

4. Project Evaluation

4.1 Economic and Financial Evaluation

4.1.1 Economic Evaluation

The model sites in this zone are Oka, Lamahala Jaya, Sagu, Lewoleba, Balauring, and Lamalera. The basic inputs are facility improvements, the purchase of equipment and materials, and activity costs. In the economic evaluation, these costs will be converted into economic prices.

Basic fishing port facilities and marketing and processing facilities, including an ice-making facility are planned for the model sites in Larantuka and Lewoleba. A transport truck or a multipurpose transport boat will be provided in Lamahala Jaya, Sagu, Balauring, and Lamalera, in addition to other equipment.

The benefits are 1) reduced working hours due to improved basic fishing port facilities, 2) increased value added of fresh fish supply due to improved processing and marketing facilities, 3) reduced costs due to efficient and improved transport and loading activities, 4) increased consumption of ice due to lower ice price, and 5) new technology and resource management by fishermen due to the provision of a model fishing boat. In addition, trial activities to reduce suspended business operations and health costs by improving the fishing village environment will also be implemented.

The evaluation period will be 15 years and basic inputs will be implemented in FY0. In addition, the required renovation inputs in conjunction with the physical lifespan years of the facility have been added, and the cost of the terminal value in FY16 has been added.

(1) Benefits

Benefit	Without Project			With Project
Fish landing volume	Remains the same.			Remains the same
Reduced working hours	Unable to secure time for fishing activities Excessive burden on fishing village women			By reducing the landing time, the time for fishery activities is secured, sustainable resources management becomes possible (opportunity cost in terms of fish catch has been added)
Increased value added fresh fish supply		Fresh fish ratio	Unsold ratio	Fresh fish ratio: Larantuka 74% Lamahala Jaya 59% Sagu 64% Lewoleba 65% Balauring 69% Lamalera 26% Unsold ratio Improves to 0% Processed fish price: 50% increase
	Larantuka	57%	14%	
	Lamahala Jaya	46%	7%	
	Sagu	44%	13%	
	Lewoleba	43%	11%	
	Balauring	47%	12%	
	Lamalera	17%	4%	
Reduced transport costs	Due to the lack of a refrigerated transport vehicle, unable to ship fresh fish. Lack of transportation to the market has made fresh fish transport difficult.			Easier access to the market due to the introduction of multipurpose transport boats and disappearance of price differences between the average fish price (Rp.4,000/kg) in west Flores due to consumer surplus. Fisheries and daily equipment and supplies become easier to obtain. Increased will to pay with introduction of inland transport truck.
Decrease in ice price due to consumer surplus	Current market price Larantuka Rp.600/kg Lewoleba Rp.600/kg			<u>Larantuka</u> 5kg bags:Rp.300/kg 25kg Rp.280/kg <u>Lewoleba:</u> 5kg bags:Rp.380/kg 25kg blocks Rp.360/kg
New technology and resource management by fishermen due to the provision of a model fishing boat	Surplus fish catch of coastal resources			Extend basic infrastructure of future fishing grounds
Improved fishing village environment (introduction of garbage collection system)	Garbage is not regularly collected.			Garbage containers will be provided and garbage will be collected regularly.

(2) Calculating the Benefits

1) Increase of value of landed fish catch

	Motorized boat	Operational efficiency	Possible fishing days	Catch/day (non-motorized)	Catch/day (motorized)	Annual increased quantity	Annual increase value (Rp Million)
Sagu	23	0.62	348	7.5 kg	30 kg	112 tons	224
Balauring	28	0.63	360	10 kg	40 kg	191 tons	382
Lamalera	14	0.50	210	18 kg	72 kg	72 tons	158

Of the annual increase of value of fish landed mentioned above, about 50 percent is assumed to be operational cost (fuel and maintenance) increased by motorization. Consequently, the benefit of motorization is assumed to be 50 percent of the above landed value.

2) Time saving

Due to improved landing and other facilities, the fish landing hours, the time required for refueling and restocking boat supplies will be reduced (see Table 6-2-1, Appendix 6).

