- Wuring is a main supply source of both fresh and processed fish to Kalimati. Fishermen in Wuring live in houses built over waters located in the tidal zone, subsequently, there is insufficient space for fish processing and fishing gear repair activities.

Conclusion

The priority zone, which consists of Kalimati, Wuring, Paga and Paupanda, was created as a fish supply point for two district capitals (Maumere and Ende) and western Flores.

5. Feasibility Study

A feasibility study was implemented for the four-selected priority zones mentioned above.

5.1 Bima Priority Zone

5.1.1 Current Conditions and Issues

1) Rompo is categorized as a core fishery community among the several fishery communities in the area.

2) There are seven fishing villages along the Waworada Bay comprised of 782 fishermen households in four sub-villages in three villages, of which 311 households are located in the Rompo sub-village.

3) The fishing season in Waworada Bay varies according to the type of fishing gears that is employed. The peak fishing season for Bagan fishing is from March to June, and from June to September for purse seine and gill net fishing and from September to March for bottom long line and hand line fishing for demersal fish.

4) There are 40 Bagan boats, 44 purse seine boats, and 14 gill net / bottom long line boats operating in Waworada Bay. Bagan operations are carried out in the coastal waters during the night and purse seine is conducted in the central area of the bay during the day. About 50 percent of the Bagan boats (22 boats) move to Sape Bay during the lean fishing season (January to March).

5) Most of the fish harvested by Bagan operations are sold to fish collector boats (25 boats) at the sea during the night. The fish catch of purse seiners is directly landed at Rompo.

6) Since the size of the catch is larger than other areas, the fishery resources of Waworada Bay have not been fully exploited. In addition, the potential fishery resource of the coastal waters outside the bay is estimated at about 3,000 tons.

7) Fish catch in Waworada is rich in variety. About 60% of the catch is small pelagic fish (anchovies, sardines, round scads, etc). Others are large migratory fish (13%), demersal fish (5%), squids (4%), and others.

8) Landed fish is mainly transported to and sold in district capital Bima and in surrounding retail markets as well as inland villages along the way to Bima city. In addition, the annual exported volume of demersal fish to Bali is estimated to be about 60 tons.

9) During the peak season, about 11.2 tons/day of fresh fish is handled by about 100 fish traders and retailers.

10) Some small pelagic fish is salted and dried, and frigate tuna and skipjack are used for salted and baked products, and 43 percent of the catch is used in processing. About 10 percent of the catch remains unsold and is the source of economic loss.

11) Fisheries related facilities are nonexistent with the exception of a small fish auction hall (TPI) in Rompo. This auction hall is also used as meeting place.

12) A KUD has been organized and conducts small scale credit and savings and runs a kiosk shop in Rompo. It has 232 members, of which 75 percent are fishermen. The technical and managerial capabilities of the KUD are not trusted among the fishermen.

13) Due to the lack of fresh water, the water supply is insufficient. The lack of toilets and human waste disposal into the sea are other issues.

14) The village residents' motivation to resolve such issues within the community is low.

15) Fish is sold in unhygienic condition in the existing Bima Market which is congested.

5.1.2 Development Concept

1) An initial coastal resource management system that can be implemented by the fishermen and the local government will be established, in conjunction with measures to improve the knowledge of fishermen about coastal resources management and to improve the local government's fisheries licensing system.

2 The facilities related to the fishing activities of the fishing villages within the bay such as fish landing, shipping, marketing, and processing will be developed. Technical training for fishermen and fishing village women and extension activities to improve fisher income will also be developed.

3) Based on a performance review of past fishing village cooperative activities, a new fishermen association will be created that will produce benefits for the fishermen. The local government and other local organizations will assist this organization until it has developed sufficiently to operate independently.

4) A programme to strengthen the self-motivation of the fishermen to improve their living environment and village infrastructure will be developed.

5) A training and extension programme to disseminate the activities described above to other districts and sub-districts will be developed.
6) Improve the condition for fish sales in Bima Market.

5.1.3 Approach

1) The introduction of model fishing boats and FADs will promote the development of offshore fishing grounds and fishermen training and help establish a system of fishing ground management by fishermen. It will also help the model coastal communities to draft regulations on coastal resources management.
2) Fish landing, marketing, processing, and other fisheries related facilities will be developed at the sub-village of Rompo in Waworada village aimed at raising fishermen income by improving the inland bay fisheries activities of this sub-village.
3) A joint management and operations system by the government and fishing community will be established that will enable the fishermen organization to operate the facilities and equipment independently in future.
4) Infrastructure related model projects that promote the fishing community's motivation to implement improvements in their living environment and educational activities to strengthen the village residents' motivation will be pursued.
5) An extension section to be set up within district fisheries office to strengthen the capability of staff and to disseminate extension activities to other areas in the district based on the achievement of the project.
6) To construct a fish retail market adjacent to the existing Bima Market in Tanjung Bima .

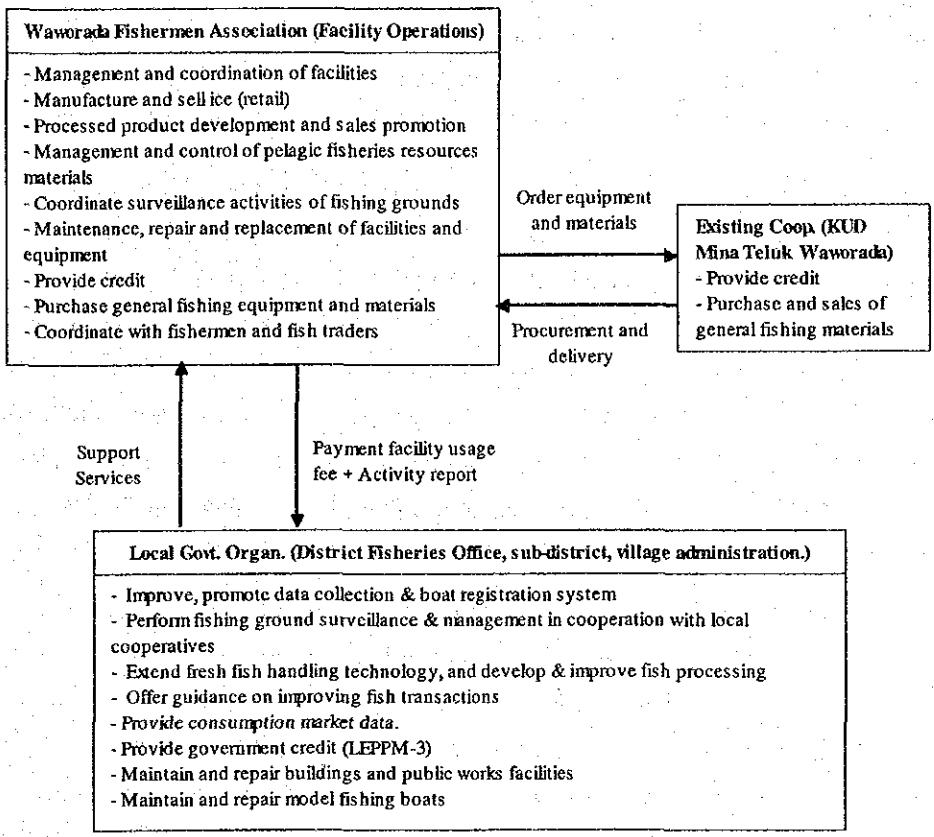
5.1.4 Development Projects

The development projects implemented in Rompo based on the concepts and approach mentioned above are shown on following table.

1 Coastal Resources Management Plan	
1) Improve fish landing data collection system.	• Record fish landing data by fishermen and data collection / analyses. • Provide guidance to improve fishery management.
2) Expand and improve existing fishing permit system.	• Formulate fishing license system and fishing boat construction permit system. • Issue fishing license and collect license fees • Issue fishing boat markers. • Legally establish this system and its extension to the district level.
3) Diversify fishing grounds.	• Create offshore fishing grounds using floating Fish Aggregating Device (FAD). • Exploit offshore pelagic resources by introducing a model boat.
4) Establish a coastal fishing ground monitoring system.	• Establish monitoring and communication system to discourage operations by illegal fishing boats. • Establish a system of controls against illegal fishing boats.
2 Fish landing/Handling/Shipping/Processing Plan	
1) Improve fish landing and handling system.	• Provide appropriate fish landing facilities. • Provide fish handling facilities.
2) Improve fresh fish shipping system.	• Provide ice plant and ice storage. • Provide cool boxes and their keeping place. • Provide communication equipment. • Popularize the use of cool boxes.
3) Conduct extension activities to introduce fresh fish handling technology.	• Provide model processing facilities.
4) Improve processing technology.	• Conduct extension activities to improve existing processing practices. • Conduct extension activities to introduce new processed products.
5) Create a Bima Fish Market.	• Provide wholesale and retail markets.
3 Fishery Activities Support Plan	
1) *Improve incidental facilities for fish landing/handling/shipping/processing plans*	• Provide facilities for fuel / water supply, small workshop, fish net repair space, etc.
4 Fishery Community Environment Improvement Plan	
1) Improve community infrastructure.	• Provide model facilities for water supply and toilet. • Provide trash collection system. • Provide roads and drains in the villages.
2) Upgrade the community's motivation to improve the social environment.	• Provide trash boxes and extension of trash collection system.
5 *Fishermen Organization / Fishery Extension Improvement Plan*	
1) Establish a fishermen organization.	• Establish fishermen organizations to operate and manage the planed facilities.
2) Conduct extension activities to enable the fishermen organization carry out viable and self-reliant project management.	• Introduce a participatory monitoring and evaluation system.
6 Education / Training Plan	
1) Establish a fishery extension unit in the district fisheries office.	
2) Provide training to build the capacity of the extension staff and enhance the economic activities of the fishermen organization.	• Provide training for the leaders of the fishermen organization and extension staff of the fishery office by external institutes

5.1.5 Operation and Maintenance Plan

A new local fishermen organization that will be operated based on the decisions made by local residents is to be established. The organization will be placed under the jurisdiction and supported by the provincial government and will operate the planned facilities in conjunction with existing organizations. The functions and role division of each organization and the overall system of coordination are shown in the figure below.



