



CHAPTER – 5

ECONOMIC EVALUATION

5.1 Introduction

The purpose of project economic evaluation is to describe, assess the project benefits, backed up, as far as possible, with the quantified results from the economic analyses. This economic evaluation based on life-cycle costing aims at identifying and valuing the costs and benefits accruing over the project life. Here, the project life referred to its economic service life during which time the project remained relatively maintenance-free, while maintaining an appropriate service and safety level. The project life considered for the purpose of economic evaluation of this project is 14 years, although economic life of fishery harbour facilities like RCC jetties and the shore based buildings under normal use and maintenance may have life longer than 14 years.

As part of project economic evaluation, financial analyses of the costs and income of the project are represented as financial statements (cash inflow/outflow). For this, all the physical inputs such as civil works (buildings and infrastructure), equipment etc., required over the project's economic life period are phased out and then costed on an annual basis, in present day prices. All these costs and benefits are converted into current prices by applying discount rates. Price contingencies for inflation are not included in cash flows (although they may form part of project budget estimates) as the analysis is undertaken in current prices.

5.2 Economic Analysis

The first step in the preparation of economic analysis is to estimate the capital and operating costs of the project. Estimation of the capital costs include investment to be made in the fishery harbour facilities and associated infrastructure, timing of the capital costs over the life of the project, renewal and replacement costs of fishing boats, if the project's life is extended beyond the average economical life, machinery, equipment, shore based facilities, investment made in fishing vessels, ice plants, fish processing plants etc.

Secondly, estimation of the annual operating costs of the project include fishing vessel operating costs (costs of fuel, maintenance of vessel and engine, salaries for crew, ice, commission on sale of fish landings, harbour dues, fish landing and wharfage charges, insurance, interest & loan instalment including fishery harbour management and maintenance, costs of fish processing, distribution and marketing, fishery harbour management and maintenance.

Finally, estimation of income for the project is made based on the average annual fish landings and value for each size and type of fishing vessels and the number of fishing boats which are already in operation and the new vessels proposed to be





introduced during project development. After estimating the cash inflow and outflow of the project, annual surplus is calculated by subtracting the capital costs and operating costs from the income year by year for the assumed economic life of the project. During the first one or two years, the profit could be negative for some of the projects; thereafter it will be positive during the rest of the project life. The annual surplus will be discounted to the project's present value. The discount rate would reflect the rate of return that one might reasonably expect to be best alternative investment of comparable risk. **Sensitivity analyses** are done to allow for risks and uncertainty inherent in the project by putting the project into several sensitivity tests like assuming lower level of fish landings by about 20% (consequently reducing the fishing vessel/project's income), increasing the capital investment costs by about 25% etc.

5.2.1 Economic Evaluation Methods

Several methods are available to evaluate the projects for taking investment decisions and it may be emphasised here that these methods are only tools for decision making. The methods most widely used to appraise and compare the economic feasibility of investment are the Pay-back Period method, the Average Rate of Return method and the Discounting method. The last method is also called Present Value method and it includes the Net Present Value (NPV), the Internal Rate of Return (IRR) and the Benefit-Cost Ratio methods. IRR is the most useful measure of the economic feasibility of investment and it is widely used by the international banks such as ADB, World Bank etc., including organisations like FAO/UNDP.

5.2.1.1 Net Present Value Method

In order to use this method, costs have to be subtracted from the benefits (income) on a year to year basis throughout project's life to arrive at the net benefit or surplus. The annual net benefits are discounted to a pre-determined discount rate or the interest rate on loan. The net present value can also be calculated by separately discounting the stream of annual cash inflow and cash outflow and subtracting the latter from the former. The discounting will be made by the Discounting Table. If the NPV is more than zero, the investment would be profitable, if it is less than zero, the project would not be profitable and if it is equal to zero then the project is at break-even.

5.2.1.2 Benefit Cost Ratio Method

Benefit Cost Ratio can be defined as the ratio of the total present value of the benefits to the costs. The benefit cost ratio can be done by two methods i) by discounting the stream of benefits and costs separately or ii) by discounting the net benefits which are arrived by subtracting the costs from the benefits. If the benefit cost ratio is greater than one, then the project may be considered as economically feasible.