Although the fish catch revenue according to time greatly differs according to fishing

method and fishing period, Rp.2000/hour was used here. As a result, the benefits were calculated as shown in the table below.

Unit: Rp.million			
Time Reductions	Larantuka	Lewoleba	Total
Fish landing	133.2	10.7	143.9
Refueling	15.0	27.1	42.1
Restocking water supply	15.0	9.0	24.0
Total	163.2	46.8	210.0

3) Increased supply of value added fresh fish

The breakdown of the annual handling volume, irrespective of whether the project is implemented or not, has been summarized in the table below. The retail price per kilogram differs greatly according to fish species and fishing season, but the average price for fresh fish will be Rp.2,000/kg and the price of processed products will be three-fourths of this price, and unsold fresh fish will be transacted at half this price.

(a) Oka

Unit: Rp million/year						
Fish Marketing		With the Project		Without the Project		Benefit
		Handling volume (ton/year)	Retail price	Handling volume (ton/year)	Retail price	
Fresh fish	In the zone	1,468	2,936.0	1,650	3,300.0	864.0
	Outside the zone			250	500.0	
Processed fish	Value conversion before the improvements	769	1,153.5	693	1,039.5	114.0
	Increased value added after the improvements	-	-	-	519.8	519.8
Unsold fresh fish		356	356.0	0	0.0	356.0
Total		2,593	4,445.5	2,593	5,359.3	913.8

(b) Lamahala Jaya

Unit: Rp million/year						
Fish Marketing		With the Project		Without the Project		Benefit
		Handling volume (ton/year)	Retail price	Handling volume (ton/year)	Retail price	
Fresh fish	In the zone	987	1,974.0	1,008	2,016.0	546.0
	Outside the zone			252	504.0	
Processed fish	Value conversion before the improvements	1,019	1,528.5	904	1,356.0	172.5
	Increased value added after the improvements	-	-	-	678.0	678.0
Unsold fresh fish		158	158.0	0	0.0	158.0
Total		2,164	3,660.5	2,164	4,554.0	893.5

(c) Sagu

Unit: Rp million/year						
Fish Marketing		With the Project		Without the Project		Benefit
		Handling volume (ton/year)	Retail price	Handling volume (ton/year)	Retail price	
Fresh fish	In the zone	241	482.0	272	544.0	228.0
	Outside the zone			83	166.0	
Processed fish	Value conversion before the improvements	239	358.5	196	294.0	64.5
	Increased value added after the improvements	-	-	-	147.0	147.0
Unsold fresh fish		71	71.0	0	0.0	71.0
Total		551	911.5	551	1,151.0	239.5

(d) Lewoleba

Fish Marketing		With the Project		Without the Project		Benefit
		Handling volume (ton/year)	Retail price	Handling volume (ton/year)	Retail price	
Fresh fish	In the zone	767	1,534.0	886	1,772.0	760.0
	Outside the zone			261	522.0	
Processed fish	Value conversion before the improvements	809	1,213.5	621	931.5	282.0
	Increased value added after the improvements	-	-	-	465.8	465.8
Unsold fresh fish		192	192.0	0	0.0	192.0
Total		1,768	2,939.5	1,768	3,691.3	751.8

(e) Balauring

Fish Marketing		With the Project		Without the Project		Benefit
		Handling volume (ton/year)	Retail price	Handling volume (ton/year)	Retail price	
Fresh fish	In the zone	169	338.0	207	414.0	158.0
	Outside the zone			41	82.0	
Processed fish	Value conversion before the improvements	149	223.5	112	168.0	55.5
	Increased value added after the improvements	-	-	-	84.0	84.0
Unsold fresh fish		42	42.0	0	0.0	42.0
Total		360	603.5	360	748.0	144.5

(f) Lamalera

Fish Marketing		With the Project		Without the Project		Benefit
		Handling volume (ton/year)	Retail price	Handling volume (ton/year)	Retail price	
Fresh fish	In the zone	84	168.0	93	186.0	90.0
	Outside the zone			36	72.0	
Processed fish	Value conversion before the improvements	393	589.5	369	553.5	36.0
	Increased value added after the improvements	-	-	-	276.8	276.8
Unsold fresh fish		21	21.0	0	0.0	21.0
Total		498	778.5	498	1,088.3	309.8

4) Reduced transport costs

The costs that are curtailed due to the basic facility improvements that will be provided, especially the reduction in transport costs in Lewoleba. The benefits have been calculated as shown in the table below (refer Table 6.2, Appendix 6).