5.1.6 Breakdown of Project Costs

A breakdown of the project costs for Waworada is shown in the table below.

(Unit: Rp. million)

Site	Center		Estimated Project Costs	Foreign Cost	Domestic cost
Waworada	Coastal resources management	Facility	-	-	-
		Equipment	1,772	1,772	-
		Activity costs*	578	-	578
	Landing, handling, shipping, processing fisheries	Facility	24,271	23,587	684
		Equipment	2,608	2,608	-
		Activity cost*	978	-	978
	Improvements to fishing village environment	Facility	393	-	393
		Equipment	-	-	-
		Activity cost*	-	-	5
Bima market	Fish landing, handling, shipment, processing	Facility	4,384	3,117	1,267
Total			34,984	31,084	3,905

Note: Asterisk mark denotes for the first two-year period

5.1.7 *Project Evaluation*

The small-scale fisheries development project for this zone will not contribute directly to an increase in the fish catch volume. But it will increase the fresh fish supply and its value added through the transfer of marketing and processing technology, and subsequently help increase the local income through the marketing network.

The average per capita income of the Lombok fishermen in FY2001 was Rp.1.76 million and it exceeds the per capita income of Rp.1.63 million targeted in the MP. The implementation of this project is anticipated to produce an annual benefit of Rp.2.165 billion for the entire site. Consequently, the average income of the 782 fishermen households, who are the beneficiaries of this project, is estimated to rise by Rp.539,000/person.

The EIRR of the development project in the targeted zone was 10 percent. This figure was lower than the estimated interest rate of the Central Bank (14 percent) when the Indonesian government formulated its FY2002 budget. But it is a much higher figure than the real interest rate minus the inflation rate of 8 percent. Moreover, this figure is also higher than the real discount rate of 8.5 percent that is generally used by the World Bank. The FIRR only on the portion of planned facilities/equipment is 4 percent. However, it is not possible to calculate the overall FIRR that included the financial burden of the district government. Therefore, financial assistance for facility repair costs and grant to cover a large portion of the fiscal year investments required by the central and district governments are needed.

. In terms of a long-term perspective, the development plan is significant since it improves the protein intake of the populace and establishes a coastal resources management system. It also improves fish marketing, processing facilities, the fishing village environment, generates employment opportunities for fishing village women, and promotes social participation. It is especially significant in terms of gender promotion. Since major environmental issues do not exist, it has been concluded that the overall implementation of the plan is highly feasible.

5.2 Dompu Priority Zone

5.2.1 Current Conditions and Issues

(1) Soro

1) Soro is also categorized as an independent fishing community located near a consumption center.
2) There are 1,100 fishermen households, and the majorities are permanent fishermen.
3) The fish catch volume is fairly high from March to September, and the peak season is from May to July.

4) Soro is located at the end of Saleh Bay. There are 33 motorized Bagan boats, 10 purse seiners and 14 gill net / hand line boats in Soro. The Bagan boats are more than 20m in length, and the purse seiners range from 12 to 15m in length.

5) Most of the fish catch by Bagan or purse seiners are sold to fish collectors at sea, and the relationship between the two parties is one of mutual support.

6) The fish catch of Saleh Bay is believed to have reached its level of TAC. Although pelagic fish resources of the Flores Sea outside the Saleh Bay have not been exploited, these waters are too far from Soro (about 100km).

7) The fish catch harvested by Bagan is a major fish supply source for the local consumption market. Because the fish catch volume decreases during the full moon period, the fresh fish supply to the market is largely influenced by the moon phases. Consequently, the price of the fish catch affects the supply volume to the Dompu market.

8) About 75 percent of the fish catch landed in Soro is comprised of small pelagic fish. The ratio of demersal fish is also comparatively high at about 20 percent.

9) There are 144 local fish traders (including 108 of women). The traders handle about 9 tons/day during the peak season. The 90 percent are small-scale traders that handle less than 100kg/day.

10) About 2.1 tons of fresh fish is often remains unsold during the peak season.

11) The fish landing site is located at a shallow and flat beach area, where the seabed becomes exposed for about 300 to 400m from the shore during the low tide. The containers of fish are landed and manually transported to the shore during this time.

12) A PPI exists in Soro, but it is not utilized because of the lack of functional facilities.

13) A KUD has been organized that conducts small scale credit and fuel sales. However, it is not trusted by the fishermen due to the lack of transparency its accounting activities and past bad performance.

14) Due to the shortage of fresh well water, the water supply for household and drinking purposes is insufficient.

15) Community motivation to improve the living environment is low in terms of water supply and waste disposal improvements, and others.

(2) Hu'u

1) Hu'u is categorized as an independent fishing community located near a consumption center.

2) Hu'u is located at near the mouth of Cempi Bay, and fishery resources along the southern coast of Sumbawa district adjacent to Dompu district remains undeveloped.

3) There are 546 fishermen households in Hu'u; and the majority are part-time fishermen.

4) The major form of fishing is purse seine. Gill net and hand line operations are also carried out. There are 14 purse seiners and 9 gill net boats in Hu'u.

5) The fish catch volume is fairly high from March to September, and the peak season is from May to July.

6) The purse seiners shift their fishing grounds to the Alas or the Sape channels during the lean season of January to February. During the peak fishing season in Cempi Bay, about 50 purse seiners will arrive from other regions to fish in the bay.

7) The wives of boat owners control the sales of landed fish. The fish is sold near this village when the catch is small, but it is transported and sold at the Dompu market when the catch is large.

8) There are 27 local fish traders (including 11 women). The fish traders handle about 1.3 tons/day in the peak season. The daily handling volume by each trader is below 100kg.

9) About 65 percent of the landed volume is comprised of large pelagic fish such as frigate tuna, marlines, skipjack, tuna, etc.

10) The fish catch price largely fluctuates according to season and the phases of the moon, and affects the supply volume to the Dompu market.

11) Salted / baked (Pindang Selepi) frigate tuna and skipjack are a specialty product food of this area, and its unit price is higher than fresh fish.

12) A fishermen cooperative was newly established in 2002, but its activities have not started as yet.

13) Community motivation to improve the living environment of the village is low.

5.2.2 Development Concept

1) An initial coastal resource management system that can be implemented by the fishermen and the local government will be established, in conjunction with measures to improve the knowledge of fishermen about coastal resources management and to improve the local government's fishing licensing system. In particular, trial operations in mariculture and establishing boundaries for fisheries and marine culture zones to effectively utilize the resources within Saleh Bay are recommended.

2 Fishery facilities connected with landing, shipping, distribution, and processing should be provided, and fishermen and fishermen's wives should be given technical training and advice from extension officers, with the aim of raising their incomes. Note, however,

that because of the limitations of Hu'u's natural conditions, landing facilities for that village have not been included.

3) Based on the degree of maturity of the activities of the existing sub-village fishermen cooperatives (Soro) and fishing cooperatives (Hu'u), the project administration system will be centered on these organizations in a way that is beneficial for the fishermen. In addition, until the fishermen's organizations become mature and self-sufficient, the regional government and the regional cooperatives should set up mechanisms to assist them.

4) Programmes that strengthen the motivation of the fishing village residents to take the initiative to improve village infrastructure and the social and living environment will be created.

5) Extension and training programs to extend the activities described above to other areas in the district will be implemented.

5.2.3 Approach

1) Although fishermen training activities will be conducted and offshore fishing grounds will be developed in Hu'u, developing offshore fishing grounds in Kempo is difficult. Therefore, trial activities aimed at developing propagation aquaculture in the coastal areas and activities to draft boundaries for culture and fishing operations based on scientific data will be implemented. In addition, a coastal resources management system will be established that includes fishing ground surveillance activities by fishermen and substantiating the fishing licensing and fishing boat construction permit system.

2) Fish landing, marketing, processing, and other fisheries related facilities and equipment will be provided in Soro and Hu'u (a fish landing facility will not be provided for Hu'u) to raise fishermen income through improved fishing activities by the community.

3) Based on the measures described in section 2), in order to enable the future operations of the facilities to be carried out by the fishermen organization as they become self-reliant, a joint government and private operations system will be established. For the facilities at Hu'u, a shared system based on the participation of the existing KUD, the district Fisheries Office, and the Hu'u fishermen's association will be set up.

4) A model project to develop infrastructure and educational activities to strengthen the motivation of the village community will be implemented to help the fishing village achieve a self-reliant living environment.

5) An extension section to be set up within district fisheries office to strengthen the capability of staff and to disseminate extension activities to other areas in the district based on the achievement of the project.