5.2.1.3 Internal Rate of Return Method

While applying the present value and benefit cost ratio methods, one may encounter the problem regarding choosing the appropriate rate of discount. The method that avoids this difficulty is the internal rate of return. The internal rate of return on an investment is the discount rate that makes the future net cash flow equal to zero. It represents the average earning power of the money invested in the project over the project's life. If the IRR is greater than the opportunity cost of the capital, or the interest rate at which funds were borrowed, then the investment is considered to be feasible. In the present project, the Financial Internal Rate of Return (FIRR) is worked out by following the discounted cash flow method.

5.3 Assumptions of a General Nature

The average prices of fish and prawns prevailed during 2017 have been used to calculate the operating results of fishing vessels (Appendix 3) and to calculate unit costs of fish processing, distribution and marketing of fish and prawn products (Appendix 7(a)). Up-to-date costing has also been applied to investment in fixed assets (Appendix 8). From the point of income, boatside prices for landings (Appendix 2), and retail or boatside prices for marketing (Appendices 7(b) and 10), in year 2017 have also been taken as the base.

The problem of ownership is not a critical one from the point of the economic analysis contained in this Chapter. In Section 4.10 of Chapter 4, certain observations were made about ownership and management. Firm recommendations in these matters are outside the scope of this report. Therefore, only a framework of ownership has been suggested to give a general background to the development proposal. An important assumption about ownership is that it will be linked with efficient management, both at sea and onshore. The construction of a fishery harbour will provide one of the facilities necessary for further development. Expansion and financial success will occur only, if fishermen and other entrepreneurs take advantage of economic opportunities, as they arise. That they will do so, serves as one of the most general assumptions in this report.

This report is in no way, a detailed socio-economic study of the project area. Without a considerable amount of fieldwork, it would not be possible to plot with any precision all of the benefits, which will flow from project implementation. Therefore, the evaluation is mainly limited to an assessment of the direct monetary benefits, which may accrue and omits an assessment of the indirect benefits, which would flow from improved per caput income etc.

On the expenditure side, the evaluation excludes certain costs incurred in public utilities, in addition to town or village social services, in training sea-going personnel and those whose task it will be to manage shore-based facilities. No



deductions have been made from costs for taxes, duties and levies imposed by Government authorities. The inclusion of these items is in line with the methodology of using ruling market prices. Equally, no deductions have been made for subsidies or indirect assistance, which may be rendered by a Government, in order to accelerate development. Hence the evaluation is primarily a commercial investment analysis, wherein the major costs and benefits are identified.

As explained in Section 9.2 of Chapter 9, a period of 15 years (Year "0" plus Years 1 to 14) has been chosen to evaluate the costs and benefits of the integrated project covering harbour construction, vessel operations and shore-based activities, to either a retail or shipside (export) level. Of course, the fishery harbour, some of the fishing vessels, and part of the industrial plants, will have a longer working life than 14 years. These facilities will still be available to the local fishing industry, after the end of 14 years. Residual investment at the end of Year 14 has not been taken into account when discounting benefits and cost, as it would have only a marginal effect on the Internal Rate of Return.

5.4 Sensitivity Analysis of Vessel Operations

5.4.1 Basic Vessel Operations

Appendix 3 gives a detailed account of vessel operations under six headings, "General Information", "Operational Schedule", "Landings per Trip and per Season", "Fishing vessel Investment", "Vessel Operating Costs", and "Financial Results". The information and estimates contained in Appendix 3 are based on current activities (2016) and expectations about the future. On the basis of the accounting shown in relevant sections of Appendix 3, net earnings as a percentage of capital employed are as shown in Table 5 -1.

Table 5 -1

(Percent)

Type of Vessel	Earnings before Depreciation	Earnings after Depreciation	Earnings after Depreciation and Interest	Earnings after Instalment Payment
10 M	24.0	20.0	13.3	0.8
15 M	22.3	16.7	10.0	-2.6
24 M	24.0	18.4	11.7	-0.9

5.4.2 A 25% Reduction in Prawn Landings.

What would happen to net earnings, if the quantity of prawn landings were 25% less than those forecast in Appendix 2? A reduction would lower vessel earnings (Appendices 2 and 3) unless a fall in landings was offset by increased prices.



However, assuming constant prices (Appendix 2), a 25% reduction would alter the quantity and value of boatside sales, as indicated in Table 5-2.

Table 5-2

Type of vessel	Prawn Landings by Fishing Vessels			
	As per appendices 2 and 3		With a 25% reduction	
	Quantity (kg.)	Value (Rs.)	Quantity (kg.)	Value (Rs.)
10 M	1,250	1,75,000	938	1,31,250
15 M	7,500	20,50,000	5,625	15,37,500

The income reductions outlined in Table 5-1 change percentage returns on investment in the following way in Table 5-3.