Reduced Transport Costs	Unit: Rp million/year Benefit
Efficient refueling reduced ocean transport cost	36.2

With the introduction of insulated fish boxes, fresh fish will be marketed over a wide area. Subsequently, a consumer surplus due to an increased fresh fish supply in areas where the average fish price exceeds Rp.4,000/kg in West Flores is anticipated. The price difference of Rp.2,000/kg between raw fish is shown as a benefit.

Two refrigerated trucks are needed since the annual fish catch volume of 400 tons is

marketed over a wide area. Therefore, 470 tons at Rp.2,000/kg (Rp.2 million/ton) has been added as a benefit.

The provision of multipurpose transport boats has been proposed for Lamahala Jaya Sagu, Lewoleba, Balauring, and Lamalera. These boats will greatly promote the economy in the outlying islands, but they have been simply indicated as a will to pay (rental fees) in the planned revenues in the table shown below.

Model Site	Willing to Pay Rp million/trip	Secure ice, fuel Rp million/trip	Number of Trips (trips/year)	Benefits Rp million/trip
Lamahala Jaya	0.22	0.406	300	187.8
Sagu	0.51	0.167	100	67.7
Lewoleba	0.39	0.318	200	141.6
Balauring	0.80	0.271	100	107.1
Lamalera	0.84	0.117	100	95.7
Total				599.9

The provision of transport trucks for Lamahala Jaya, Balauring, and Lamalera has also been proposed. Since the convenience factor will be greatly improved, it is anticipated that there will be a higher will to pay (rental fees) than now. Therefore, it has been added as a benefit in the planned revenue.

Model Site	Destination	Will to Pay Rp million/trip	Number of Trips (trips/year)	Benefits Rp million/trip
Lamahala Jaya	Inland region	0.19	300	57
Balauring	Inland region	0.08	200	16
	Lewoleba	0.22	50	11
Lamalera	Inland region	0.19	300	57
Total				141

5) Increased consumer surplus due to lower ice price

The estimated ice sales volume and price differences are shown in the table below (see Tables 5-2-4, 5-2-5, Appendix 5 for details) and the benefits have been added.

(a) Oka

Unit of Ice Sales	Retail Volume (ton/year)	Price Difference (Rp/kg)	Benefit (Rp million/year)
5kg	854	300	256.20
25kg	820	320	262.40
Total	1,674		518.60

(b) Lewoleba

Unit of Ice Sales	Retail Volume (ton/year)	Price Difference (Rp/kg)	Benefit (Rp million/year)
5kg	544	220	119.68
25kg	293	240	70.32
Total	837		190.00

6) New technology and resource management by fishermen due to the provision of a model fishing boat

The aim of the model fishing boat is to develop offshore fishing grounds and to strengthen the capabilities of fishermen by helping them to acquire experience and new technology in offshore fishing operations. As explained later, although the model fishing boat does not contribute directly to a large increase in fish catch revenue, its benefit is extremely significant in terms of enabling fishermen to acquire new experience, knowledge, and technical skills. Although this is quantitatively difficult to define, the benefits derived from

the model fishing boat was set at twice the fish catch income and it was added as a benefit of Rp.196.7 million/year $\times 2 =$ R.393 million/year (see section 2.5.2 (1) 2) A-2). The cost is counted for 10 years, and after 10 years it is assumed that a similar model fishing boat will be introduced by credit and the operation is maintained.

The benefits derived from the high-speed boat that will be used in surveillance activities was set as Rp.15.7 million/year for East Flores district and Rp.7.1 million/year for Lembata district, since licensing fees will be collected (see section 2.5.2 (1) 2) (c)).

