

## **FISHERIES TSUNAMI EMERGENCY PROGRAMME**

### **Sri Lanka**

Assessment of rehabilitation and reconstruction needs in the Tsunami  
affected post-harvest fisheries sector.

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# **Assessment of Rehabilitation and Reconstruction Needs in the tsunami affected Post-harvest Fisheries Sector - Sri Lanka**

## **Summary**

The ten most tsunami affected fisheries districts of Sri Lanka account for over 72% of total marine landings and over 60% of the national fleet operations of the country. Nearly 67.3% of the total of 148,830 active fishermen live in these areas while 77.4 % of the major fish landing sites and 8 out of the 10 fishery harbours are also located in the affected stretch of the coast. Thus, the tsunami damage to both the pre-harvest and post-harvest sector has been very severe.

Infrastructure of the fishery harbours (ice plants, cold storages, freezing facilities), chain of coastal fish landing sites and the associated fish collection/assembly points, the fleet of transport vehicles, the chain of fish wholesaling/ retailing outlets and the fleet of cycle vendors constitute the key elements in the post-harvest sector. The tsunami damage to the post-harvest sector, especially to infrastructure at fishery harbours and fish landing sites and the marketing channel, compounded further by the damage to the national fishing fleet, will have far reaching impact on the socio-economic status of the coastal fishing communities and the fisheries sector at large. Realizing the gravity of the needs international community has responded generously with material and financial support and monetary pledges. However, if the sustainability and long-term economic viability of these efforts are to be ensured, there is a need to support them with technical support and guidance as appropriate, a role which FAO is well equipped to play.

Physical and quality losses in the post-harvest sector have been variously estimated at 20-30% of the total landings. Ice usage in fisheries, though has increased significantly over the years, still remain relatively low and can be singled out as the primary cause of quality loss along with physical damage, contamination and exposure to elements. Increased quality awareness among consumers and growing focus on exports has however acted as an incentive for better handling of fish and improved ice usage.

The present study estimates the availability of ice at the time of survey (February 2005) to the fisheries sector to be around 550MT/ day, which is about 50% of the estimated needs of the sector. Hence the addition of up to 600MT extra ice production capacity is recommended. Tsunami damage to ice plants located at several fishery harbours has affected the ice supply at these locations. Shortage of ice in the coastal centers in the far South and the North-East is evidenced by the relatively high price of ice at these

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locations; 50kg block of ice which is sold at Rs. 80-90 in Colombo is priced at Rs. 180-250 in these locations. It is heartening to note that, realizing the need for an improved supply of ice, there has been several donor pledges for investment in the sector. The report recommends that any new investment should be tied up to a careful needs assessment in the sector to identify the location, capacity, type of ice, etc to ensure long-term sustainability and economic feasibility of such investment, an area where FAO could play an advisory role. The indicative cost of adding 350-500MT additional ice production capacity is estimated to be around US\$ 3.3-4.5 million.

Tsunami damage to fishery harbours and fish landing centers have affected a large number of fish auction/ assembly points along the beach and at the fishery harbours. Re-establishment/ rehabilitation of these is of paramount importance to ensure minimal post-harvest losses and ensure quality/ safety of the fish traded. Re-establishing potable supply of water, ice/ chilled fish storage facilities, provision for waste disposal etc are important in this respect. If Sri Lanka is to ensure quality/ safety of the fish traded and to ensure safety of exports, urgent investment is needed in upgrading these facilities at fishery harbours and fish landing sites.

Fish marketing network of the island suffered severe tsunami damage. The Municipal fish markets at Galle, Matara, Hambantota and a large number of retail outlets belonging to the Ceylon Fisheries Corporation and the private traders sustained heavy damages and in many cases were completely destroyed. Also affected were the large fleet of cycle/ motor-cycle vendors who were the sole breadwinners of their families. In the 265km coastal belt from Panadura to Kirinda alone the number of such vendors has been estimated at 3000. Re-establishment of the marketing network is thus an issue which is of great socio-economic importance to the coastal fishing communities. However, re-establishment of such facilities at the same locations may not be possible due to the planned establishment of a 100/200 metre buffer zone along the coastline. Rehabilitation of the fish marketing network with the re-establishment of the municipal markets and extension of support for re-establishment of private sector fish retail outlets and the fleet of cycle vendors is estimated at US\$ 290,600.