Table 5-3

Item	10 M	15 M
Before Depreciation	20.1	12.7
After Depreciation	16.1	7.1
After Interest Payment	9.3	0.3
After Instalment Payment	- 3.2	- 12.2

Prawns are very much critical for 10 M & 15 M and it may be seen it loses to the extent of Rs. 11,125 and Rs.6,10,000 respectively after payment of instalment payment.

5.4.3 A 20% Reduction in Total Landings of Fish and Prawns

The implications of an overall 20% reduction in landings for both fish and prawns are shown in Table 5-4.

Table 5-4

Item	10 M	15 M	24 M
As per Appendices 2 and 3			
Total landings - Quantity (kg.)	25,000	50,000	120,000
- Value (Rs.)	14,00,000	58,75,000	93,60,000
With a reduction of 20%			
Total landings - Quantity (kg.)	20,000	40,000	96,000
- Value (Rs.)	11,20,000	47,00,000	74,88,000

The foregoing reductions severely affect the financial results of all the three type of vessels. The financial losses that these boats would incur are summarised in Table 5-5.



Table 5-5

Item	10 M	15 M	24 M
Before Depreciation	-36000	-20000	588000
After Depreciation	-50000	-300000	28000
After Interest Payment	-73625	-637500	-647000
After Instalment Payment	-117375	-1262500	-1897000

5.4.4 A 25% Increase in Investment in a Fishing Vessel

An increase in investment involves increases in some items of vessel operating costs. The items affected are maintenance of vessel and engine, maintenance of fishing gear, vessel insurance, provision for gear replacement, depreciation, interest and instalment payment. The net earnings as a percentage of capital employed are given in **Tables 5-6**.

Table 5-6

(Rupees)

Item	10 m	15 m	24 m
Before depreciation	65000	935000	2040000
After depreciation	47500	585000	1340000
After interest payment	17969	163125	496250
After instalment payment	-36719	-618125	-1066250

5.4.5 What quantity of landings is required to maintain a minimum of 12% return on vessel investment?

This "break-even" type of analysis assumes that only enough surpluses is left, after deducting operating costs (Item 5.15), from income (Item 3.12) to maintain a 12% return on investment. All the three type of vessels 10 m, 15 m and 24 m could afford a marginal reduction in landings to the extent of about 5%, 4% and 7% respectively to get a 12% return on investment after depreciation. The effects of the foregoing reductions in terms of quantity and value of landings are shown in Table 5-7.

Table 5-7

Item	10 m	15 m	24 m
As per Appendices 2 and 3			
Total landings - Quantity (kg.)	25,000	50,000	120,000
- Value (Rs.)	14,00,000	58,75,000	93,60,000



With a minimum Requirement of 12% Return on Investment			
Total landings - Quantity (kg.)	23,750	48,000	111,600
- Value (Rs.)	13,30,000	56,40,000	87,04,800

5.4.6 The Situation in a "Poor" Fishing Season

The information about catch composition and landings given in Appendix 2 represents what may be termed as "average" over a long period of time, say, the working life of fishing vessels, described in this report. In some years, landings would be greater than those shown and in other years, those would be less. With regard to the day-to-day operations of a fishing vessel, the quantity of landings is not constant, and, of course, the catch composition changes with season, in accordance with the abundance of individual species within the total resources being exploited. Fluctuations also occur between what is commonly referred to as the "peak" and "lean" months during a fishing season. These sorts of fluctuations also occur over a time spread of seasons (years). Most of the analysis in this section of the report has dealt with reduction in catches with a related commitment that day to day operating expenses would be met by boat owners and that annual fixed costs would be paid. In a really "poor" fishing season, it may be possible to pay only daily expenses and payment of overheads may have to be postponed to a later time, when fishing efforts are more rewarding.

What are the quantities of landings required to meet daily operating expenses during a really bad fishing year? In other words, at the prices shown in Appendix 2, how much fish must be sold to cover such costs as fuel, basic wages, commission, maintenance and any other item for which, under normal circumstances, payment cannot be deferred?

Before answering this question, it is necessary to introduce two basic assumptions. Firstly, it is assumed that the "poor" fishing season is a local phenomenon and hence a shortage of fish and prawns is not offset by higher prices from the boat owner's point-of-view. In this connection, the relative unimportance of the "local" market should be noted (see Section 4.9 of Chapter 4). Secondly, it is assumed that boat-owners are either unwilling to take their fishing vessels to another region or State, where fishing activities would be more profitable.