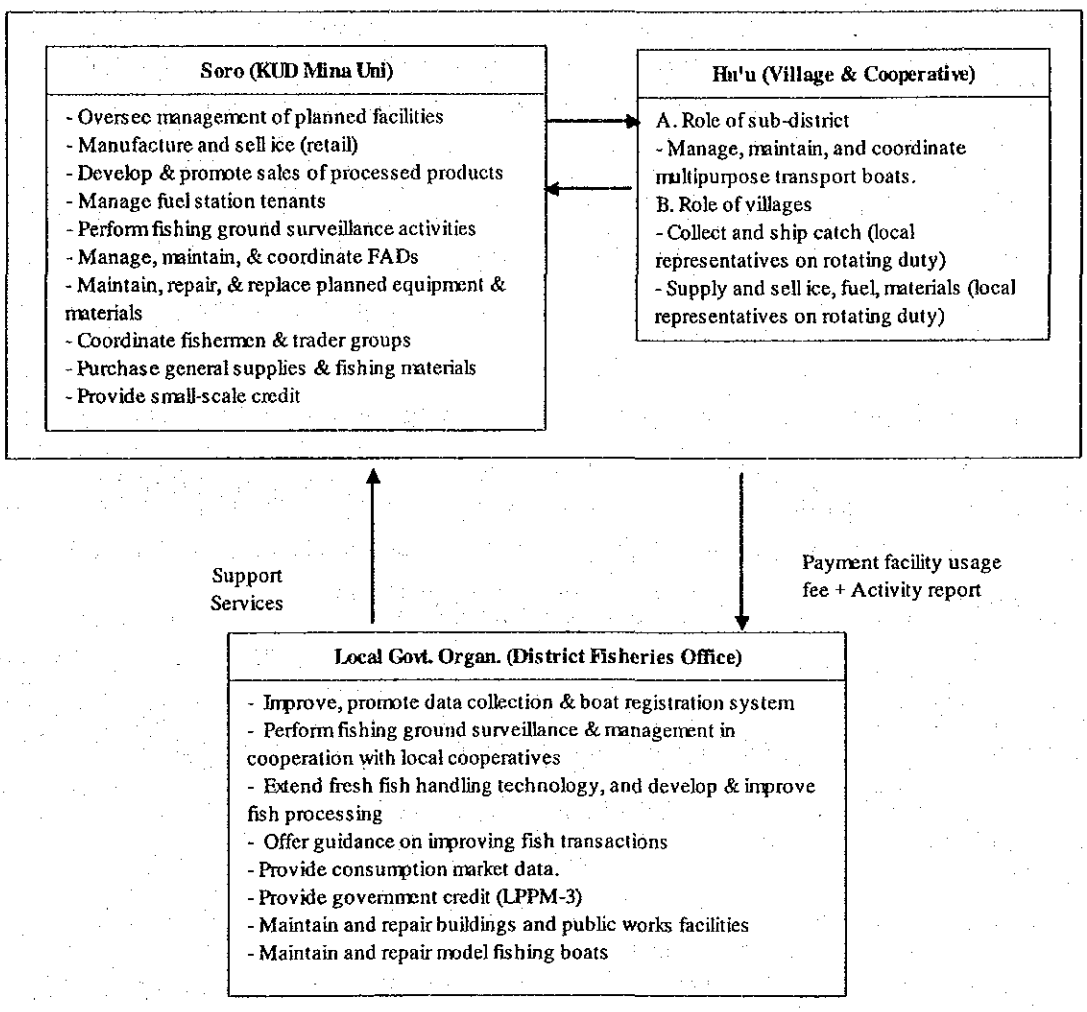
5.2.4 Development Projects

The development projects that will be implemented in Soro and Hu'u based on the concepts and approach mentioned above are shown in following table.

1	Coastal Resources management Plan	
1)	Improve fish landing data collection system.	• Record fish landing data by fishermen and data collection / analyses. • Provide guidance to improve fishery management.
2)	Expand and improve existing fishing permit system.	• Formulate fishing license system and fishing boat construction permit system. • Issue fishing license and collect license fees • Issue fishing boat markers. • Legally establish this system and its extension to the district level.
3)	Diversify fishing grounds.	• Conduct trial exploitation of sea grass bed as a nursery ground for fishery resources (Soro). • Exploit potential resources along the southern coastal area in Sumbawa District. (Hu'u) • Exploit offshore pelagic resources by introducing a model fishing boat.
4)	Establish a coastal fishing ground monitoring system.	• Establish monitoring and communication system against illegal fishing boats. • Establish a system of controls for illegal fishing boats
2	Fish landing/Handling/Shipping/Processing Plan	
1)	Improve fish landing and handling system.	• Provide appropriate fish landing facilities (Soro). • Provide fish handling facilities.
2)	Improve fresh fish shipping system.	• Provide ice plant and ice storage. • Provide cool boxes and their keeping place. • Provide communication equipment.
3)	Conduct extension activities in fresh fish handling technology.	• Popularization of cool boxes.
4)	Improve processing technology.	• Provide model processing facilities. • Conduct extension activities to improve existing processing practices. • Conduct extension activities to introduce a new processing product.
3	Fishery Activities Support Plan	
1)	Improve incidental facilities for Fish landing/Handling/Shipping/Processing Plan	• Provide facilities for fuel / water supply, small workshop, fish net repair space, etc.
4	Marine Aquaculture Plan	
1)	Formulate a draft spatial plan for marine aquaculture development in Saleh Bay (Soro).	• Survey existing fishing grounds (Soro) • Survey hydrological conditions (Soro).
2)	Establish cage culture technology applicable to Saleh Bay water (using seedlings from hatchery) (Soro).	• Clarify content of the contract for participants (Soro). • Transfer proper farming / management technology (Soro). • Establish an appropriate cage culture model Soro).
5	Fishery Community Environment Improvement Plan	
1)	Improve community infrastructure (Soro).	• Provide model facilities for water supply and toilet (Soro). • Provide trash collection system (Soro).
2)	Upgrade the community's motivation to improve the social environment.	• Provide trash boxes and extension of trash collection system.
6	Fishermen Organization / Fishery Extension Improvement Plan	
1)	Establish a fishermen organization	• Establish a fishermen organization to operate and manage the planned facilities.
2)	Provide extension activities to enable the fishermen organization to conduct viable and self reliant project management	• Introduce a participatory monitoring and evaluation system.
7	Education / Training Plan	
1)	Establish a fishery extension unit in the district fisheries office.	
2)	Provide training to build the capacity of the extension staff and enhance economic activities of fishermen organization.	• Provide training for leaders of the fishermen organization and extension staff of fisheries office by external institutes

5.2.5 Operation and Maintenance Plan

A new local fishermen organization that will be operated based on the decisions made by local fishermen will be established. The organization will be placed under the jurisdiction and supported by the provincial government, and will operate the planned facilities in conjunction with existing organizations. The functions and role divisions of each organization and the overall system of coordination are shown in the figure below.



5.2.6 Breakdown of Project Costs

A breakdown of the project costs for Dompu is shown in the table below.

Unit: Rp. million

Site	Center		Estimated Project Costs	Foreign Cost	Domestic cost
Kempo	Coastal resources management	Facility	-	-	-
		Equipment	480	480	-
		Activity costs*	126	-	126
	Landing, handling, shipping, processing fisheries	Facility	17,083	15,015	2,068
		Equipment	1,419	1,419	-
		Activity cost*	1,156	-	1,156
	Improvements to fishing village environment	Facility	246	-	246
		Equipment	-	-	-
		Activity cost*	5	-	5
Hu'u	Fish landing, handling, shipment, processing	Facility	-	-	-
		Equipment	1,539	1,539	-
		Activity cost*	579	-	579
	Coastal resources management	Facility	4,213	3,051	1,162
		Equipment	342	342	-
		Activity costs*	191	-	191
Total			27,379	21,846	5,533

Note: Asterisk mark denotes for the first two-year period

5.2.7 Project Evaluation

The small-scale fisheries development project for this zone will not contribute directly to an increase in the fish catch volume. But it will increase the fresh fish supply and its value added through the transfer of marketing and processing technology, and subsequently help increase the local income through the marketing network.

The average per capita income of the Solo fishermen in FY2001 was Rp.1.88 million and it exceeds the per capita income of Rp.1.63 million targeted in the MP. The implementation of this project is anticipated to produce an annual benefit of Rp.1.463 billion for the entire site. Consequently, the average income of the 1,101 fishermen households, who are the beneficiaries of this project, is estimated to rise by Rp.26,600/person.

In contrast, the average per capita income of the Hu'u fishermen in FY2001 was Rp.1.20 million/person and it is lower than the per capita income targeted in the MP. The implementation of this project is anticipated to produce an annual benefit of Rp.5.768 billion for the entire site. Consequently, the average income of the 546 fishermen households, who are the beneficiaries of this project, is estimated to rise by Rp.26,400/person. However, the per capita average income with this increase is only Rp.1.46 million and falls short of the targeted figure.

The EIRR of the project to develop fisheries facilities and equipment for this zone is 8 percent and it is the lowest among the four priority zones. In addition, the FIRR is –3 percent for the fisheries facilities and equipment. It was not possible to calculate the overall

FIRR that included the financial burden of the district government. Therefore, financial assistance for facility repair costs and grant to cover a large portion of the fiscal year investments required by the central and district governments are needed.

However, in terms of long-term goals, the creation of a resources management system is important not only for Indonesia, but for the global community as well. It is also an important source of protein for the Indonesian people. A project that strengthens the capabilities of the small-scale fishermen is a vital first step to improving the coastal fishing communities. Furthermore, activities to improve marketing, the facilities located at the river mouth, and to improve the fishing village environment will generate employment opportunities for the village women, increase their participation in village society, and positively affect the gender issue.

Improvements implemented simultaneously at the Solo and Hu'u sites will place a financial strain on the district government, but shifting the timing of the improvements will alleviate this burden.

Implementation of the project raises no major environmental issues. Therefore, it is concluded that overall, there is a high potential to implement the project.

5.3 Eastern Flores Priority Zone

5.3.1 Current Conditions and Issues

1) Eastern Flores is categorized as core fishery community among the fishery communities in the remote islands.
2) The model sites consist of Oka, Lamahala Jaya and Sagu in East Flores and Lewoleba, Balauring and Lamalera in Lembata. There are 2,360 fishermen households and 77 Bagan boats, 103 purse seine boats, 248 gill net / hand line / trawling boats at these sites. It is estimated that only 9 percent of these boats are motorized.
3) About 80 percent of the export volume from this zone is generated by fishery products.
4) The average annual per capita income of Lembata district (Rp.356,000) is quite low in comparison to East Flores district (Rp.702,000).
5) Bagan and purse seiners operate in the island channels and bay areas which have the largest fish landing volume. Large migratory pelagic fish is caught by small boats operating in the northern coastal waters, and whales and small pelagic fish are harvested in the southern coastal waters.
6) From the Larantuka base, skipjack pole and line boats operate in the offshore waters where FADs have been installed. The catch is sold to three local companies.