North-East districts, some of the areas most affected by the tsunami, accounts for nearly 42% of total fish landings of the country and is also the home for nearly 58% of the estimated total of 148,800 fisher families in the island. The landings constitute a high proportion of exportable species such as tuna, shrimp, cuttlefish, *beche de mer* (sea cucumber), mullet etc. Traditionally North-East areas have sustained a very vibrant small-medium scale fish processing industry, which has gone into hibernation as a result of the unsettled conditions which prevailed in the region for the last two decades. The situation however has changed since the re-establishment of normalcy in the region a few years back. Thus re-establishing the small-medium scale fish processing/ marketing network would undoubtedly help to elevate the socio-economic status of the fisher populations in the North-East of the country. On the other hand, the industry should also explore export-processing opportunities if it is to benefit fully from its valuable resource base. FAO could play a vital role in this respect by developing suitable project proposals/ feasibility assessments to attract new investment to the sector.

The medium-long term rehabilitation and reconstruction needs of the fisheries post-harvest sector should focus not only on replacement of damaged assets but also on facilitation of bringing about necessary urgent improvements to ensure catch-up in the growth and sustainable development of the sector as a whole. This is of paramount importance if the tsunami shattered industry is to establish itself and contribute towards national development and socio-economic upliftment of the sectors of production and processing, and the industry as a whole. It is in this connection that the report proposes a broad-based developmental programme encompassing product and market diversification while assuring quality and safety of seafood marketed.

There are signs of growing quality awareness among consumers as evidenced by their willingness to pay a price premium for quality. Even though there has been a significant improvement in the way fish is retailed, there is still much to be desired in the way fish is handled at the Island's main wholesale market in Colombo, the St John's Market. The market needs urgent improvements, including perhaps relocation, if it is to blend with the positive developments in the fish retail chain and to ensure quality/ safety of the fish traded.

Meanwhile, the export-processing sector has grown significantly over the years, diversifying its product range and penetrating new markets while broadening its raw material supply base. The sector works closely with the relevant governmental outfits to ensure that the exports satisfy the stringent quality/ safety requirements laid by major markets through collective efforts of the Ministry of Fisheries and Aquatic Resources (MFAR), National Aquatic Resources Agency (NARA), Sri Lanka Standards Institution (SLSI) and the Sri Lanka Export Development Board (SLEDB), with the latter taking an active role in providing marketing support. Heavy tsunami damage to NARA laboratories, the Island's premier fisheries R & D outfit has affected MFAR's ability to fulfill its statutory obligations. As such rehabilitation and strengthening of seafood quality/ safety monitoring and fisheries R & D capabilities at NARA/ MFAR (an indicative equipment cost of US\$ 748,000) deserves urgent attention. The report also recommends strengthening industry's access to marketing information by setting up a dedicated marketing information unit. The cost of setting up such an outfit is estimated at US\$ 95,000/=.

# **Assessment of Rehabilitation and Reconstruction Needs in the tsunami affected Post-harvest Fisheries Sector - Sri Lanka**

## **1. Introduction**

This report is based on the findings made during visits undertaken to affected areas in the South and North-East of the country and discussions held with governmental, industry and NGO entities with respect to tsunami damages, especially with respect to post-harvest fisheries sector, and rehabilitation and reconstruction needs in the affected areas. The document discusses:

- general situation of the sector prior to tsunami
- an assessment of damages
- socio-economic impact of the damages
- short-term needs assessment (6-12months)
- medium-term rehabilitation and reconstruction needs
- broader developmental requirements

Statistical data available with the Ministry of Fisheries and Aquatic Resources (MFAR), interim damage/ needs assessment reports prepared by MFAR, Ceylon Fishery Harbours Corporation (CFHC), Ceylon Fisheries Corporation (CFC) and various draft reports prepared by MFAR/ FAO Post-Tsunami Fisheries Reconstruction and Development Programme were used in the preparation of this report along with information collected through discussions and meetings held with field staff of the MFAR, CFHC and CFC, boat owners/ fish transporters/traders etc.

It should be stressed that the process of damage assessment in the post-harvest sector is still continuing, especially with respect to damage caused to the private sector. The assessments in this report are mostly focuses on damage caused to fisheries infrastructure at fishery harbours (Figure 1), fish landing sites, municipal and governmental fish markets and fish retail outlets. Reference is also made to damage to privately owned fish retail outlets and fish vendor network.