Some of the assumptions relating to vessel operating costs, as summarised in Section 5.0 of Appendix 3 would change to reflect "poor" fishing season. The consequential amendments could be as follows:

For all types of Vessel	
Fuel and lubricating oils	80%
Maintenance of vessel	50%
Maintenance of fishing gear	70%
Basic wages for crew	75%
Food allowances	50%



Harbour dues 100%

On the basis of the foregoing assumptions, the revised operating costs for each type of fishing vessel would be as follows. The figures in **Bold** are the costs of the basic statement shown in section 5.0 of Appendix 3.

10 M	1280000	1050000
15 M	4440000	3407500
54 M	6320000	4773600

The average boat side price per kilogram of landings of fish and prawns, as per quantities and values shown in Appendices 2 and 3 are shown in Table 5-8.

Table 5-8

Item	9 m	15 m	24 m
Total landings-quantity (kg)	25,000	50,000	1,20,000
Total landings-value (Rs.)	14,00,000	58,75,000	93,60,000
Average price per kg.(Rs.)	56.00	117.50	78.00

If the minimum operating costs of Rs.1050000, Rs.3407500 and Rs.4773600 for a 10 M, 15 M and 24 M respectively are divided by the average price per kilogram shown in Table 5-8, then the quantities of landings needed to support fishing effort during a "poor" fishing season are as given below (the figures in brackets are the tonnages shown in Appendix 2):

10 M -	18.75 tonnes (which is 75 % of 25 tonnes)
15 M -	29.00 tonnes (which is 58 % of 50 tonnes)
24 M -	61.20 tonnes (which is 51 % of 120 tonnes)

From the foregoing, it is obvious, that all the types of fishing vessels could withstand substantial reductions in landings during a "poor" season. This statement, inter-alia assumes that

- there would not be any difficulty about late payment of certain fixed costs and
- that the "poor" season is only a short-term phase in the long-term exploitation of local fishery resources.

5.5 Sensitivity Analysis of the Project



Appendices 1 to 10 outline in detail, a fishery development proposal for NizampatnamPhase II fishing harbour project. Appendix 11 which reconciles cash inflows and cash outflows, provides the base for calculating Financial Internal Rate of Return (FIRR) on investment for integrated project operations. This reconciliation and its consequent Financial Internal Rate of Return serves as the "Basic Statement" of project objectives expressed in financial terms. The Financial Internal Rate of Return (FIRR) on the basic statement works out to 10 - 11%.

What would be the Internal Rate of Return if annual vessel landings, as described in this report, were overestimated by 25%? What would be the effect on total operations if the landing of prawns fell by 25%? The answers to these questions and others are given in Table 5-9.

Table 5-9

Financial Internal Rate of Return being Calculated for the Integrated Project

Sl. No	PROPOSITION	FINANCIAL INTERNAL RATE OF RETURN
1.1	Basic statement (Appendix 11)	10 - 11 %
1.2	Total fleet landings, hence total products being reduced by 20%	Negative %
1.3	The value of export income being reduced by 25%	Negative %
1.4	The investment cost of all fishing vessels and fishery harbour being increased by 25% other variables constant except for necessary consequential amendments	1 – 2 %



Appendix – 1

Fleet Size, Fishermen Employed and Average Annual Landings

Item	Year	
	1	2 - 14
Fishing Vessels Operating		
10 metre Motorised Craft	1000	1000
15 metre Trawler	500	500
24 metre Trawler	100	100
Total	1600	1600
Fishermen Employed		
10 metre Motorised Craft	4000	4000
15 metre Trawler	4000	4000
24 metre Trawler	1000	1000
Total	9000	9000
Average Annual Landings (tonne)		
10 metre Motorised Craft		
Prawns		
- Class 1	0	0
- Class 2	250	250
- Class 3	1000	1000
Sub-total	1250	1250
Fish		
- Class 1	1250	1250
- Class 2	2500	2500
- Class 3	6250	6250
- Class 4	13750	13750
Sub-total	23750	23750
Total Fish and Prawns	25000	25000
15 metre Trawler		
Prawns		
- Class 1	1000	1000
- Class 2	1250	1250
- Class 3	1500	1500
Sub-total	3750	3750
Fish		
- Class 1	5000	5000
- Class 2	7500	7500
- Class 3	5000	5000
- Class 4	3750	3750
Sub-total	21250	21250
Total Fish and Prawns	25000	25000
24 metre Tuna Long Liner		
Tuna Fish		
- Class 1	1800	1800
- Class 2	3600	3600
- Class 3	3600	3600
- Class 4	3000	3000
sub – total	12000	12000