7) Improvements of the Fishing Village Environment

According to the field survey, it was found that the quality of the living environment was a major factor that affected the disease ratio. Therefore, a decrease in the number of sick leave days and health and transport costs were calculated into the benefits that would be derived from the project. According to the survey, an annual benefit of Rp.48,900 would be generated per household (refer Table 6.4.19, Appendix 6). In addition, 440 households in Sagu, 107 households in Balauring, and 289 households in Lamalera will be targeted in a project to introduce a garbage collection system. Therefore, a benefit of Rp.7.4 million/year for Sagu, Rp.1.8 million/year for Balauring, and Rp.4.9 million/year for Lamalera has been added.

In Balauring, other water supply and model toilet facilities are planned and the composite impact of these facilities is large.

(3) Economic Costs of the Project

The calculations for the conversion factors are identical to the figures for Rompo. For details refer 4.1.1 (3) in Bima Priority Zone.

(4) Economic Internal Rate of Return (EIRR)

If the costs and project benefits explained in sections (2) and (3) above are calculated as the EIRR for each model site, high figures are obtained for Oka at 14 percent, Lamahala Jaya at 42 percent, Sagu at 23 percent, Lewoleba at 9 percent, Balauring at 9 percent and Lamalera at 27 percent. The EIRR for the entire zone is 17 percent.

(a) Oka

Unit: Rp.million/15 years

Evaluated Programmes	Benefit	Cost	EIRR (%)
Coastal resources management	6,575	4,978	9
Landing, marketing, processing	38,033	16,931	15
Village environment improvements	-	-	-
Total	44,608	21,909	14

(b) Lamahala Jaya

Unit: Rp.million/15 years

Evaluated Programmes	Benefit	Cost	EIRR (%)
Coastal resources management	-	934	N.A.
Landing, marketing, processing	17,068	3,657	52
Village environment improvements	-	-	-
Total	17,068	4,591	42

(c) Sagu

Unit: Rp.million/15 years

Evaluated Programmes	Benefit	Cost	EIRR (%)
Coastal resources management	3,360	2,790	11
Landing, marketing, processing	4,606	1,596	27
Village environment improvements	111	82	66
Total	4,717	2,898	23

Note: Includes benefits of motorization.

(d) Lewoleba

Unit: Rp.million/15 years

Evaluated Programmes	Benefit	Cost	EIRR (%)
Coastal resources management	6,007	4,897	6
Landing, marketing, processing	17,486	8,991	10
Village environment improvements	-	-	-
Total	23,493	13,888	9

(e) Balauring

Unit: Rp.million/15 years

Evaluated Programmes	Benefit	Cost	EIRR (%)
Coastal resources management	5,730	3,426	45
Landing, marketing, processing	4,184	1,564	22
Village environment improvements	27	19	53
Total	9,992	5,009	29

Note: Includes benefits of motorization

(f) Lamalera

Unit: Rp.million/15 years

Evaluated Programmes	Benefit	Cost	EIRR (%)
Coastal resources management	2,370	1,540	25
Landing, marketing, processing	7,034	2,274	34
Village environment improvements	211	25	170
Total	9,615	3,839	27

Note: Includes benefits of motorization

(b) Sensitivity analysis

In this evaluation analysis, there are several suppositions about the conversion of the economic price and calculations of the benefits. In this zone, the impact of the overall EIRR will be reviewed. If the benefits and costs are fluctuated at +10% and -10%, respectively, the results are shown as follows in the table below.

Fluctuation Range	Benefit +10%	Benefit +0%	Benefit -10%
Cost +10%	14	12	9
Cost +0%	17	14	12
Cost -10%	21	18	14

The above indicates that the effects of decreased costs and increased benefit are the same. In case of construction of basic infrastructure is delayed for two years due to constraints in getting investment, the overall EIRR will increase slightly to 19% because the benefit is large.

(c) Distribution of benefits

The largest benefit is the increase in the fresh fish supply and its value-added due to the use of ice and insulated boxes. This will lead to a direct increase in income not only for the traders and retailers, but also for the fishing village women who are engaged in fish processing activities. There are very few projects that will lead to an immediate increase in production for fishermen, and the distribution of short-term benefits is difficult. But through

stringent resources management, long-term benefits will be generated.