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## 2. Production and Marketing: Pre-Tsunami Situation

### 2.1 Production

Marine fish landings account for nearly 90 per cent of the total fish landings of Sri Lanka (Table 1) while inland fisheries and aquaculture account for the rest. During the period 1995-2003, marine landings have grown by 2.6% annually while the growth in inland fisheries and aquaculture sector has been around 8.2%. In the marine sector, marine coastal landings have shown a very low growth during this period while the off-shore landings have contributed heavily towards marine landings with an annual growth of 6.4% during the period 1995-2003.

**Table 1 : Annual Fish Production by Sub-Sector (1995-2003)**

Year	Marine Fish Catch		Total Marine	Inland & Aquaculture	Total Catch	Fish Dried	% Fresh	% Dried
	Coastal	Off Shore						
1995	157500	60000	217500	18250	235750	36000	85	15
1996	149300	57000	206300	22250	228550	30000	87	13
1997	152750	62000	214750	27250	242000	36000	85	15
1998	166700	73250	239950	29900	269850	43500	84	16
1999	171950	76500	248450	31450	279900	46120	84	16
2000	175280	84400	259680	36700	296380	60900	79	21
2001	167530	87360	254890	29870	284760	43650	85	15
2002	176250	98510	274760	28130	302890	61720	80	20
2003	163850	90830	254680	30280	284960	54340	81	19
<b>Annual ave. change %</b>	0.5	6.4	2.1	8.2	2.6	6.4		

Expansion of multi-day fishing operations has been the primary reason for the increase in off-shore landings. The multi-day fleet primarily consists of 32-45ft FRP boats powered by 50-250hp inboard engines. They may undertake fishing trips of 1-4 weeks, or more. The boats take anything from 150-400 blocks of crushed ice packed in polypropylene sacks. Some boats also take 100-200 sacks of salt for salting fish. Fish caught during the first few days of fishing are mostly salted while valuable species and especially fish caught in the last few days of the operation are iced. The partially salted fish are sold to dry fish processors at around Rs. 120-140/ kg depending on the demand, for further processing.

**Table 2 : Landings of Skipjack, Yellowfin and Tuna-like Species (1983-2003)**

	Fish type	1983	1990	1995	2000	2003
1.	Skipjack	13570	12230	33550	49110	42810
2.	Yellowfin	9280	8410	26050	29320	27620
3.	Tuna like sp.	16320	9190	17640	27890	33210
4.	Sub Total	39170	29830	77240	106320	105643
5.	Total Landings	184740	145790	217500	253680	254680
6.	4/5 %	21%	20%	36%	42%	41%

Expansion of off shore multi-day fishery has also resulted in an increase in the landings of large pelagic species, especially skipjack, tuna and tuna-like species. The composition of these species in the total marine landings now stand at around 41% (Table 2). Tuna and tuna-like species have a relatively high commercial value both locally and in export markets. Most of the tuna are exported to Japan (gilled and gutted) and to EU as loins.

The ten most tsunami affected fisheries districts of the country account for over 72% of total marine landings. Over 60% of the national fleet (72.7 of multi-day boats, 75.8 % of day-boats, 51.9% of vessels with outboard motors and 63.2% of non-motorized boats) are registered in these ten districts. Nearly 67.3% of a total of 148,830 active fishermen live in these areas while 77.4 % of the major fish landing sites are also located in the affected areas (Table 3). Thus the tsunami affected areas are very important with respect to fish landings, fleet operations and livelihood of fishermen.

