4) underwater camera; and 5) nautical chart. The expert should have more than ten years of experience in night diving, deep sea and submerged boats. He should also be knowledgeable in oceanographic observation.

Personnel expenses:	Foreign expert 5 months x \$15,000/month = \$75,000
Equipment and facilities:	Current meter, school of fish detector, diving equipment, underwater camera, nautical charts \$30,000 Research boat lease (50 days x \$80 = \$ 4,000)
Administrative expenses:	5 months x \$1,000 = \$5,000

(5) Fisheries statistics and biology expert (3 months, between 2004 and 2005) [B]

Estimated cost \$48,000

In Phase 2, biological information will be gathered in addition to the fisheries production data, for the biological analysis to be made. Defining the order of priority of the data required for analysis should be determined. On the other hand, it will be necessary to set up a continuous information collection system in order to make an analysis of the situation of the resources. To this effect, a fisheries expert will be required to provide support to CENDEPESCA and to give advice on the suitable biological analysis methodology. This expert should be capable of giving advice and provide transfer of technology to set up a continuous biological data collection. He must be proficient in Spanish. No special equipment will be required.

Personnel expenses:	Foreign expert 3 months x \$15,000/month = \$45,000
Equipment and facilities:	-
Administrative expenses:	3 months x \$1,000 = \$3,000

(6) Fishers' organizations support expert (between 2006 and 2010, approximately three months each year) [A] Estimated cost \$240,000

It will be necessary to have an expert in the fishers' organizations growth stage to form the national federation. This expert should be able to give advice on the type of activities to be carried out, on the management of organizations as well as on the improvement of the legal framework.

Personnel expenses:	Foreign expert 15 months x \$15,000/month = \$225,000
Equipment and facilities:	-
Administrative expenses:	15 months x \$1,000 = \$15,000

(7) Offshore fisheries expert (approximately three months, starting October 2006, and approximately three months starting October 2007) [A] Estimated cost \$177,000

In order to increase the area of operation of off shore artisanal fisheries, it will be necessary to obtain technical assistance from an expert on the installation and use of big FADs. The expert must have experience on these structures and should be able of provide assistance on safe navigation techniques, fishing methods (longline, trolling, hand line, encircling gill nets, etc.) As a requirement, the budget to rent a medium-size boat with internal engine and to build the reefs should be ensured.

Personnel expenses:	Foreign expert 6 months x \$15,000/month = \$90,000
Equipment and facilities:	Construction of offshore FADs 10 units x \$2,000 = \$20,000 Rental of boats for the construction of floating reefs 2 boats x 5 days x \$100 = \$1,000 Rental of medium long-liners 6 months x \$10,000 = \$60,000
Administrative expenses:	6 months x \$1,000 = \$6,000

(8) Systems engineer (approx. Four months during the first visit and two months during the second visit between 2007 and 2008) [A] Estimated cost \$160,000

Once the *broadband* service allowing the permanent low cost connection to the Internet in El Salvador is in place, the conventional database system should be replaced by the *on-line* system. Considering the magnitude of El Salvador's fisheries statistics, it is convenient to implement a web database system easy to maintain. Since there are few experts in the field in El Salvador, it will be necessary to look for a foreign expert.

The appointment period will be of four months during the initial stage to be able to organize the data currently managed by CENDEPESCA Statistics Unit and to develop a comprehensive database system. Subsequent to the transfer of system operation and

maintenance technology, additional six months will be granted for monitoring purposes. The necessary equipment includes: a database server, support software for web database development, and broadband communication equipment.