Item	Year	
	1	2 - 14
Total Fish	12000	12000
Total Fleet		
Prawns		
- Class 1	1000	1000
- Class 2	1500	1500
- Class 3	2500	2500
sub – total	5000	5000
Fish		
- Class 1	8050	8050
- Class 2	13600	13600
- Class 3	14850	14850
- Class 4	20500	20500
sub – total	57000	57000
Total Fish and Prawns - Qty. (tonne)	62000	62000
- Value (Rs. in lakhs)	52735	52735



Appendix - 2

**Average Landings and Value per Season for a Typical
10 Metre Motorised Craft (MC), 15 Metre Trawler/Gill Netter (GN) and 24 Metre Tuna Long Liner**

Item	Boatside Price Rs. / Kg.	10 M MC			15 M Trawler/GN			24 M TLL		
		%	Quantity (Kg.)	Value (Rupees)	%	Quantity (Kg.)	Value (Rupees)	%	Quantity (Kg.)	Value (Rupees)
Prawns										
Class - 1	500	0	0	0	4	2000	1000000			
Class - 2	300	1	250	75000	5	2500	750000			
Class - 3	100	4	1000	100000	6	3000	300000			
Sub-total		5	1250	175000	15	7500	2050000			
Fish										
Class - 1	150	5	1250	187500	20	10000	1500000	15	18000	2700000
Class - 2	100	10	2500	250000	30	15000	1500000	30	36000	3600000
Class - 3	60	25	6250	375000	20	10000	600000	30	36000	2160000
Class - 4	30	55	13750	412500	15	7500	225000	25	30000	900000
Sub-total		95	23750	1225000	85	42500	3825000	100	120000	9360000
Total Prawns and Fish	-	100	25000	1400000	100	50000	5875000	100	120000	9360000



Appendix – 3

**General Information, Operational Schedule and Estimated Annual Financial
Statement for a Typical 10 Metre Motorised Craft (MC), 15 Metre Trawler/ Gill Netter (GN) and 24 Metre Tuna Long Liner**

(Monetary Values in Rupees)

Sl. No.	Item	Fishing Vessels		
		10 Metre OBM	15 Metre	24 Metre
1.00	GENERAL INFORMATION			
1.01	Length (metre)	10.0	15.0	24.0
1.02	Beam (metre)	2.0	4.5	6.0
1.03	Draught (metre)	1.0	2.5	3.0
1.04	Engine horse power	10	106	160
1.05	Fish plus ice carrying capacity (tonne)	3	6	20
1.06	Number in crew	4	8	10
1.07	Fishing method mainly	Multi Net	Trawling / GN	Tuna Long Line
2.00	OPERATIONAL SCHEDULE			
2.01	Number of trips per year	100	25	20
2.02	Days per trip	2	8	10
2.03	Days at sea per year (2.01 x 2.02)	200	200	200
2.04	Days between trips	70	70	70
2.05	Length of fishing season (2.03+2.04)	270	270	270
3.00	LANDINGS PER TRIP AND PER SEASON			
3.01	Per trip - Prawns - Landings - Kg.	13	300	0
3.02	- Value - Rs..	1750	82000	0
3.03	- Fish - Landings - Kg.	238	1700	6000
3.04	- Value - Rs..	12250	153000	468000
3.05	- Total - Landings - Kg.	250	2000	6000
3.06	- Value - Rs..	14000	235000	468000