**Table 3 : Fishermen, Landing Sites, Fleet Structure and Total Landings by District (2003)**

	Fisheries District	Active Fishermen	Fish Landings	Multiday Boats	Day Boats	Out Board Engines	Non Motorized	Total Boats	Total Landings
1.	<i>Batticaloa*</i>	21740	116	0	188	302	2510	2952	22240
2.	<i>Galle*</i>	5510	60	182	93	624	354	1213	20870
3.	<i>Tangale*</i>	5720	24	184	45	789	769	1733	21700
4.	<i>Kalutara*</i>	3800	34	225	13	222	606	1028	21700
5.	<i>Kalmunai*</i>	15500	54	6	229	424	1078	1571	21380
6.	<i>Matara*</i>	7850	31	472	149	396	482	1489	28430
7.	<i>Trinco*</i>	18250	53	43	230	1262	1223	2707	25030
8.	<i>Mullathivu*</i>	3250	29	0	0	599	290	813	2250
9.	<i>Kilinochchi*</i>	3660	40	0	11	370	344	725	2760
10.	<i>Jaffna*</i>	14860	103	0	168	1053	2458	3667	18550
11.	Colombo	2400	11	21	46	138	219	419	1990
12.	Negombo	16700	27	216	179	1159	1589	3111	20940
13.	Puttlam	10050	58	38	69	1471	2170	3592	16640
14.	Chilaw	10000	31	142	7	1724	1137	2981	13570
15.	Mannar	9540	32	1	59	1105	774	1693	16630
16.	<b>Total</b>	<b>148830</b>	<b>703</b>	<b>1530</b>	<b>1486</b>	<b>11638</b>	<b>16003</b>	<b>29694</b>	<b>254680</b>
17.	Total 1-10*	100140	544	1112	1126	6041	10114	17898	184910
18.	Total 11-15	48690	159	418	360	5597	5589	11796	69770
19.	17/ Total (%)	67.3	77.4	72.7	75.8	51.9	63.2	60.3	72.6

\* districts with most tsunami damage

## 2.2 Marketing

Most of the fish landed is sold fresh (79-87%) while the rest is salt cured (13-21%). Fish landed at fishery harbours, anchorages and fish landing centres is either transported to major urban centres such as Colombo, Kandy, Galle etc or sold locally. Fish transportation is done in insulated or non-insulated covered transport vehicles, packed in wooden boxes with ice. Colombo has the main wholesale market in the island, St John's

Market (SJM). It receives on an average 120-150 vehicles (3-5MT capacity)/ day, carrying 2-3MT of fish each. Fish received is either sold to retailers, institutional buyers, caterers or consumers, or is redirected to various parts of the island. Thus, SJM receives nearly 30% of the total fish landings of the island. Almost 98% of fish marketed is handled by the private sector, while the share of the Ceylon Fisheries Corporation is around 1-2%. The 1000MT cold storage facilities located at the CFC Mutwal complex mainly caters for the needs of the private fish exporters and storage of perishables. The complex also have 4 units of 2.5MT/batch capacity blast freezers with a total daily freezing capacity of 25-30MT. There is no ice production at the Mutwal complex while the necessary supplies are obtained from a private ice plant and sold to export-processors at Rs106/ 50kg.block.

Fish retailing is done through municipal fish markets in urban centres, private sector owned fish stalls and fish retailing outlets or vendors using motorcycle/ cycle. Over the last few years supermarkets have introduced dedicated fish sections which are becoming increasingly popular among urban consumers.

### 2.3 Exports and Export Marketing

The two major items of export are shrimp and fin-fish, mostly tuna species. The value of exports of fish and fishery products has increased more than ten fold in rupee terms over the 1990-2003 period. The exports in 2003 recorded a value of Rs. 9542 million or over US \$100 million. Shrimp and fin-fish accounted for nearly 80% of the export value (Table 4).

Product mix in the export sector has not shown much change over the years except for the rapid growth in the exports of tuna, mainly tuna loins to European markets. Yellowfin tuna landed domestically, and a small quantity imported, are both used in the production of tuna loins for export.

**Table 4 : Export Quantities (Q=MT) and Values (V=Rs.million) of Shrimp, Fish and Total Exports of Fish and Fishery Products (1990-2003)**

Item	1990	1995	2000	2003	% of Total
<b>Shrimp (Q)</b>	1855	2780	4855	4468	28
<b>Shrimp (V)</b>	486	2153	5041	4165	44
<b>Unit Value</b>	Rs 261	Rs 774	Rs 1038	Rs 932	
<b>Fish (Q)</b>	821	1978	11873	7563	48
<b>Fish (V)</b>	174	413	3781	3300	35
<b>Unit Value</b>	Rs 212	Rs 208	Rs 318	Rs 436	
<b>Total (Q)*</b>	3032	7457	19567	15689	100
<b>Total (V)*</b>	819	3655	10328	9542	100

\* total includes other products such as lobster, crabs, sea cucumber, ornamental fish, shells, fish maws, shark fins etc.