Personnel expenses:	Systems Engineer (Salvadoran) 12 months x \$3,000 = \$36,000
Equipment and facilities:	Communication infrastructures (Statistics Unit and five offices) \$10,000
Administrative expenses:	Statistics Unit and five offices 24 months x \$1,000 = \$24,000

17.2 Projects

(1) Shrimp Fisheries Optimization Project –(By 2006) [A] Estimated cost \$197,000

During the initial phase, it will be necessary that the administrative sector take the initiative to carry out actions aimed at defining the closed season and closed season areas, etc. In order to set up an adequate fisheries management system, it will be necessary to create a cooperation relationship between artisanal and industrial fisheries. Along with the artisanal fishers empowerment (strengthening) set out in the present Plan, it is necessary to reduce the number of trawlers in a way that it will not upset industrial fishers. In view of this situation, it is recommended to conduct necessary studies based on a neutral position in order to look for the possibility to reduce the number of shrimp fishing boats through the control of the total shrimp catch (TAC), individual quota (IQ), buy back and conversion to other fishing activities. This includes studies on the environment, resources and socio-economic issues. Based on the study results, a plan harmonic coexistence of artisanal and industrial fisheries will be prepared and the necessary financing to this end will be obtained.

Environmental study

Research will be conducted in order to find out whether the estuary environment is suitable to the growth of shrimp post-larvae. Particularly, the Gulf of Fonseca constitutes a very important space for resources reproduction and it is necessary to coordinate efforts with the neighboring countries with borders within the Gulf in order to conduct such study. The study will comprise topics such as oceanographic conditions, natural shrimp post-larva production volume, and the use of mangrove shores.

Resources survey

Special emphasis will be given to white shrimp caught by artisanal and industrial fishers. It is deemed that the survey is a relatively easy task since shrimp is an annual reproduction species and therefore the population is relatively stable, unless significant meteorological events such as El Niño or big hurricanes occur. An experimental operation would be conducted, at least for one month throughout the coastal zone, renting local shrimp fishing boats. Based on the analysis of the results from this study and combined monthly catch statistics, it would be possible to determine the distribution of shrimp fishing zones as well as the abundance of the resources (biomass).

Socio-economic study

Based on the estimated bio-mass, the analysis of the different fisheries regulations, the possibility to reduce the number of boats, and of the control of the total catch (TAC), individual quota (IQ) and industrial and artisanal fishing quotas, will be made. Furthermore, the impact that these actions will have on the economy (income distribution, employment opportunities from the fishing to the export phase, etc.) will be investigated.

Personnel expenses:	Environmental study expert (foreign) 2 months x \$15,000/month = \$30,000 Environmental study expert (local) 4 months x \$6,000/month = \$24,000 Resources inventory expert (foreign) 2 months x \$15,000/month = \$30,000 Resources inventory expert (local) 4 months x \$6,000/month = \$24,000 Socio-economic study expert (foreign) 3 months x \$18,000/month = \$54,000
Equipment and facilities:	Boat rental 50 days x \$100; 10 days x \$1,000 = \$15,000
Administrative expenses:	Car rental , etc. \$20,000

- (2) Group training program in water resources co-management with Central American participants (3 times starting in 2003) [A] Estimated cost \$ 358,500

Co-management constitutes a very significant topic in the present days. Several European cooperation organizations have started projects in developing countries and have prepared training handbooks on water resources co-management. In the case of Japan, JICA includes the co-management topic in its training course (In-Shore Fisheries Management and Administration) but not as the main topic. Nevertheless, Japan is one of

the most advanced countries in terms of co-management and therefore, an exchange of experiences between Central American and Japanese fishers could be important. Consequently, it is proposed to organize a group of Central American participants to travel abroad to learn about co-management experiences.

Objective of the training

Provide training in fishing resources co-management adjusted to the reality of the Central American region through seminars and field trips. The course will have duration of one or two months. It is expected that once the participants return to their own countries, they will have an active participation in the promotion of co-management throughout Central America.

Participants (number of)

Five Central American countries (Guatemala, El Salvador, Honduras, Nicaragua and Costa Rica). One representative of the public sector and one representative of the fishers' organizations of each country making a total of ten people.

Contents of the training

- Seminar on the theory of Co-management. (The course materials should be adjusted to the reality of Central America).
- Due importance should be given to the analysis of co-management success models as well as to the dialogue with local fishers of each country.