4.1.2 Financial Evaluation

(1) Basic Concept on Cost Distribution

In principle, the beneficiaries will bear the operating costs of the ice making, processing, and marketing facilities. The renovation and repair costs of the basic facilities, such as the landing facility, strengthening the cooperatives and surveillance activities (data collection for resources management, monitoring, and cost of controlling illegal fishing activities) will be borne by the district government. The general activity costs of the fishermen's association that will be in charge of the operations and maintenance of the facilities will be covered by membership dues or its deposits.

The fishing ground user fees will cover the cost of the FADs. The fishermen kelompok will manage the Mariculture project, and due to its high profitability, it was excluded from the financial evaluation.

Depreciation costs are usually included in the costs, but this review was restricted to the ability to cover renewal input.

(2) Estimated Revenue

1) Revenues generated by the fisheries complex and the multipurpose facilities

(a) Ice-making, marketing, and processing facilities

The following sales revenues were estimated for the ice making, marketing, and processing facilities (see Table 5-2-4, 5-2-5, Appendix 5).

Unit: Rp million/year				
Sales Revenue	Initial 2 years	3 – 5 years	6 – 15 years	Annual Average
Oka	512.62	524.81	534.57	529.69
Lewoleba	331.01	339.56	346.40	342.98

Note: The facility user fees are not included in the above.

(b) Refrigerated truck

The cooperative will collect rental fees for use of the refrigerated truck as shown in Table 5-3-2, Appendix 5. The party renting the truck will be responsible for paying for fuel costs.

Unit: Rp million/year				
Rental fees	Initial 2 years	3 – 5 years	6 – 15 years	Annual Average
Oka	0.90	0.92	0.96	0.94

(c) Multipurpose transport boat

The planned revenue for the multipurpose transport boat given in Table 5-4-1-5, Appendix 5 will be used.

(d) Transport truck

The rental fees were used as the estimated revenue (refer Table 5-3-3, 5-3-4, Appendix 5).

2) Revenue of the district government

(a) Model fishing boat

A model fishing boat will be provided to promote the modernization and use of larger fishing boats. Sales revenue generated by the sales of fresh fish landed from 88 fishing trips/year was estimated at Rp. 196.7 million (see Table 5-1-3, Appendix 5). The benefit is calculated for 10 years as the life of a model fishing boat is about 10 years.

(b) Resources management

If the same fisheries licensing fees as Bima district were introduced, the revenue is estimated at Rp.45.0 million for East Flores and Rp.7.1 million for Lewoleba.

(c) Extension activities to introduce fresh fish handling technology and fish processing

The capital required to implement extension activities to introduce fresh fish handling technology and fish processing will be provided by the district FO. The operating cost for the first fiscal year was estimated at Rp. 59.1 million for East Flores district and Rp.56.3 million for Lewoleba.

(d) Strengthening the cooperative

The capital required to strengthen the cooperatives will be provided by the district fisheries office (see section 2.5.2 (5) 2)).

(3) Summary of Expenditures

1) Expenditures of the fisheries complex

(a) Ice-making, marketing, and processing facilities

The costs given in section 2.5.2 (5) were used as the estimated expenditures of the ice making, marketing, and processing facilities.

Operating Costs	Initial 2 years	3 – 5 years	6 – 15 years	Unit: Rp million/year
				Annual Average
Oka	383.9	392.8	410.8	357.11
Lewoleba	255.1	261.2	273.5	403.60

(b) Refrigerated truck

The cost given in Table 5-3-2, Appendix 5 for the refrigerated truck was used for the refrigerated truck.

Operating Costs	Initial 2 years	3 – 5 years	6 – 15 years	Unit: Rp million/year
				Annual Average
Oka	16.08	20.16	28.30	25.04

(c) Multipurpose transport boat

The cost given in table 5-1-3, Appendix 5 for the multipurpose transport boat was used for the multipurpose transport boat.

(d) Transport truck

The cost given in Tables 5-3-3 and 5-3-4, Appendix 5 was used for the transport truck.