Even though the exports in volume and value in rupee terms have shown a significant increase, the unit value of exports has not shown much change or the increase has been marginal. Though the stagnating commodity prices in fisheries has been a feature in many developing countries, some (e.g. Thailand, Vietnam, Indonesia etc) have taken decisive steps to remedy the situation through value addition and product/ market diversification. While Sri Lanka has shown progress in product and market diversification of its tuna resources, there is much to be achieved in this respect with shrimp.

### **3. Post-Tsunami Situation and an Assessment of Damages**

The study examined the landing/ marketing centres located on the tsunami-affected Southern and North-Eastern coastal belt of the country to assess the post-tsunami situation and damages to infrastructure and fish marketing channels. Relevant data and information were collected through discussions held with the officials of MFAR and its field staff and those of CFHC, CFC and relevant Municipal officials. Discussions were also held with FAO/ ADB field staff and NGOs operating in the affected areas. Useful information was also gathered through discussions with fishermen, boat owners, fish transporters, traders and export-processors.

The traditional fishing season for the Southern coast is from September to March/April whereas for the North-Eastern coast it is from January-September. However, with the rapid expansion of the multi-day fleet in the country, the seasonality of the landings has almost disappeared at most harbours/ landing sites which have witnessed catches throughout the year. Due to damages to crafts and gear, fishing operations are a long way from the pre-tsunami level, both in terms of landings and the number of boats operating. The general situation in the major fishery harbours and fish marketing centres in the tsunami affected stretch at the time of the field visits in early February 2005, with specific reference to damages caused (Figure 2 & 3) where appropriate, is discussed below:

#### **3.1 Fishery Harbours:**

##### ***BERUWALA***

**Number of boats operating/ registered:** Pre-tsunami, nearly 380 multi-day boats and around 120 day-boats were operating from Beruwala fishery harbour. The number at present is far below the above and are yet to reach the pre-tsunami level.

**Fish landings:** Pre-tsunami, on an average, about 6-12 boats used to land fish daily. Landings varied from 20-30 MT of fish, consisting mainly of tuna species, marlin, shark, sword fish and a variety of small pelagic species. Some of the larger boats belonging to export-processors (e.g. Thalula Fisheries which has six boats) bring fish, mainly tuna, of prime quality for export.





**Water supply:** Fresh water from the municipal line is supplied to boats by two pumping stations. The overhead tank fed from the municipal supply has a capacity of 105,000 litres while that for well water is much smaller (1000 litres). Pipe water for washing and cleaning is in short supply (especially during the dry season).

**Ice supply:** Ice is mainly supplied by a 10MT flake ice plant located in the CFHC premises and a 10MT block ice plant (Dilshan Ltd.) located outside the harbour premises. Since the supply is not adequate, ice is transported from other sources in Colombo and Kalutara. Ice is sold at Rs. 80/ per 50kg block.

**Chilled/ frozen storage:** The 150MT cold room facility in the CFHC premises has been out of operation for sometime. As such there is no provision for chilled/ frozen fish storage at present. The two blast freezers in the premises have a freezing capacity of 4MT/ batch, a total of 8MT.

**Fish marketing:** Most of the fish landed is transported chilled by private transporters in 3-5 MT insulated or non-insulated trucks to Colombo and other urban centres. On a day with good landings, around 10-15 truck loads of fish leave the harbour. The CFHC landing site also supplies fish to around 30-50 retailers, 80-100 cycle vendors and a large number of consumers.

**Fish Auction hall:** The auction hall (approximately 1000 sq metres) was heavily damaged as a result of the tsunami. Even before the tsunami, the hall was not fully utilized as the facilities were inadequate and the layout and the location of the auction hall, away from the boat, encouraged fish unloading on to the quayside or directly to the transport vehicles, bypassing the designated fish receiving area/auction hall.

### ***HIKKADUWA***

**Number of boats operating/ registered:** Around 77 multi-day boats and 50 day-boats operate from the Hikkaduwa fishery harbour. In addition an unspecified number of smaller boats (OBMs) use the harbour facility.