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Sl. No.	Item	Fishing Vessels		
		10 Metre OBM	15 Metre	24 Metre
3.07	Per season - Prawns - Landings - Kg.	1250	7500	0
3.08	- Value - Rs..	175000	2050000	0
3.09	- Fish - Landings - Kg.	23750	42500	120000
3.10	- Value - Rs..	1225000	3825000	9360000
3.11	- Total - Landings - Kg.	25000	50000	120000
3.12	- Value - Rs..	1400000	5875000	9360000
4.00	FISHING VESSEL INVESTMENT			
4.01	Hull and Fittings	160000	3000000	5500000
4.02	Engine and Equipment	40000	1000000	2500000
4.03	Sub - total	200000	4000000	8000000
4.04	Fishing gear	150000	1000000	2000000
4.05	Total Investment	350000	5000000	10000000
5.00	FISHING VESSEL OPERATING COSTS			
5.01	Fuel and lubricating oils	735000	2860000	3432000
5.02	Maintenance of vessel & engine (5% of 4.03)	4000	200000	400000
5.03	Maintenance of fishing gear (20 % of 4.04)	30000	200000	400000
5.04	Salaries for Crew - explined in Chapter	319550	730000	1410000
5.05	Food Exp.(Rs.600, 3200 & 5000 / trip for 10 M, 15 & 24 M respect.)	60000	80000	100000
5.06	Ice 0.1, 1.5 & 4 t / trip respect for 10 M, 15 M & 24 M respectively	20000	75000	160000
5.07	Commission on sales - 3 % of item 3.12	42000	176250	280800
5.08	Port Dues (Rs.500, 4000 & 6000 / trip for 10 M, 15 M & 24 M respect)	60000	100000	120000
5.09	Sundries and overheads	9450	18750	17200
5.10	Sub - total	1280000	4440000	6320000
5.11	Vessel insurance - 3.0 % of item 4.03	6000	120000	240000
5.12	Provision for gear replacement - 20%of item 4.04	30000	200000	400000
5.13	Sub - total	1316000	4760000	6960000
5.14	Depreciation - 7 % of item 4.03	14000	280000	560000
5.15	Sub - total	1330000	5040000	7520000



Sl. No.	Item	Fishing Vessels		
		10 Metre OBM	15 Metre	24 Metre
5.16	Interest - on capital - 12% of item 4.05	23625	337500	675000
5.18	Sub - total	1353625	5377500	8195000
5.19	Loan instalment payment - 1/ 8 of item 4.05	43750	625000	1250000
5.20	Total operating costs	1397375	6002500	9445000
6.00	FINANCIAL RESULTS			
6.01	Surplus before depreciation	84000	1115000	2400000
6.02	Surplus after depreciation	70000	835000	1840000
6.03	Surplus after interest payment	46375	497500	1165000
6.04	Surplus after instalment payment	2625	-127500	-85000
6.05	RETURN ON INVESTMENT			
6.06	Before depreciation - item 6.01 as a % of 4.05	24.0	22.3	24.0
6.07	After depreciation - item 6.02 as a % of 4.05	20.0	16.7	18.4
6.08	After interest payment - item 6.03 as a % of 4.05	13.3	10.0	11.7
6.09	After instalment payment - item 6.04 as a % of 4.05	0.8	-2.6	-0.9

Fuel

10 M FRP OBM - Kerosene 120 lit /trip @ Rs.60/lit + Petrol 2 lit/tip @ Rs.75 for 100 trips.

15 M Trawler / GN - Diesel 1600 lit /trip @ Rs.65/lit + 10% for oil for 25 trips.

24 M Tuna Long Liner - Diesel 2400 lit /trip @ Rs.65/lit + 10% for oil for 20 trips.



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Appendix – 4

Recovery Factors and Percentages of Landings Allocated to various Products and Markets

Class of Landings and Type of Products		Markets								Total	
		Export		Local		Inland		Howrah			
		RF	PLAM	RF	PLAM	RF	PLAM	RF	PLAM	RF	PLAM
Prawns											
Frozen	- Class 1	65	100							65	100
	- Class 2	55	70							55	70
	- Class 3	50	60							50	60
Fresh	- Class 2			100	5	100	5	100	20	100	30
	- Class 3			100	10	100	10	100	20	100	40
Fish											
Frozen	- Class 1	80	100							80	100
	- Class 2	70	50							70	50
Fresh	- Class 2			100	10	100	20	100	20	100	50
	- Class 3			100	20	100	40	100	40	100	100
	- Class 4			100	10	100	20	100	20	100	50
Dried/Cured-Class 4				30	10	30	20	30	20	30	50

Note : RF = Recovery Factor (Raw Material to Product Weight)
: PLAM = Percentages of Landings Allocated to Product / Market.