7) The good fishing season for Larantuka and Lamahala Jaya is from March to December (the peak season is from April to May and from September to November), and it is from September to March for Sagu and Balauring. The fish landing volume of Lewoleba Bay does not fluctuate throughout the year, while the fish landing of Larantuka decreases from January to March.

8) The major fish catch species are skipjack (30 percent of the total landed volume), frigate tuna, etc. A comparatively higher percentage of demersal fish is landed in Lewoleba.

9) Recently, many privately owned FADs have been installed in water areas which are occupied by specific fishing boats.

10) The fishermen communities are scattered in Larantuka, and the fish catch is landed in 16 places. Most of the fishing boats (more than 3 GT) land their fish catch on the beach adjacent to the public wharf where many fish traders and retailers gather. In the island areas, fishermen land their fish catch on the beach in front of their village, which is marketed to inland areas by local community women.

11) There are 363 fish traders and retailers in the model sites, who handle an average of 23.4 tons/day. More than 90 percent of these traders and retailers are women. Buyers who handle more than 100kg daily operate only in Larantuka and Lewoleba.

12) Fish that is marketed outside of this zone is carried out by fish processors who visit from March to November, fish collection boats from Ende and Bima, and local fishery companies.

13) The annual volume of unsold fresh fish is about 800 tons in this zone, which becomes an economic loss for fishermen.

14) In Larantuka, a fishermen group started grouper cage culture supported by the district Fisheries Office since 2000, but face various management problems.

15) The water supply is insufficient at the Larantuka site. In addition, the landing beach is also used a site for human wastes and garbage disposal by the community residents, which has affected fish landing conditions.

5.3.2 Development Concept

In view of the current situation where fish landed by small fishing villages in the outlying islands of this zone is marketed to West Flores via Larantuka, the following measures will be implemented to comprehensively improve the prevailing conditions explained above, including those of the five major fishing villages in Adonara and Lembata islands.

1) An initial coastal resource management system that can be implemented by the fishermen and the local government will be established, in conjunction with measures to improve the knowledge of fishermen about coastal resources management and to improve the local government's fishing licensing system.

2) Develop the facilities and equipment needed to transport fresh fish to the West Flores Islands from Larantuka as well as the flow of commodities between Larantuka and the outlying islands, the fishing villages, and to support fishing activities such as fish landing, shipping, marketing, and processing. Conduct technical training for fishermen and fishing village women and extension activities to improve fishermen income.

3) A project management body centered on the existing fishing village cooperative, fisheries cooperative, and fishermen groups will be created based on the maturity and experience of these groups, in order to help fishermen access the benefits produced by the project. The local government and other local organizations will assist this management body until it has developed sufficiently to operate independently.

4) Activities to improve mariculture technology will be implemented. In Larantuka, technical guidance will be provided to improve the propagation culture technology for groupers. In order to reduce the rearing period, natural fry will be used to develop the technology, which will be transferred to the local fishermen.

5) As in the case of the Bima priority zone, a programme to strengthen the self-motivation of the fishermen to improve their living environment and village infrastructure will be developed.

6) A training and extension programme to disseminate the activities described above to other areas in the district will be implemented.

5.3.3 Approach

1) In addition to developing offshore fishing grounds and implementing fishermen training activities, a fishing surveillance system by fishermen and measures to substantiate the fisheries licensing system and a boat construction permit system will be implemented.

2) Facilities will be constructed in Larantuka to enable fish shipments from the outlying islands to the western Flores region. In addition, facilities with fish collection functions will be constructed in Lewoleba, where the fish landing volume is high throughout the year, and small multipurpose facilities (fish handling, cold storage, processing, etc.) will be constructed at the other sites, in lieu of a fish landing facility with the objective of reducing the economic loss and raising fishermen income.

3) Technology transfer will be conducted to improve grouper cage technology in Larantuka. In order to shorten the culture period, culture technology will be developed using slightly bigger size of natural fingerlings.

4) A joint management and operations system by the government and fishing community will be established that will enable the fishermen organization to operate the facilities and equipment independently in future.

5) Infrastructure related model projects that promote the fishing community's motivation to implement improvements in their living environment and educational activities to strengthen the village residents' motivation will be pursued.

6) An extension section to be set up within district fisheries office to strengthen the capability of staff and to disseminate extension activities to other areas in the district based on the achievement of the project.

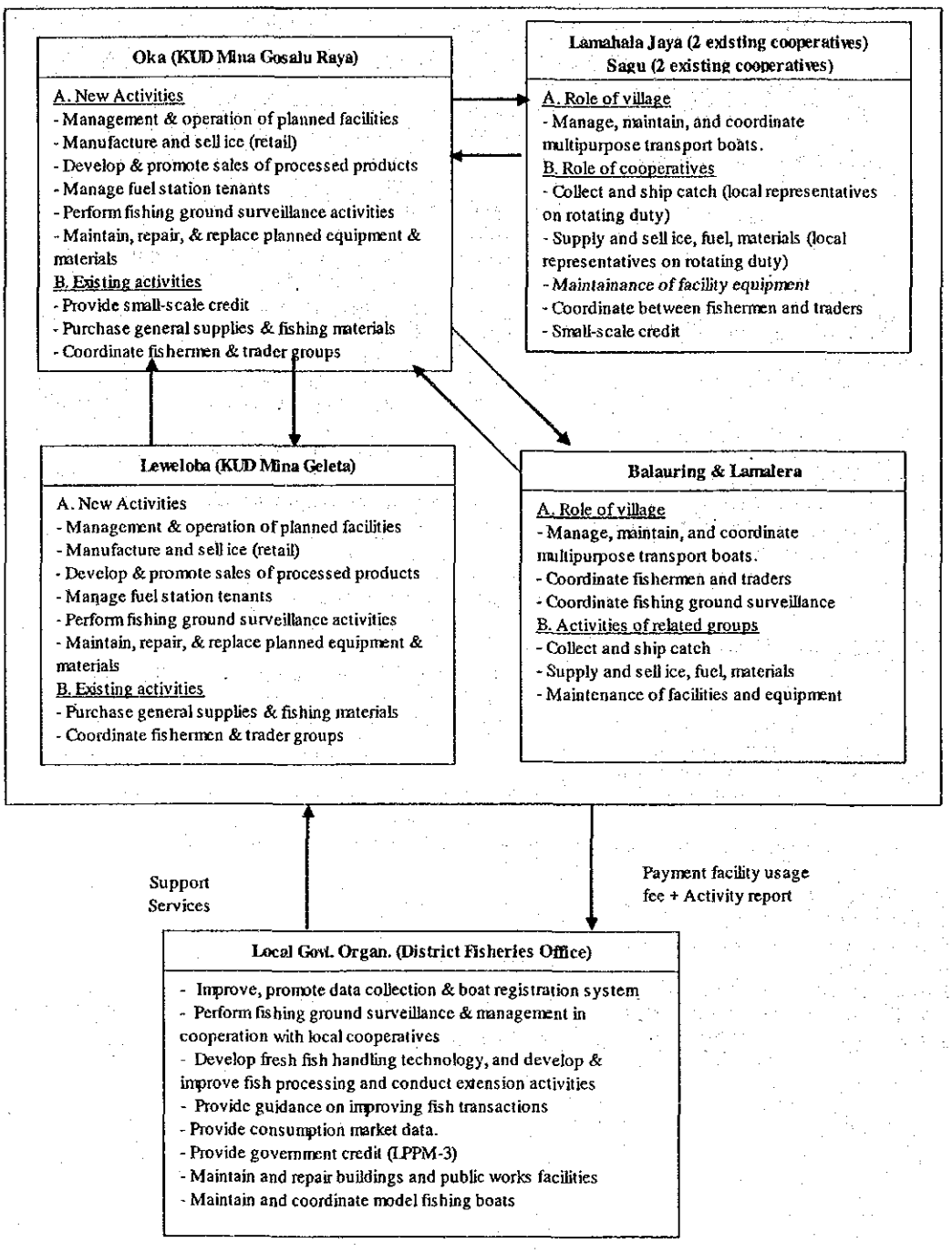
5.3.4 Development Projects

The development projects implemented in East Flores based on the concepts and approach mentioned above are shown in following table.

1 Coastal Resources Management Plan	
1) Improve fish landing data collection system.	• Record fish landing data by fishermen and data collection / analyses. • Provide guidance to improve fishery management.
2) Expand and improve existing fishing permit system.	• Formulate fishing license system and fishing boat construction permit system. • Issue fishing license and collect license fees • Issue fishing boat markers. • Legally establish this system and its extension to the district level.
3) Diversify fishing grounds.	• Create offshore fishing grounds using floating Fish Aggregating Device (FAD). • Exploit offshore pelagic resources by introducing a model boat. • Motorize artisanal fishing boats in Sagu, Balauring and Lamalera.
4) Establish a coastal fishing ground monitoring system.	• Establish monitoring and communication system against illegal *fishing boats.* • Establish a system of controls against illegal fishing boats.
2 Fish landing/Handling/Shipping/Processing Plan	
1) Improve fish landing and handling system.	• Provide fish landing/handling facilities in Oka. • Provide fish landing/handling facilities in Lewoleba.
2) Improve fresh fish shipping system.	• Provide ice plant and ice storage (Oka, Lewoleba). • Provide cool boxes and their keeping place. • Provide insulated trucks (Oka, Lamahala Jaya, Lewoleba, and Balauring). • Providetransport truck (Larantunka and Balauring • Provide multi-purpose transport boat (except Larantuka). • Provide communication equipment.
3) Conduct extension activities for fresh fish handling technology.	• Popularize cool boxes.
4) Improve processing technology.	• Provide model processing facilities (Oka, Lewoleba). • Conduct extension activities to improve existing processing practices. • Conduct extension activities to introduce new processed products.
3 Fishery Activities Support Plan	
1) Improve incidental facilities for Fish landing/Handling/Shipping/Processing Plan.	• Provide facilities for fuel / water supply, small workshop, fish net repair space, etc.
4 Marine Aquaculture Plan	
1) Establish cage culture technology applicable to Larantuka (Using seeds from nature).	• Clarify content of the contract for participants. • Transfer proper farming / management technology. • Establish an appropriate cage culture model.
5 Fishery Community Environment Improvement Plan	
1) Improve community infrastructure.	• Provide model facilities for water supply and toilet. • Provide trash collection system.
2) Upgrade the community's motivation for improvement of social environment.	• Provide trash boxes and disseminate the trash collection system.
6 Fishermen Organization / Fishery Extension Improvement Plan	
1) Establish a fishermen organization.	• Establish fishermen organization to operate and manage the planned facilities.
2) Provide extension activities to enable the fishermen organization to conduct viable and self reliant project management.	• Introduce a participatory monitoring and evaluation system.
7 Education / Training Plan	
1) Establish a fishery extension unit in the district fisheries office.	
2) Provide training to build the capacity of the extension staff and enhance the economic activities of fishermen organizations.	• Provide training for the leaders of fishermen organizations and extension staff members of the Fisheries Office by external institutes.