**Fish landings:** Before tsunami, on an average, about 4-6 multi-day boats and a large number of day-boats used to land fish daily. During the season (April-September) daily landings varied from around 5-15 MT of fish, consisting mainly of tuna species, shark, small pelagics (linna, lelawa). Most of the boats operate long-lines, gill net/ encircling gill nets (light fishing and gill net).

**Water supply:** Fresh water from the municipal supply is delivered to boats through pumping stations at Rs. 250/ 1000 litres.

**Ice Supply:** Ice is mainly supplied by a privately owned 10MT block ice plant located at Wellawatta, outside the harbour premises. Ice is also transported from ice plants in Galle and Mirissa. Ice is sold by these plants at Rs. 105/ 50kg block.

**Fish marketing:** Most of the fish landed is transported chilled by private transporters in 3-5MT insulated trucks or non-insulated vehicles. On a day with good landings around 2-3 truck loads of fish are transported to Colombo and inland urban centers. The CFHC landing site also supplies fish to around 10-20 retailers and 20-30 cycle vendors.

## ***GALLE***

**Number of boats operating/ registered:** On an average, around 250 multi-day boats and 125 day-boats used the harbour facility before tsunami though the number is almost 30% of the pre-tsunami level at the time of the visit.

**Fish landings:** Pre-tsunami, on an average, about 6-12 boats used to land fish daily. Landings varied from 10-30 MT of fish, consisting mainly of tuna species, shark, carangids and a variety of small pelagic species. Landings are yet to return to pre-tsunami level. Some of the larger multi-day boats use Galle port facilities to unload fish, mostly tuna destined for export.

**Water supply:** Fresh water from the municipal supply is supplied to boats by two pumping stations. The harbour management charges Rs. 250/ 1000 litres of water.

**Ice supply:** Out of the two ice plants located in the premises repairs on the 20MT flake ice plant belonging to Harbour View Co. which was damaged by the tsunami is in the process of repair and is expected to be operational shortly. The 25MT block ice plant operated by Lanka Ice Co. Ltd has been severely damaged by the tsunami and is not operational. The 10MT ice plant belonging to CFC too has been severely damaged. Thus, none of the ice plants in Galle are presently operational. At present the supplies come from an ice plant located at Mirissa, about 30 km South of Galle, on the Matara Road.

**Chilled/ frozen storage:** The 400MT cold room facility, built as three separate smaller units, has been out of operation for sometime. The facility has got heavily damaged by the tsunami.

**Fish marketing:** Most of the fish landed at the fishery harbour and the Galle port is transported chilled by private transporters to Colombo and other urban centres in the hinterland. Some species such as yellowfin and bigeye are meant for export as gilled and gutted “bullets”(mainly to Japan) or as loins. On an average around 30-50MT of fish were landed daily before tsunami, while 5-8 truck loads of fish left the harbour daily. On an average around 300-400 retailers, cycle vendors and consumers visit the harbour daily to buy fish.

The fish packaging plant belonging to CFC located in the premises and its equipment (band saw - 2 units), vacuum packing machine and other ancillary equipment) have been completely damaged beyond repair. CFC fish retail outlet in the Galle bazaar too has been severely damaged by the tsunami. CFC has also lost a 5MT freezer truck to the tsunami.

**Fish auction hall:** The large fish receiving area cum auction hall (approximately 40'x140') is completely damaged and would need complete reconstruction.

### ***MIRISSA***

**Number of boats operating/ registered:** Around 80 multi-day boats and 40 day-boats operate from the Mirissa harbour. The multi-day boats are mostly 34'-39' range, while the fleet consists of nearly 10 boats exceeding 40 feet.

**Fish landings:** Before tsunami, on an average, about 5-10 multi-day boats and a large number of day-boats used to land fish daily. Daily landings ranged from around 20-35 MT of fish, consisting mainly of tuna species, shark, small pelagics (linna, lelawa). Most of the boats operate long-lines and gill net/ encircling gill nets (course fishing and gill net).

**Water supply:** Fresh water from the municipal supply is delivered to boats through 7 pumping stations at Rs. 200/ 1000 litres. Water is also obtained from a well for washing purposes through a sump/ overhead tank system. During the dry season the wells fail to provide enough water for washing/ cleaning purposes.