Appendix – 5

Allocation of Raw Material and Products Produced for Each Market Outlet

Class of Landings and Type of Products	Markets								Total	
	Export		Local		Inland		Howrah/Chennai			
	RM	PW	RM	PW	RM	PW	RM	PW	RM	PW
Prawns										
Frozen - Class 1	1000	650							1000	650
- Class 2	1050	578							1050	578
- Class 3	1500	750							1500	750
Fresh - Class 2			75	75	75	75	300	300	450	450
- Class 3			250	250	250	250	500	500	1000	1000
Fish										
Frozen - Class 1	8050	6440							8050	6440
- Class 2	6800	4760							6800	4760
Fresh - Class 2			1360	1360	2720	2720	2720	2720	6800	6800
- Class 3			2970	2970	5940	5940	5940	5940	14850	14850
- Class 4			2050	2050	4100	4100	4100	4100	10250	10250
Dried/Cured-Class 4			2050	615	4100	1230	4100	1230	10250	3075
Total for all Markets	18400	13178	8755	7320	17185	14315	17660	14790	62000	49603

Note : RM = Raw Material

: PW = Product Weight



Appendix – 6

Estimates of Capacities of Shore – establishments

		(Tonne)
Demand for Facility	Assumptions Regarding Requirements	Year 1-14
Ice making capacity		
Fishing fleet - 12 metre	100 kg /trip x 100 x 1000 vessels	10000
- 15 metre	1500 kg /trip x 25 x 500 vessels	18750
- 24 metre	4000 kg /trip x 20 x 100 vessels	8000
		36750
Fish and Prawns for overnight storage prior to transportation	Ratio 1:1 for 20% of all fresh sales of fish and prawns	6670
Distribution		
Prawns - fresh - Local	Ratio 0.2 : 1 for all sales	65
- Inland	Ratio 1 : 1 for all sales	325
- Chennai	Ratio 1 : 1 for all sales	800
Fish - fresh - Local	Ratio 0.2 : 1 for all sales	1276
- Inland	Ratio 1 : 1 for all sales	12760
- Howrah	Ratio 1 : 1 for all sales	12760
- Total	Sub – total	27986
Total annual demand summarised		
Fishing fleet		36750
Overnight storage		6670
Distribution		27986
Total	Total	71406
Calculation of capacity required		
Total demand brought forward		71406
Peak monthly demand	15% of annual demand	10711
Daily requirement	Divide peak monthly demand by 30 (days) and rounded	360
Ice and fish storage - Capacity needed	Multiply daily ice making capacity by two	720
Fish curing / drying yard		
Raw material - Fish - Class - 4		10250
Peak monthly demand	15% of Raw material	1538
Daily requirement	Divide peak monthly demand by 30 (days) and rounded	49
	Multiply daily requirements by recovery factor 33.33 % and multiply by 10 and rounded	165

Note : Existing capacity of ice plants at in and around Nellore district and in and around areas and the fish merchants themselves bring ice from elsewhere in their vehicles are sufficient. Additional capacity of 10 t. with 20 t. storage is only recommended.



Appendix 7 (a)

Cost of Production, Distribution and Marketing per Tonne of Fish and Prawn Products for any Year 1 – 14

(Amount in Rupees)

Market - Product	Drying and / or Sorting	Processing and / or Freezing & Packing	Ice and / or Storage	Transport to Market or Shipside	Marketing Expenses NEI	Sub - total of costs
EXPORT MARKET						
Prawns - Frozen - Class 1	500	30000	6000	1000	-	37500
- Class 2	500	30000	6000	1000	-	37500
- Class 3	500	30000	6000	1000	-	37500
Fish - Frozen - Class 1	500	20000	6000	1000	-	27500
- Class 2	500	20000	6000	1000	-	27500
LOCAL MARKET						
Prawns - Fresh - Class 2	400	-	300	-	300	1000
- Class 3	400	-	300	-	300	1000
Fish - Fresh - Class 2	300	-	300	-	300	900
- Class 3	300	-	300	-	300	900
- Class 4	300	-	300	-	300	900
Dried/Cured - Class 4	1200	-	-	-	300	1500
INLAND MARKETS						
Prawns - Fresh - Class 2	400	500	900	1200	500	3500
- Class 3	400	500	900	1200	500	3500
Fish - Fresh - Class 2	300	500	900	1200	500	3400
- Class 3	300	500	900	1200	500	3400
- Class 4	300	500	900	1200	500	3400
Dried/Cured - Class 4	1200	200	300	1000	300	3000
HOWRAH / CHENNAI MARKET						
Prawns - Fresh - Class 2	400	500	600	1200	500	3200