2) Expenditures of the district government

(a) Conservation costs of resources management

The cost given in Table 6-2-1, Appendix 6 was used for the conservation costs generated by resources management.

(b) Model fishing boat

The cost given in Table 5-1-3, Appendix 5 was used for the model fishing boat. A total of Rp.198.2 million was estimated comprised of operating cost (Rp.142.1 million), revenue distribution to the crew (Rp.30.1 million), and maintenance and repairs (Rp.26.0 million). The benefit is calculated for 10 years as the life of the model fishing boat is about 10 years.

(c) High speed boat

The operating cost given in section 2.5.2 (1) 2) (c) was used for the high-speed boat.

Unit: Rp million/year				
Operating Costs	Initial 2 years	3 – 5 years	6 – 15 years	Annual Average
Larantuka	13.2	14.8	18.0	22.2

(d) Other Activity costs

A summarized cost of other activities is shown in the table below.

Unit: Rp million/year				
	Initial 2 years	3 – 5 years	6 – 15 years	Annual Average
Guidance for fishing village environmental improvements	4.0	0.0	0.0	0.3
Education, training	31.1	51.8	92.3	11.7
Organizing cooperatives, operations	55.0	77.8	259.4	26.2
Total	89.0	133.7	198.1	28.1

(4) Revenues and Expenditures

Based on the estimations given above, the expenditures and revenues of each site were calculated and are shown below.

Unit: Rp.million/15 years							
		Oka	Lamahala Jaya	Sagu	Lewoleba	Balauring	Lamalera
Revenue (A)	Ice-making machine, etc.	7,945.4	-	-	5,144.7	-	-
	Transport truck	2,832.0	4,200.8	1,173.4	2,114.8	2,133.3	2,422.7
	Model fishing boat	1,966.8	-	-	1,966.8	-	-
	FAD	-	1,350.0	750.0	-	750.0	1,350.0
	Surveillance activities	675.0	-	-	106.5	-	-
	Basic facilities	-	-	-	-	-	-
	Total	13,419.2	5,550.8	1,923.4	9,332.8	2,883.3	3,772.7
Operations cost (B)	Ice-making machine, etc.	6,054.1	-	-	4,028.3	-	-
	Transport truck	375.6	1,112.9	727.2	737.2	969.6	1,247.9
	Model fishing boat	2,944.2	-	-	2,944.2	-	-
	FAD	-	0.0	0.0	-	0.0	0.0
	Surveillance activities	1,878.2	436.9	446.2	1,821.5	122.0	107.1
	Basic facilities	0.0	-	-	0.0	-	-
	Total	10,270.71	2,552.5	1,199.7	8,549.8	1,536.2	1,748.6
Replacement input (c)	Ice-making machine, etc.	149.4	-	-	172.5	-	-
	Transport truck	1,630.9	510.4	67.5	0.0	56.1	377.7
	Model fishing boat	0.0	-	-	0.0	-	-
	FAD	-	1,350.0	750.0	-	750.0	1,350.0
	Surveillance activities	252.8	281.5	456.0	250.6	339.2	215.8
	Basic facilities	1,573.7	86.6	97.6	937.8	35.5	44.0
	Total	3,606.8	2,228.5	1,371.1	1,360.9	1,180.8	1,987.5
Revenue (A-B-c)	Ice-making machine, etc.	1,741.9	0.0	0.0	943.9	0.0	0.0
	Transport truck	825.5	1,574.8	352.4	1,377.6	663.0	403.5
	Model fishing boat	4.0	-	-	4.0	-	-
	FAD	-	0.0	0.0	-	0.0	0.0
	Surveillance activities	-1,456.0	-718.4	-902.2	-1,965.6	-461.2	-322.9
	Basic facilities	-1,573.7	-86.6	-97.6	-937.8	-35.5	-44.0
	Total	-458.3	769.8	-647.4	-577.9	166.3	36.6

Based on the above, the marketing and processing facilities, and the transport truck

will operate at a profit, but the revenue will not cover the initial input for the basic facilities. The replacement input of the basic facilities is a major issue.