**Ice supply:** Ice is mainly supplied by two privately owned block ice plants located outside the harbour premises. However, one of the plants (Thushara Ice Plant) is out of service. The second plant located on the Galle-Matara main road (consists of 4 block ice units and 1 flake ice unit) supplies all the ice necessary for the harbour. Ice is sold by these plants at Rs. 105/ 50kg block.

**Fish marketing:** Most of the fish landed is transported chilled by private transporters in 3-5MT insulated trucks or non-insulated vehicles. On a day with good landings around 8-12 truck loads of fish are transported to Colombo and inland urban centres such as Deniyaya, Akuressa, Ratnapura etc .The CFHC landing site also supplies fish to around 40-50 retailers and 20-30 cycle vendors.

**Fish auction hall:** The fish receiving/ auction hall is not used for the purpose due to its poor location, at the far end of the pier.

### ***PURANAWELLE***

**Number of boats operating/ registered:** Around 400 multi-day boats and around 30 day-boats operate from the Puranawella/ Dondra fishery harbour. The multi-day boats are mostly 34'-39' range, while the fleet consists of nearly 20 boats exceeding 40 feet. Fish landings were severely affected (around 20-30% of the pre-tsunami levels) at the time of the visit in early February 2005.

**Water supply:** Fresh water is supplied through a 20,000 litre overhead tank/ 50,000 litre sump system. The harbor management charges Rs.200/ 1000 litre of fresh water. Each

multi-day boat takes around 1000-2000 litres of fresh water depending on the planned duration of the fishing trip. Fresh water for washing/ cleaning is in short supply.

**Fish landings:** Before tsunami, on an average, about 15-20 multi-day boats used to land fish daily. Landings varied from 60-80 MT of fish, consisting mainly of tuna species, shark, small pelagics (linna, lenawa). Most of the boats operate long-lines and encircling gillnet.

**Ice supply:** The 5MT block ice plant and a 40MT flake ice plant, located in the harbour premises suffered severe damages as a result of the tsunami and are presently out of operation. Even before tsunami, the supply of ice has often been inadequate and fish transporters have been buying ice from a flake ice plant located at Devinuwara and from ice plants in Matara. Ice is sold by these plants at Rs. 100/ 50kg crushed block. Crushed ice is delivered to boats, packed in used poly-propylene bags.

**Fish marketing:** Most of the fish landed is transported chilled by private transporters in 3.0-3.5MT insulated trucks or non-insulated vehicles. On a day with good landings around 12-15 truck loads of fish are transported to Colombo and inland urban centres such as Ratnapura and Kandy. The CFHC landing site also supplies fish to around 40-50 retailers and 20-30 cycle vendors.

**Fish auction hall:** There is no fish auction hall at Puranawella.

### ***KUDAWELLA***

**Number of boats operating/ registered:** Around 125-150 multi-day boats and around 50-75 day-boats operate from the Puranawella/ Dondra fishery harbour. Boat registration scheme has not yet been implemented at Kudawella and hence it is difficult to obtain accurate figures. Fish landings were severely affected (only about 30% of the pre-tsunami levels) at the time of the visit in early February 2005.

**Water supply:** The lack of fresh water supply is a serious problem faced by the fishermen and fish transporters. Suppliers, transporting fresh water by truck in plastic tanks charge anything from Rs. 500-1000 per 1000 litres. Each multi-day boat takes around 1000-2000 litres of fresh water depending on the planned duration of the fishing trip.

**Fish landings:** Pre-tsunami, on an average, about 6-8 boats used to land fish daily. Landings varied from 25-40MT of fish, consisting mainly of tuna species, shark, small pelagics. Small pelagics are landed by encircling gill net fishery, which is the prevalent type of fishery at Kudawella.

**Ice supply:** Ice is mainly supplied by two 10MT block ice plant located in Kudawella and Mahawela on the main road. As the supply is often inadequate, fish transporters also buy ice from two ice plants in Puranawella (block and flake ice). Ice is sold by these plants at Rs. 100/ 50kg crushed block. Crushed ice is packed in used poly-propylene bags.

**Fish marketing:** Most of the fish landed is transported chilled by private transporters in 3.0-3.5MT insulated trucks or non-insulated vehicles. On a day with good landings around 6-8 truck loads of fish are transported to Colombo and other urban centres. The CFHC landing site also supplies fish to around 40-50 retailers/ institutional buyers.