Training period: 45 days (language: Spanish)

Travel expenses:	10 persons x 3 times (3 years) x \$4,000 = \$120,000
Boarding and meals:	10 persons x 45 days x 3 times (3 years) x \$100 = \$135,000
Administrative expenses:	1.5 months x 3 times x \$23,000 = \$103,500

(3) Infrastructure construction

- 1) Reef construction (After 2002) [A] Total cost \$440,000

Through the pilot project, it has been observed that the construction of artificial reefs has been an incentive to join participants in fishers' groups of different zones. The Study Team has negotiated in terms that the local NGOs can receive financing from the Government of Japan through the Non Reimbursable Financial Cooperation for Community Projects and continue with the construction of such structures. Consequently, such projects were started in some highly motivated

communities. However, the budget is still insufficient to cover the entire Salvadoran coastline. Therefore, it is hereby proposed to promote an artificial reef construction project with the following timeline.

Phase 1	Approx. 90 units Pilot project (small reefs)
Phase 2 – initial stage	Approx. 100 units - \$80,000
Phase 2 – intermediate stage	Approx. 200 units - \$180,000
Phase 2 – final stage	Approx. 200 units - \$180,000

While it is true that the funds from the Grass roots grant aid carry out by the Japanese government is relatively a small fund, it can bring a great benefit to use this fund for those projects that cannot be assisted by multilateral assistance organizations “because their cost is too low”. These resources would allow covering a great part of the coastal zones and notwithstanding the small size of the project, its impact will be great. Another option of fund would be to implement the project as one of the components of the construction schedule of small fisheries infrastructures and marine product markets.

The Social Investment Fund for Local Development of El Salvador (FISDL) could be another financing source. Reefs are an incentive to promote the organization of fishers. In view of the above, the representative of the FISDL has shown genuine interest and has mentioned the possibility to channel their resources to this project. In order to obtain financing, a proposal should be submitted for evaluation by such organization and approved projects could obtain the necessary credit. As a matter of reference, the FISDL fund for the construction of social infrastructures for the year 2002 totals US \$4 million.

- 2) Construction of a fish market in La Libertad – (around 2004) [A] Estimated cost – unknown to date

The land next to the La Libertad wharf is underway is managed by CORSATUR that is an agency of the Ministry of Finance. CENDEPESCA has a project to build a fish market in the idle land at the entrance of the wharf. This project is justified by the following reasons although the final decision-making should follow a feasibility study.

The current wharf is too small and does not provide the sufficient space to

berth fishing boats together with the points of fish sale of the catch.

The current wharf is highly obsolete and if an earthquake occurs during busy hours, for example in a weekend, it could be a catastrophe.

Fisheries product wastes are dumped into the coast without any treatment and this is not convenient from the sanitary point of view.

For the statistical data, collection of a nearby market is significant.

La Libertad and surrounding areas attract tourists since it is near San Salvador.

In the event that the feasibility study shows the viability of the project, such project could be implemented with funds from the multilateral or bilateral cooperation. Following is some of the facilities, equipment and materials that will be required.

- Fisheries Center

- Fish retail market

- Fishers' meeting room

- Demonstration tank of small marine organisms

- Management office

- Waste treatment facilities

- Small processing plant

- Ice making and cold store facilities

- Adjacent facilities

- Common parking

- Small boat berth

- Emergency generator

- Water purification tank

- Water storage tank

- Outboard engine repair shop

- Fishing gear storage

- Retailer's storage

- Latrines and showers

- Equipment

- Cooling trucks

Freshness meter
fish containers
Radio equipment

3) Small fish collection centers – (Starting 200) [B] Total cost \$750.000

The necessary facilities will be built giving higher priority to the communities where fishers' organizations exist and the situation of the collection of the catch has been verified based on statistical data. The basic facilities will include: a collection center (approx. 50 m²), ice-making machines (approx. 0,5TM/day), ice freezer, and fish conservation boxes, among others.

1 total collection facilities 10 centers x \$75,000 = \$750,000

4) Port of Acajutla expansion works – (By 2008) [B] Total cost \$888,000

It will be necessary to increase the capacity of the breakwater to berth the boats as artisanal fisheries increases its area of operations and the number of medium boats at high sea.

Expansion of the breakwater (approx. 80m) and installation of mobile elevator in the existing wharf: \$888,000