Market - Product			Drying and / or Sorting	Processing and / or Freezing & Packing	Ice and / or Storage	Transport to Market or Shipside	Marketing Expenses NEI	Sub - total of costs
Fish	- Fresh	- Class 3	400	500	600	1200	500	3200
		- Class 2	300	500	600	1200	500	3100
		- Class 3	300	500	600	1200	500	3100
		- Class 4	300	500	600	1200	500	3100
	Dried/Cured - Class 4		1200	200	300	1000	300	3000



Appendix – 7 (b)

Retail or F.O.B Prices per Tonne of Product Weight

(Amount in Rupees)

Market - Product	Sub-total of costs App - 7(a)	Cost of Raw- Material	Total costs	Product Price	Surplus
EXPORT MARKET					
Prawns - Frozen - Class 1	37500	769231	806731	847000	40269
- Class 2	37500	545455	582955	606000	23045
- Class 3	37500	200000	237500	245000	7500
Fish - Frozen - Class 1	27500	187500	215000	221000	6000
- Class 2	27500	142857	170357	175000	4643
LOCAL MARKET					
Prawns - Fresh - Class 2	1000	300000	301000	310000	9000
- Class 3	1000	100000	101000	104000	3000
Fish - Fresh - Class 2	900	100000	100900	104000	3100
- Class 3	900	60000	60900	63000	2100
- Class 4	900	30000	30900	32000	1100
Dried/Cured - Class 4	1500	100000	101500	105000	3500
INLAND MARKETS					
Prawns - Fresh - Class 2	3500	300000	303500	319000	15500
- Class 3	3500	100000	103500	109000	5500
Fish - Fresh - Class 2	3400	100000	103400	109000	5600
- Class 3	3400	60000	63400	67000	3600
- Class 4	3400	30000	33400	35000	1600
Dried/Cured - Class 4	3000	100000	103000	108000	5000
HOWRAH / CHENNAI MARKET					
Prawns - Fresh - Class 2	3200	300000	303200	321000	17800
- Class 3	3200	100000	103200	109000	5800
Fish - Fresh - Class 2	3100	100000	103100	109000	5900
- Class 3	3100	60000	63100	67000	3900
- Class 4	3100	30000	33100	35000	1900
Dried/Cured - Class 4	3000	100000	103000	109000	6000



Appendix – 7 (c)

Consolidated Statement of Cost of Production, Distribution and Marketing of Fish and Prawn Products - For any Year 1 – 14

(Rs.' 000)

Market – Product	Product Weight (tonne)	Drying and / or sorting	Processing and / or Freezing & Packing	Ice and / or Storage	Transport to Market or Shipside	Marketing Expenses NEI	Total costs
EXPORT MARKET							
Prawns - Frozen - Class 1	650	325	19500	3900	650	0	24375
- Class 2	578	289	17325	3465	578	0	21656
- Class 3	750	375	22500	4500	750	0	28125
Fish - Frozen - Class 1	6440	3220	128800	38640	6440	0	177100
- Class 2	4760	2380	95200	28560	4760	0	130900
LOCAL MARKET							
Prawns - Fresh - Class 2	75	30	0	23	0	23	75
- Class 3	250	100	0	75	0	75	250
Fish - Fresh - Class 2	1360	408	0	408	0	408	1224
- Class 3	2970	891	0	891	0	891	2673
- Class 4	2050	615	0	615	0	615	1845
Dried/Cured - Class 4	615	738	0	0	0	185	923
INLAND MARKETS							
Prawns - Fresh - Class 2	75	30	38	68	90	38	263
- Class 3	250	100	125	225	300	125	875
Fish - Fresh - Class 2	2720	816	1360	2448	3264	1360	9248
- Class 3	5940	1782	2970	5346	7128	2970	20196
- Class 4	4100	1230	2050	3690	4920	2050	13940
Dried/Cured - Class 4	1230	1476	246	369	1230	369	3690
HOWRAH / CHENNAI MARKET							



Market – Product	Product Weight (tonne)	Drying and / or sorting	Processing and / or Freezing & Packing	Ice and / or Storage	Transport to Market or Shipside	Marketing Expenses NEI	Total costs
Prawns - Fresh - Class 2	300	120	150	180	360	150	960
- Class 3	500	200	250	300	600	250	1600
Fish - Fresh - Class 2	2720	816	1360	1632	3264	1360	8432
- Class 3	5940	1782	2970	3564	7128	2970	18414
- Class 4	4100	1230	2050	2460	4920	2049	12709
Dried/Cured - Class 4	1230	1476	246	369	1230	368	3689
TOTAL FOR ALL MARKETS	49603	20429	297140	101727	47612	16255	483161