5.3.5 Operation and Maintenance Plan

A new local fishermen organization that will be operated according to the decisions made by local residents will be established. The organization will be placed under the jurisdiction and supported by the provincial government. It will operate the planned facilities in conjunction with existing organizations. The functions and role division of each organization and the overall system of coordination are shown in the figure below.



5.3.6 Breakdown of Project Costs

A breakdown of the project costs for Eastern Flores zone is shown in the table below.

Unit: Rp. million

Model Site	Center		Estimated Project Costs	Foreign Cost	Domestic cost
Oka	Coastal resources management	Facility	-	-	-
		Equipment	1,549	1,549	-
		Activity cost*	631		631
	Landing, handling, shipping, processing fisheries	Facility	12,130	10,707	1,423
		Equipment	2,702	2,702	-
		Activity cost*	1,609	-	1,609
	Improvements to fishing village environment	Facility	-	-	-
		Equipment	-	-	-
		Activity cost*	4	-	4
Lamahala Jaya	Coastal resources management	Facility	-	-	-
		Equipment	398	398	-
		Activity cost*	26	-	26
	Landing, handling, shipping, processing fisheries	Facility	1,238	1,195	43
		Equipment	1,092	1,092	-
		Activity cost*	221	-	221
Sagu	Coastal resources management	Facility	-	-	-
		Equipment	476	476	-
		Activity cost*	26	-	26
	Landing, handling, shipping, processing fisheries	Facility	433	383	50
		Equipment	93	93	
		Activity cost*	114	-	114
	Improvements to fishing village environment	Facility	39	-	39
		Equipment	-	-	-
		Activity cost*	-	-	-
Lewoleba	Coastal resources management	Facility	-	-	-
		Equipment	1,548	1,548	-
		Activity cost*	590	-	590
	Landing, handling, shipping, processing fisheries	Facility	6,733	5,959	774
		Equipment	1,316	1,316	
		Activity cost*	767	-	767
Balauring	Coastal resources management	Facility	-	-	-
		Equipment	1,548	1,548	-
		Activity cost*	590		590
	Landing, handling, shipping, processing fisheries	Facility	6,734	6,679	55
		Equipment	2,434	2,434	
		Activity cost*	767	-	767
Lamalera	Coastal resources management	Facility	-	-	-
		Equipment	276	276	-
		Activity cost*	-	-	-
	Landing, handling, shipping, processing fisheries	Facility	418	370	48
		Equipment	878	878	-
		Activity cost*	2,031	-	2,031
	Improvements to fishing village environment	Facility	10	10	-
		Equipment	-	-	-
		Activity cost*	1	-	1
Total			49,422	39,613	9,809

Note: Asterisk denotes for the first 2-year period.

5.3.7 Project Evaluation

A widespread fisheries marketing network will be established and measures to increase fishermen income will be implemented in this zone. Projections on fishermen income in the zone have been evaluated for both East Flores and Lembata districts which comprise this zone.

The average per capita income of East Flores District (Larantuka, Lamahala Jaya, and Sagu) in FY2001 was Rp.1.61 million, which is slightly below the per capita income of Rp.1.63 million targeted in the MP. The implementation of this project is anticipated to produce an annual benefit of Rp.2.468 billion for the entire site. Consequently, the average income of the 1,723 fishermen households, who are the beneficiaries of this project, is estimated to rise by Rp.330,000/person; and the average per capita income of fishermen will rise to Rp.1.93 million. This exceeds the per capita income targeted in the master plan.

The average fishermen income in Lembata district (Lewoleba, Balauring, and Lamalera) is Rp.1.56 million/person, which is below the per capita income targeted in the MP. The implementation of this project is estimated to produce an annual benefit of Rp.1.2943 billion for the entire site. Consequently, the average income of the 637 fishermen households, who are the beneficiaries of this project, is estimated to rise by Rp.535,000/person; and the average per capita income of fishermen will rise to Rp.2.10 million. This exceeds the per capita income targeted in the master plan.

Moreover, the implementation of the project will enable the 275 tons of the 629 tons of surplus fresh fish in the East Flores region to be shipped to Central Flores, and 354 tons of fresh fish to be shipped to western Flores via Central Flores. With an increase in surplus fresh fish stemming from extended fishing grounds in future, increased shipments of fresh fish to this region can be expected.

The EIRR of the development project in the targeted zone was a high 17 percent, which is indicative of a high need for the project. The FIRR was low for all five sites, excluding Lamahala Jaya (7 percent). In particular, the financial responsibility of the district government for the entire project could not be calculated because the internal profit ratio of the management organizations in Sagu and Lamalera showed a deficit. Therefore, financial assistance for facility repair costs and grant to cover a large portion of the fiscal year investments required by the central and district governments are needed.

However, in terms of long-term goals, the creation of a resources management system is important not only for Indonesia, but for the global community as well. It is also an important source of protein for the Indonesian people. A project that strengthens the capabilities of the small-scale fishermen is important for this region since it will serve as a

fish supply base for the other regions, as well as functioning as a vital first step to improving the coastal fishing communities of this zone.

Furthermore, the project will contribute greatly to generating employment opportunities and promoting social participation of village women in the fishing villages through improvements in the marketing system and processing facilities.

Implementation of the project raises no major environmental issues. Therefore, it is concluded that overall, there is a high potential to implement the project.

5.4 Central Flores Priority Zone

5.4.1 Current Conditions and Issues

1) Central Flores is the economic center of Flores Island, and Maumere is the largest distribution base.

2) Central Flores (Kalimati/Wuring, Paga and Paupanda) is categorized as a fishery community adjacent to an urban area.

3) PPI in Kalimati is in close vicinity to the consumption area of Maumere, but there are no fishermen households at the site. The fishermen in neighboring villages (mainly fishermen in the Wuring sub-village) land their catch at the PPI in Kalimati.

4) There are 4,406 households in Wuring, and all the households are engaged in fishery activities. The village is known as a traditional fishing village and it is a tourist spot. In Paga, 400 households out of a total of 1,460 households are engaged in fisheries. All the households in Paupanda are also engaged in fisheries. The motorized fishing boats consist of 108 purse seiners, 91 gill net / hand line / trawling boats and 31 other types of fishing boats. The existing purse seiners are rather small and the non-motorized boats do not have enough space to install fish holds.

5) The motorization ratio of fishing boats is about 12 and 16 percent in Sikka and Ende districts, respectively.

6) The fishing grounds are roughly divided into the northern area (Flores Sea side) and the southern area (Sabu Sea/ Indian ocean side). In the northern area, some fishery companies and live fish buyers collect fish for outside markets, but there are no fishery companies and live fish buyers in the southern area.

7) The exploitation rate of fishery resources is estimated at below 50 percent, and there is still scope for resources to be exploited. The fishery resource of the southern area is considered to be richer than the northern area.

8) Good fish catch season for both areas is from March to December; and the landing volume of the northern area is comparatively stable throughout the year, while the fish catch volume in the southern area is decreases greatly from December to February.

9) The landing percentage of large migratory fish such as skipjack and tuna is comparatively high--especially in Maumere where 70 percent of the total landed volume is comprised of large migratory fish.

10) Fishing boats in Kalimati and Paupanda anchor at a distant site from the beach and land their fish catch by sampans. Consequently, the landing beach is congested and time is wasted.

11) In Paupanda, traders buy the entire fish catch from fishing boats and sell fish at the beach to retailers by mutual agreement. In contrast, in Kalimati, both small and large traders and retailers gather at the landing site and buy fish directly from the fishing boats.

12) There are 223 fish traders and retailers who handle an average of 17 tons of landed fish daily. The majority of these buyers are male. The percentage of small traders whose daily handling volume is below 100kg is 39 percent in Kalimati, 67 percent in Paupanda and 98 percent in Paga.

13) A large volume of unsold fish is generated during the peak fishing season that is used as raw material for processed fishery products. In particular, the fish price plummets in Lamalera during the season when large frigate tuna is harvested and the unsold fish is abandoned.

14) The community residents dispose human wastes and garbage at the fish landing beach and these conditions must be rectified. Although limited community activities are conducted in Ende, such activities are nonexistent at the other sites and the motivation of the community residents to improve their village environment is low.

15) The Sikka district Fisheries Office have secured land (2,300m2) for fisheries development and is scheduled to construct a landing jetty, fish market and office in 2002. But this plan must resolve various issues, because the design does not reflect the actual needs of the fisheries activities. Likewise, a PPI exists in Ende, but it is not utilized by local fishermen since they do not meet the current needs of the fisheries activities.

5.4.2 Development Concept

This plan aims to qualitatively improve the fisheries industry in fishing villages located near urban areas and to promote appropriate resources management while ensuring a stable supply of fish to the cities. It will deal with distribution issues by linking Maumere and Ende, as well as production issues in Paga, thereby enabling the region to supply fish to the

western areas of Flores Island and to serve as a mid-way point for fish transported from eastern Flores. The following measures will be implemented to comprehensively improve all of the prevailing conditions explained above.