The district government will be responsible for providing the cost of the surveillance activities, but presently, the operating budget of the East Flores district fisheries office is Rp.577.9 million. Based on this figure, it will be required to allocate 44 percent of its budget during the first fiscal year of the project and 19 percent after three years. The operating budget of Lembata district fisheries office is Rp.309.3 million, and it will be required to allocate 73 percent of its budget for the first fiscal year of the project and 35 percent after three years. Therefore, the district fisheries office must strive to secure a budget within the district government.

(5) Calculation of the FIRR

Based on the estimations given above, the FIRR of the joint management organization in Lamahala Jaya is 7%. However, the FIRR is a mere 1 percent for Larantuka and 2 percent for Lewoleba. On the other hand, the FIRR for Balauring is 0%, -2% for Sagu, and -3% for Lamalera. In case 80 percent grant fund is secured, the FIRR for Lamahala Jaya will become 57%, for Oka 40%, Lewoleba 33%, Balauring 27%, Sagu 18% and Lamalera 19%. The overall FIRR, including the expenditure of district government is 14% for Lamahala Jaya, 3% for Oka, 2% for Lewoleba, 5% for Balauring, and 5% for Lamalera. However, for Sagu FIRR can not be computed.

(6) Sensitivity Analysis

If the revenue and expenditures of the fisheries complex were fluctuated at +10% and -10%, the results are as shown in the table below.

East Flores District

	Revenue+10%	Revenue±0%	Revenue-10%
Input amount +10%	4	1	-3
Input amount ±0%	6	2	-2
Input amount -10%	9	4	0

The effect of increased revenue is much larger than the effect of decreased input.

Lembata District

	Revenue+10%	Revenue±0%	Revenue-10%
Input amount +10%	2	-1	-4
Input amount ±0%	4	1	-3
Input amount -10%	5	2	-2

The effect of increased revenue is much larger than the effect of decreased input.

4.2 Environmental Evaluation

The only major construction components with environmental impact considerations are in Oka and Lewoleba. The other project sites at Lamahala Jaya, Sagu, Balauring and Lamalera have only small size multipurpose fishermen centers which does not present any significant construction stage impacts thus will not require an EIA.

(1) Oka

The significant negative impacts identified during construction stage are the nuisance from the constructional activities such as dust, noise and increase constructional traffic. By implementing the mitigation measures recommended, these negative impacts will be lessened or avoided. Although the construction of the shore facilities on filled areas of the beach and jetty construction is not expected to cause significant negative impacts, as precautionary measures, monitoring of the beach and sea bed profile change for a few seasons is recommended to properly gauge the impact if any and as early warning to avert unexpected impact.

Considering the scale of the project, the legal requirement under AMDAL, and the resulting significant impacts, EIA is not required.

(2) Lewoleba

Significant negative impacts identified during construction stage are from the nuisance of the constructional activities and the impact on the beach activities such as boat parking and repair in the area reclaimed for the shore facilities. For the latter impact, an alternative sea front location for the affected beach activities could mitigate the impact. Impact from constructional activities could be lessened or avoided by implementing the mitigation measures recommended.

Considering the scale of the project, the legal requirement under AMDAL, and the resulting significant impacts, EIA is not required.

(3) All Project Sites (Oka, Lewoleba, Lamahala Jaya, Sagu, Balauring and Lamalera)

From the social environmental survey and interview surveys, the perception of the communities to the project is positive although there were reservations regarding the viability of cooperative management of the Oka facilities involving representatives from the outer islands. To alleviate these concerns, the project's implementation plan should be fully explained to the stakeholders and their understanding / consensus sort on the operational methodology to avoid misunderstanding. Equitable and fair access to the facilities and activities is to be assured by the management organization and implementation body to avoid possibility of social conflicts especially between the people of Oka and the outer islands.

4.3 Social Evaluation

Each small-scale fisheries development project that will be implemented in the targeted zones will benefit not only fishermen, but also fishing village women and young people.

(1) Impact on the Local Society

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.

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,

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 MP.

The average fishermen income in Lembata district (Lewoleba, Balauring, 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 MP.