1) An initial coastal resource management system that can be implemented by the fishermen and the local government will be established, in conjunction with measures to improve the knowledge of fishermen about coastal resources management and to improve the local government's fishing licensing system.

2) The plan will develop the facilities for fish landing, shipping, marketing, and processing, and provide tools for shipping fresh fish from Maumere and Ende to western Flores. Technical training will be conducted for fishermen and fishing village women and extension activities will be implemented to improve fishermen income.

3) In view of the development level of the fishing village cooperatives, fishing cooperatives, and fishermen groups already organized at each model site, a project management system will be created around these organizations that will produce benefits for the fishermen. The local government and other local organizations will assist these organizations until they have developed sufficiently to operate independently.

4) As in the case of the Bima priority zone, a program to strengthen the self-motivation of the fishermen to improve their living environment and village infrastructure will be developed.

5) A training and extension program to disseminate the activities described above to other districts and sub-districts will be developed.

5.4.3 Approach

1) In addition to developing offshore fishing grounds and implementing fishermen training activities, a fishing surveillance system by fishermen and measures to substantiate the fisheries licensing system and a boat construction permit system will be implemented.

2) Facilities that meet the existing fish landing needs will be constructed in Kalimati district in Maumere as supplementary facilities for the fish landing facility that is under construction there. In addition, facilities that will provide qualitative improvements in Wuring village, where fish catch for Kalimati is landed and processing and fishing gear repair activities are presently carried out, will be provided under this plan. A multipurpose facility will be provided for Paga since the existing fish landing method will be kept due to the strong impact of the long-interval swells that are generated at this fish landing site. In Ende, an ice-making facility will be provided for the PPI (public fish landing site) to strengthen the fisheries activities there. In addition, a fresh fish transport

vehicles will be provided for Maumere (Kalimati) and Ende to transport and mobilize fresh fish marketing activities to the western region of Flores. The aim of these measures is to reduce the economic loss of fishermen and to raise their income.

3) A joint management and operations system by the government and fishing community will be established that will enable the fishermen organization to operate the facilities and equipment independently in future.

4) Infrastructure related model projects that promote the fishing community's motivation to implement improvements in their living environment and educational activities to strengthen the village residents' motivation will be pursued.

5) An extension section to be set up within district fisheries office to strengthen the capability of staff and to disseminate extension activities to other areas in the district based on the achievement of the project.

5.4.4 Development Projects

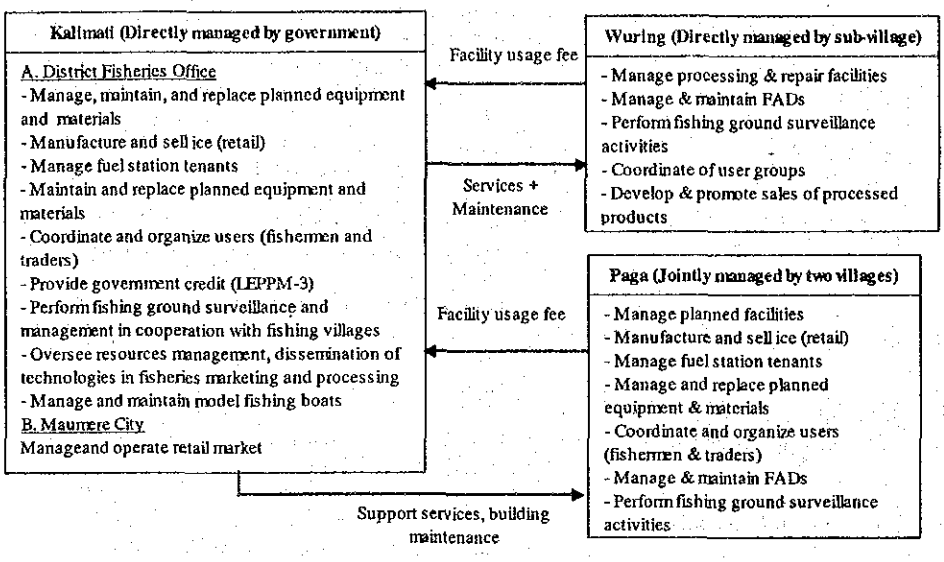
The development projects implemented in Central Flores based on the concepts and approach mentioned above are shown in the following table.

1	Coastal Resources management Plan	
1)	Improve fish landing data collection system.	• Record fish landing data by fishermen and data collection / analyses. • Provide guidance to improve fishery management.
2)	Expand and improve existing fishing permit system.	• Formulate fishing license system and fishing boat construction permit system. • Issue fishing license and collect license fees • Issue fishing boat markers. • Legally establish this system and its extension to the district level.
3)	Diversify fishing grounds.	• Control the number of purse seiners in the northern water area, and introduce appropriate fishing ground management. • Exploit large pelagic fish in the southern waters by small-scale gill net boats and trawlers. • Exploit offshore pelagic resources by introducing a model fishing boat. • Promote the motorization of small fishing boats.
4)	Establish a coastal fishing ground monitoring system.	• Establish a monitoring and communication system for illegal fishing boats. • Establish a system of controls against illegal fishing boats.
2	Fish landing/Handling/Shipping/Processing Plan	
1)	Improvement of fish landing and handling system	• Provide appropriate fish landing facilities in Kalimati. • Rehabilitate PPI in Paupanda. • Provide fish handling /auction facilities in Paga.
2)	Improvement of fresh fish shipping system	• Provide ice plant and ice storage for 3 sites. • Provide cool boxes and their keeping place. • Provide insulated truck in Kalimati and Paupanda for fresh fish transportation. • Provide multipurpose transport boat in Ende Island. • Provide communication equipment.
3)	Extension of fresh fish handling technology	• Popularize cool boxes.
4)	Improvement of processing technology	• Provide model processing facilities. • Conduct extension activities to improve existing processing practices. • Conduct extension activities introduce new processed products.
3	Fishery Activities Support Plan	
1)	Improve incidental facilities for Fish landing/Handling/Shipping/Processing Plan	
4	Fishery Community Environment Improvement Plan	
1)	Improve community infrastructure.	• Provide model facilities for water supply and toilet. • Provide trash collection system.
2)	Upgrade community motivation to improve the social environment	• Provide trash boxes and disseminate trash collection system.
5	Fishermen Organization / Fishery Extension Improvement Plan	
1)	Establish a fishermen organization	• Establish a fishermen organization to operate and manage the planned facilities.
2)	Provide extension activities to enable the fishermen organization to conduct viable and self reliant project management	• Introduce a participatory monitoring and evaluation system.
6	Education / Training Plan	
1)	Establish a fishery extension unit in the district fishery office (DPK).	
2)	Provide training to build the capacity of the extension staff and enhance economic activities of fishermen organization.	• Provide training for leaders of the fishermen organization and extension staff of fisheries office by external institutes

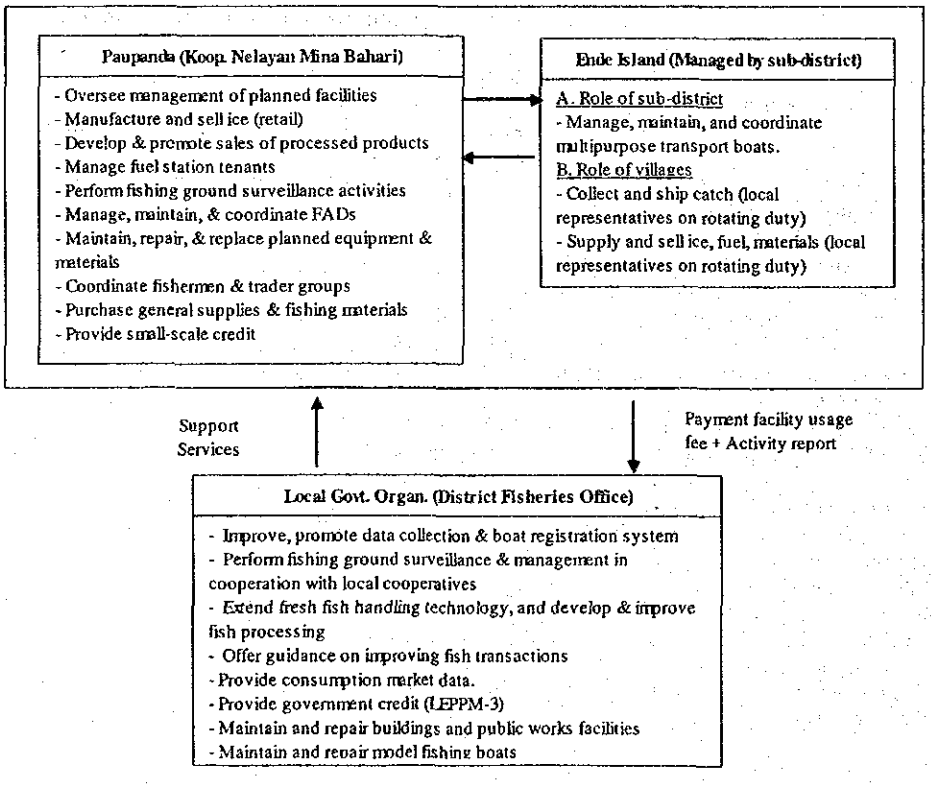
5.4.5 Operation and Maintenance Plan

A new local fishermen organization that will be operated according to the decisions of the local residents will be established. The organization will be placed under the jurisdiction and supported by the provincial government, and it will operate the planned facilities in conjunction with existing organizations. The function and role divisions of each organization and the overall system of coordination are shown in the figure below.

(a) Sikka district



b) Ende district



5.4.6 Breakdown of Project Costs

A breakdown of the project costs for the Central Flores zone is shown in the table below.

Unit: Rp million

Site	Sector		Estimated Project Costs	Foreign Cost	Domestic cost
Kalimati	Coastal resources management	Facility	-	-	-
		Equipment	1,615	1,615	-
		Activity costs*	571	-	571
	Landing, handling, shipping, processing fisheries support activities	Facility	12,100	11,642	458
		Equipment	2,203	2,203	-
		Activity costs*	737	-	737
Wuring	Landing, handling, shipping, processing fisheries support activities	Facility	5,165	4,415	750
		Equipment	-	-	-
		Activity costs*	47	-	47
	Improvements to fishing village environment	Facility	14	-	14
		Equipment	-	-	-
		Activity costs*	4	-	4
Paga	Coastal resources management	Facility	-	-	-
		Equipment	537	537	-
		Activity costs*	26	-	26
	Landing, handling, shipping, processing fisheries support activities	Facility	417	234	183
		Equipment	1,180	1,180	-
		Activity costs*	271	-	271
	Improvements to fishing village environment	Facility	8	-	8
		Equipment	-	-	-
		Activity costs*	4	-	4
Paupanda & Ende Island	Coastal resources management	Facility	-	-	-
		Equipment	2,223	2,223	-
		Activity costs*	502		502
	Landing, handling, shipping, processing fisheries support activities	Facility	11,257	10,827	430
		Equipment	1,878	1,878	-
		Activity costs*	949	-	949
Total			41,708	36,754	4,954

Note: Asterisks denote for the first 2-year period

5.4.7 Project Evaluation

A widespread fish marketing system will be established and fishermen incomes will be improved in this zone. The anticipated improvements in fishermen income was estimated according to the three regions that comprise this zone, Kalimati, Ende, and Paga.

The average per capita fisherman income in Kalimati in FY2001 was Rp.1.33 million, which is below the per capita income of Rp.1.63 million targeted in the master plan. The implementation of this project is anticipated to produce an annual benefit of Rp.6.20 billion for Kalimati. Consequently, the average income of the 1,046 fishermen households, who are the beneficiaries of this project, is estimated to rise by Rp.138,000/person; and the average per capita income of fishermen will rise to Rp.1.47 million. This falls below the per capita income targeted in the master plan.

The average per capita fisherman income in Ende in FY2001 was Rp.430,000, which is greatly below the per capita income of Rp.1.63 million targeted in the master plan. The

implementation of this project is anticipated to produce an annual benefit of Rp.1.113 billion. Consequently, the average income of the 2,563 fishermen households, who are the beneficiaries of this project, is estimated to rise by Rp.433,000/person. With this increase, the average per capita income of fishermen will rise to Rp.504,000, but as in the case of Kalimati, this figure falls below the per capita income targeted in the MP.

Likewise, the average per capita fisherman income in Paga in FY2001 was Rp.1.58 million, which is below the per capita income of Rp.1.63 million targeted in the MP. The implementation of this project is anticipated to produce an annual benefit of Rp.476.5 million. Consequently, the average income of the 397 fishermen households, who are the beneficiaries of this project, is estimated to rise by Rp.343,000/person. With this increase, the average per capita income of fishermen will rise to Rp.1.92 million, which exceeds the per capita income targeted in the MP.

With the implementation of this project, about 656 tons of surplus fresh fish from Central Flores will be shipped to the western Flores. In combination with fresh fish shipments from East Flores to western Flores, the total volume of fresh fish shipments is estimated at 1,010 tons. With an increase in surplus fresh fish stemming from extended fishing grounds in future, increased shipments of fresh fish to this region can be expected. In addition, increased fish landing volume will contribute greatly to augmenting incomes in this region. The multipurpose boat that will be provided in this project is especially anticipated to contribute to the economic activities of Ende Island.

The EIRR of the development project in the targeted zone was a high 17 percent, which is indicative of a high need for the project. However, the FIRR including the financial responsibility of the district government for the entire project could not be calculated. A large portion of the investments for the first fiscal year must be covered by grant aid and financial assistance from a public institution to cover the repair costs is needed.

However, in terms of long-term goals, the creation of a resources management system is important not only for Indonesia, but for the global community as well. It is also an important source of protein for the Indonesian people. A project that strengthens the capabilities of the small-scale fishermen is important as a vital first step to improving the coastal fishing communities in the eastern region.

Implementation of the project raises no major environmental issues. Therefore, it is concluded that overall, there is a high potential to implement the project.

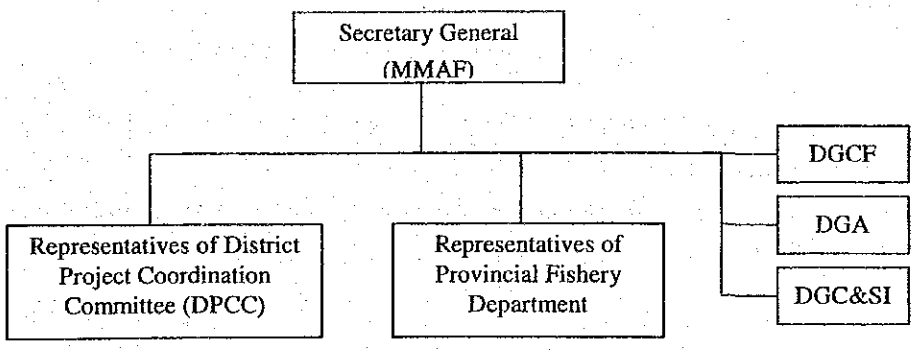
6. Project Implementation Plan

6.1 Executing Agency

The executing agency of this project is the Ministry of Marine Affairs and Fisheries, but under the regional decentralization policy, the district government will be responsible for overseeing the actual implementation of the project. However, due to the resources management programme, infrastructure improvement, the introduction of improved technology in fisheries, marketing, and processing, improvements in the social environment of the village communities, and various other programmes, that will require uniform measures by the central, provincial and district administrative levels in the area of fisheries resources, the Ministry of Marine Affairs and Fisheries must establish a system of cooperation between each respective department and office and to coordinate the activities of the provincial and district Fisheries Offices. In view of these circumstances, an organizational system of equal and mutual coordination and cooperation between the Ministry of Marine Affairs and Fisheries and the district governments is demanded. As shown in the figure below, the cooperation between the Ministry of Marine Affairs and Fisheries and each district government body will be sufficient, but in future an organization that represents neighboring district governments will be needed in future to coordinate the interests of both local governments. A project implementation committee to provide concrete support of the operations of the project and a project coordination committee that will coordinate the roles of the relevant bodies in the district government, which will actually implement the project, will be needed.

6.1.1 Programme Coordination Committee

An organizational chart of the committee that will be responsible for coordinating the various project programmes between the central and district governments is shown below.



Organizational Structure of the Programme Coordination Committee (PCC)

Legend: MMAF = Ministry of Marine Affairs and Fisheries
DGCF = Director General of Capture Fisheries
DGA = Director General of Aquaculture
DGC&SI = Director General of Coastal and Small Islands

6.1.2 District Project Coordination Committee (DPCC)

A District Project Coordination Committee (DPCC) will be established at the start of the project to coordinate the relevant parties and institutions that are relevant to the operations of the project. This committee will be comprised of representatives from the district governor's office (Buppati Office), the district fisheries office (Dinas Perikanan Kabupaten), the district cooperatives office (Dinas Koperasi Kabupaten), the district planning office (Bappeda), the provincial fisheries office (Dinas Perikanan Propinsi), and others. The representative from the district governor's office will chair the committee and it will be responsible for carrying out the administrative coordination and basic policies with regard to the project's implementation. Other related duties are as follows.

6.1.3 Project Implementation Committee

A Project Implementation Committee (PIC) will be created within the district fisheries office and will be chaired by the fisheries office director. The committee will be comprised of the officer in charge of the project, the fisheries extension officer, and representatives of the fishermen cooperatives. It will be responsible for the concrete preparations and implementation of the project in accordance with the basic policy set by the DPCC; and it will mobilize, organize, and strengthen the fishermen cooperatives and kelompoks to coordinate the project activities, and it will take responsibility for providing the needed capital and technical assistance to implement the project. It will also be responsible for the following tasks.

6.1.4 Project Management Office

A Project Management Office (PMO) will be set up in the fishermen's cooperative office that will operate the project. With the assistance and guidance of the PIC, it will be responsible for providing guidance on the organizational system, technical aspects, and loan services. The PMO staff members will be appointed by the PIC.

6.1.5 Fishermen Organizations That Will Manage the Project (Model Site)

Fishermen organizations that will be in charge of the operations of the project facilities will be established at each model site. These fishermen organizations will also represent the existing fishing village cooperatives and fishermen cooperatives. (For details about the organization's functions, refer to section 5.1.5, 5.2.5, 5.3.5, and 5.4.5.)

6.2 Implementation Schedule

6.2.1 Implementation Schedule of the Priority Zones

Implementation priority will be given to priority zones with a high EIRR that also show a financial plus. The implementation priority ranking based on project evaluation findings is shown in the table below.

Province	Priority I	Priority II
NTB	Waworada	Kempo, Hu'u
NTT	Larantuka (Oka), Lamahala Jaya, Balauring, Lewoleba, Ende, Paga	Maumere (Kalimati, Wuring), Sagu, Lamalera

6.2.2 Priority Projects in Each Programme

The projects that will raise fishermen incomes and directly eliminate the regional disparity in fish consumption were prioritized. The priority ranking of each project was determined according to the criteria shown in the table below.