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.

Furthermore, the supplementary facilities that are planned in the fishery activity support plan will not only benefit the fishermen, but will stimulate communication among the residents and impact the entire community.

(2) Achieving Sustainability

One of the effects that are targeted is a rise in the motivation of the villagers through self-help activities to improve their living environment. Additionally, the provision of a model fishing boat to train young fishermen targets the sustained use of fishery resources through diversified fishing operations.

(3) Gender Evaluation

As shown in the table below, reduced hours in fishing landing and marketing related tasks will greatly improve the living environment of the fishing village women. Additionally, an improved shipping system for fresh fish and improvements in fish processing technology will increase the income of the village women and generate new employment opportunities. These factors underscore the need and appropriateness of the project's implementation in terms of the gender issue.

Beneficiaries and Scope of Benefits for Women Anticipated From the Project (1/2)

Name of Project	Beneficiary	Benefits for Women	Benefits
1 Plan of Coastal Resources Management			
1) Project of Data Collection system Improvement	Fishermen	×	• Guidance to improve the economic state of fishermen households based on the collected data
2) Project of Fishery Licensing System Expansion	Fishermen	×	• Due to the appropriate scope of fisheries, sustainable fisheries system will be created.
3) Project of Fishing Ground Expansion Promotion	Fishermen	×	• Training of young fishermen using the model fishing boat • Unexploited resources will be effectively utilized.
4) Project of Monitoring System of Coastal Fishing Ground	Fishermen	×	• Decreased illegal fishing activities • Guidance on appropriate use and protection of coastal resources, based on self-control

2	Fish Landing/Handling/Shipping/Processing Improvement Projects			
1)	Project of Fish Landing/Handling Improvement	Fishermen Fish traders	○	● Landing time is reduced. The labor hours of village women engaged in fish sales is curtailed.
2)	Project of Fish Shipment Improvement	Fish traders	○	● Improved maintenance and storage for fish freshness reduces economic marketing losses, and increases income of women engaged in fish retail activities ● The introduction of a multipurpose boat will enable the distribution of needed daily commodities.
3)	Project of Fresh Fish Handling Extension	Fish traders	○	● Transfer of technique to maintain fish freshness through use of insulated boxes to village women engaged in fish retail
4)	Project of Fish Processing Improvement	Processors	○	● Improved income and new employment opportunities for women engaged in fish processing through improved processing technology
3	Plan of Fishery Activities Support			
1)	Improve supplementary processing and landing facilities	Fishermen Processors Fish traders	○	● Improve work efficiency through use of supplementary facilities.
4	Project of Cage Culture Technology Improvement			
	Establish cage culture technology at Lantuka (using natural fry)	Fishermen	×	● The promotion of aquaculture as a new industry
5	Plan of Community Environmental Improvement			
1)	Project of Community Infrastructure Improvement	Fishing Villagers	○	● Tap water and a model toilet will improve the sanitary conditions of the fishing landing beach sites and strengthen the motivation for self-reliant measures maintenance issues.
2)	Improvement of social environment	Fishing Villagers	○	● Educational activities to promote the motivation of the villagers are conducted.
6	Fishermen Organization Improvement Plan			
1)	Plan of Fishermen Organization/Fishery Extension Improvement	Fishermen Fish traders	○	● The participation of village women in fishermen organizations that will be in charge of project operations and management
2)	Guidance on Project Management Methods	Fishermen Fish traders	○	● Project monitoring and guidance on evaluation techniques will be provided.
7	Education and Training Plan			
1)	Establish an extension section within the District Fisheries Office	Fisheries Office	△	● Strengthening the extension section of the District Fisheries Office will enable technical guidance to be provided for the fisheries activities of the village women.
2)	Education and training for District Fisheries extension officers and strengthening economic activities of fishermen organizations	Fisheries Office Fishermen Organization	○	● Education and training activities for leaders of women groups will be provided.

Note: The sections in bold font indicate the benefits anticipated for only that zone, and all others are benefits that will be shared by all the priority zones.

4.4 Overall Evaluation

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 aid 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.