Programme	Project	Year 1	2	3	4	5	6	7	8	9	10
Coastal resource management	Data collection system	■	■								
	Expansion fishing licensing system		■	■							
	Diversification of fishing grounds			■	■	■	▪	▪	▪	▪	▪
	Coastal fishing surveillance					■	■	■	▪	▪	▪
Fish landing, marketing and processing	Fish landing & handling improvement	■	■								
	Fresh fish shipment improvement	■	■								
	Fresh fish handling extension			■							
	Fish processing improvement			■							
	Bima retail market			■	■						
Fishing Activity Support Facilities	Support facilities	■	■								
Aquaculture	Model project			■	■						
	Spatial Plan			■							
Fishing village environment	Fishing village infrastructure					■					
	Social environment improvement			■	■	▪	▪	▪	▪	▪	▪
Strengthening of fishermen organization/Fisheries Extension	Establish fishermen organization	■	■								
	Monitoring and evaluation		■	■	▪	▪	▪	▪	▪	▪	▪
Fishermen Education/Training	Education/training of fishermen leaders, govt. officers	▪	▪	▪	▪	▪	▪	▪	▪	▪	▪

Note: Bold line indicates project period and dotted bold line indicates support by local government.

6.3 Capital Procurement Plan

6.3.1 Initial Input Capital

Of the 12 model sites, the EIRR of three sites was 8~9 percent and for the other remaining sites it ranged from 10 percent to 42 percent. Due to the a large amount of initial cost for the provision of infrastructure, only one site indicated a FIRR of 7 percent; eight sites showed 0~4 percent, three sites showed minus one to minus 3 percent, and the FIRR for one remaining site could not be computed. In order to enable the project to be implemented under sound financial conditions, the Indonesian government must pursue to secure grant fund to cover the initial input costs.

In addition, since the project contains elements that may transform the coastal resources management programme and other aspects of Indonesia's fisheries administrative system, it is recommended that the technical cooperation projects of JICA or other similar assistance programmes are implemented in order to reduce the initial input.

For the fishing village environmental improvement programme, it is possible to obtain the assistance of the JOCV and other grass roots assistance to provide technical support and the equipment and materials needed to implement traveling extension activities in the zones and to produce supplementary audiovisual materials aimed at raising the motivation of the local communities to improve the social environment of the fishing villages.

6.3.2 Operating Capital

In this project, the operating capital for the facilities and equipment have been planned to revolve on independent funds. However, in order to achieve this goal, OJT and regulated extension, educational, and training activities are needed. The estimated costs of these activities are 30 to 70 percent of the district fisheries office budget. Therefore, the district fisheries office should explain the content of the project and its benefits and secure budgetary support from the district government.

6.4 Technical Assistance

Much of the technology required by each project is available in Indonesia. Providing appropriate guidance measures can effectively raise the operations of fishermen organizations. Although activities to raise the organizational and operational capabilities of the fishermen organizations will be implemented by the district Fisheries Office, its manpower capacity is limited and there is a need to strengthen its extensions personnel by establishing an extensions division. Moreover, the management and operations of the project will be effectively raised, if an expert or JOCV member can be dispatched to provide technical guidance prior to the start of the project.

Furthermore, the Indonesian government has minimal experience in establishing a coastal resources management system implemented by community residents. Therefore, it is recommended that it dispatch fisheries officers at the central or provincial government levels to undergo the training programme provided by SEAFDEC, which has implemented similar projects in the Philippines or Thailand. Moreover, the cost of the programme is only 50 percent for beneficiaries and the course is conducted in English. The fisheries officers who undergo this training programme will disseminate their newly acquired knowledge to the staff members of the district Fisheries Office and to fishermen.

7. Recommendation

(1) Improving Fishermen Income and Swift Project Implementation

The per capita GDP of NTT and NTB provinces that were targeted in this study is the third lowest among the country's 30 provinces. In particular, the fishermen income level of nine of the fishing villages out of the 33 village communities that were surveyed in this study were at the poverty line level, and the income of 25 villages was under the income earned by farmers working on less than 0.5ha of land.

Due to the difficulty accessing financial institutions, input in fisheries has been minimal. But additionally, fish prices have been kept low mainly due to undeveloped technology in fish processing and fresh fish maintenance.

One of the objectives of this study was to improve fishermen incomes in order to rectify the economic losses. This was a common problem for all the fishing communities in the study area; and since the problem does not require advance technology to resolve, the implementation of the project in the priority zones is anticipated to produce a large ripple effect. Therefore, it is recommended that the Indonesian government implement the projects as quickly as possible at least in the priority zones with an EIRR of higher than 10 percent and a plus FIRR. Appropriate budgetary measures should be enacted and the assistance of donor institutions for the initial input should be requested; and the preparation for the official request should be implemented as soon as possible.

(2) Coastal Resources Management and Government Action

Open access to fisheries resources is presently based on the consensus of the Indonesian people. Conversely, this has also been the underlying cause of the low awareness about local resource conservation by the local residents and their insensitivity to the adverse impact of illegal fishing methods used to exploit resources.

Under the decentralization policy, the local governments have begun to see the fisheries resources in their region as a source of financial revenue. However, this perspective is not based on sustained use of resources, but simply a shortsighted aim to collect fishing

revenues. This may lead to abuse of the fisheries licensing system. Therefore, in this project, independent management of coastal resources by the local fishermen has been proposed. The central government should work closely with the provincial and district governments to establish a self-reliant and basic management and surveillance system by the coastal communities to achieve sustained use of the coastal resources.

(3) Establish a Fisheries Coordination Institution in Saleh Bay

Saleh Bay in Sumbawa Island encompasses a wide area where coastal fisheries have flourished. It is an enclosed water area due to an island that obstructs the mouth of the bay. According to the statistics, the fish catch volume has stagnated these past few years and there is a need to closely manage the resources. Private companies have also expressed interest in conducting mariculture activities, and there is a need to separate the water areas for fisheries and mariculture activities based on the mutual consensus of the coastal community. In addition, the boundary between Sumbawa and Dompu districts runs through the middle of the bay, and there is a need to establish an institution that will coordinate the fishery activities of both districts with the aim of achieving sustained use of the fisheries resources.

(4) Assistance to Foster Self-reliant Fishermen Organizations

In principle, the management and operations of the facilities will be carried out by fishermen organizations whose capabilities will be strengthened with the assistance of the district fisheries office and village administrative bodies. As a result, the administrative side plays an extremely important role. Generally, the capabilities of the district level officers are low and it will be difficult for these officers to supervise the fishermen who will be in charge of the operations and maintenance of the facilities. However, based on discussions with district officers about the project during the study, it was concluded that they possess adequate basic capabilities to manage the operations of the facilities under an appropriate plan. To foster self-reliant fishermen organizations, the district government will monitor and evaluate the project's implementation and will provide technical, financial, and administrative support during the initial stages of the facilities' operations to raise the management capabilities of the fishermen organizations.

(5) Review a Financial System for Fishermen

To promote sustainable fisheries in the study area, it is important that fisheries activities are extended to offshore waters. The provision of a model fishing boat in the project will be used to train the younger generation of fishermen in offshore fisheries, which requires the use of large fishing boats. The construction cost of a large fishing boat averages Rp.3,000 million to Rp. 4,000 million, but generally, it is difficult to obtain loans from the

existing financial system, despite special loans of Rp.4000 million to women kelompoks as part of a programme by the department of outlying islands to improve their capabilities. There is a need to combine a training programme for fishermen with a financial system that will help them to purchase large fishing boats for offshore operations. The Ministry of Marine Affairs and Fisheries should endeavor to quickly establish such a financial system. Following points should be considered when a financial system is to be established.

(a) The modernization of fishing boats should be clarified within the policy framework.

(b) The credit fund, both from the government and the donor, should clearly be divided for the existing small-scale fishing activities and for the modernization of fishing boats.

(c) The financial system for small-scale fishermen which is currently provided by the local development bank should be utilized.

(d) The upper limit of the loan amount by each water body should be set up based on the economic viability of off-shore fishing activities within 12 nautical miles evaluated by DGCF of MOMAF.

(e) Minimum criteria for individuals who can access the loan are to be set up. Those individuals should have enough experiences in off-shore fishing or be acquired trainings from formal training centres (ex. Semarang Fishery Training Centre, etc.).

(f) Those centres should establish training programmes for fishermen based on the policy for the modernization of fishing boats and corresponding credit system.

(6) Factors to Consider in Mariculture Development

There is strong interest to develop mariculture at the central, provincial, and district government levels, but the targeted fish species are groupers, lobsters, and other high priced species. However, these species require a long rearing period, in terms of feed and monitoring activities, which makes it difficult for small-scale fishermen with limited capital to participate. Similarly, only private companies with capital are able to engage in high density and intensive brackish water pond culture of prawns. Presently, government supervised cage culture of groupers is underway in three to four locations in the study area. But due to the inadequate preliminary training of the fishermen, the lack of financial assistance to meet the operating costs until shipment, and the lack of a shipping system for live fish, the project will inevitably fail. If the government plans to promote mariculture among the small-scale fishermen, it must first address these issues and provide complete technical and financial support.

(7) Foster Fisheries Extension Officers

Since the fisheries sector was under the jurisdiction of the Ministry of Agriculture, the fisheries extension activities tended to be concentrated in inland fisheries. In addition, since the district extension officers are mainly centered in agriculture, the educational and training activities in marine fisheries have been inadequate and have produced very minimal results. The operations and management of the project will initially be conducted with the participation of the district fisheries and village administrative organization to strengthen the capabilities of the fishermen organization. Subsequently, it is important to raise the capabilities of the district fisheries officers. It is also important that extension activities in marine fisheries are given institutional support in the new ministry and the capabilities of the district level fisheries personnel are improved as quickly as possible.

(8) Assistance to Improve the Village Environment

Under the regional decentralization policy, the local communities must shift from an attitude of waiting to an attitude of self-help to resolve the problems in each fishing community. However, the fishing communities have grown to depend on third parties to resolve their problems, and their motivation to take action among themselves is low. The fishing villages face a variety of problems in their social environment such as the excessive labor of women, the lack of basic education for children, the lack of recreational facilities, and others. There is a need to raise the community's motivation to improve the social environment of the fishing village, and the strong assistance of the district extensions officer is vital in this area. Therefore, it is recommended that the district fisheries office formulate and implement support programmes.