## **TANGALLE**

**Number of boats operating/ registered:** Around 235 multi-day boats and around 40 day-boats operate from the Tangalle fishery harbour. Fish landings were severely affected (only around 20-30% pre-tsunami levels) at the time of the visit in early February 2005.

**Water supply:** Fresh water from the municipal source was supplied to boats by two pumping stations. As the municipal supply pressure is low, the authorities have built a sump/ overhead tank unit which will be soon ready for operation. Mostly harbor water is used for washing fish.

**Fish landings:** Pre-tsunami, on an average, about 6-12 boats used to land fish daily. Landings varied from 20-60MT of fish, consisting mainly of tuna species, shark, marlin, sail fish and a wide range of small pelagic species.

**Ice supply:** Ice is mainly supplied by a 10MT block ice plant located in the CFHC premises. The plant, which was affected by tsunami, has been repaired and is now in operation. As the supply is often inadequate, fish transporters also buy ice from a 40MT block ice plant located about 5km from the harbor (Goyambokka). The 5MT flake ice plant belonging to CFC was dislodged and severely damaged by the tsunami.

**Freezing:** The 10MT containerized mobile blast freezing unit (CFC) located in the CFHC premises was damaged and dislodged by the tsunami and is out of action. As such there is no provision for fish freezing at present.

**Chilled/ frozen storage:** There is no chilled fish storage facility. The 50MT cold room facility (CFC) has been out of operation for sometime. As such there is no provision for chilled/ frozen fish storage at present.

**Fish marketing:** Most of the fish landed is transported chilled by private transporters in 3.0-3.5 MT insulated trucks or non-insulated vehicles. On a day with good landings around 10-12 truck loads of fish are transported to Colombo (50-60%) and to other parts of the country, mainly Bandarawela and Badulla.

The CFHC landing site also supplies fish to around 20 -30 retailers/ institutional buyers and 30-40 cycle vendors.

## ***KIRINDA***

**Number of boats operating/ registered:** Around 35 multi-day boats and around 178 day-boats (OBM) operate from the Kirinda fishery harbour.

**Water supply:** Fresh water from the municipal supply is sold to boats. The supply system has a sump (26,000 litres)/ overhead tank (22,000 litres) and two pumping stations. Pipe water for washing and cleaning is in short supply.

**Fish landings:** Pre-tsunami, on an average, about 6-12 boats used to land fish daily. Total daily landings varied from 15-20 MT of fish, consisting mainly of linna, mullet, yellowfin and tuna-like species, shark and a variety of small pelagic species.

**Ice supply:** Ice is mainly supplied by a 5MT flake ice plant and a 5MT plate (10kg blocks) ice plant located in the CFHC premises. Both these plants were completely destroyed by the tsunami. Block ice is sold at Rs. 140/ 50kg.

**Freezing:** There were two blast freezing units (5MT) and a 10MT ice/ chilled fish storage unit all of which were affected by tsunami and are now out of operation.

**Fish marketing:** Most of the fish landed is transported chilled by private transporters in 3.0-3.5MT insulated or non-insulated trucks to Colombo, Ratnapura, Bandarawel and other urban centres. On a day with good landings around 4-6 truck loads of fish leave the harbour. The CFHC landing site also supplies fish to around 10-20 retailers, 30-40 vendors.

**Fish auction hall:** The auction hall (approximately 1000 sq metres) has been completely destroyed by the tsunami.

## ***TRINCOMALEE (COD BAY)***

**Number of boats operating/ registered:** Around 300-400 multi-day boats (58 locally registered and the rest migratory) operate from the Trincomalee (Cod Bay) fishery harbour during the season, from January-September. Nearly 75 day-boats (28"-34") land fish at the two piers in the (Inner Harbour road) city. Nearly 1100 beach landing vessels (17.5"-23") also land fish in locations such as Mutur, Kinniya, Salli Beach, Podokathivu etc.

**Water supply:** Fresh water from the municipal supply collected in a 24,500 litre overhead tank is supplied to boats by two pumping stations at Rs. 250/ 1000 litres. Pipe borne well water for washing and cleaning is supplied via a 80,000 litre overhead tank.

**Fish landings:** Pre-tsunami, on an average, about 8-12 multi-day boats used to land fish daily at Cod Bay. Total daily landings varied from 30-40MT of fish, consisting mainly of yellowfin, skipjack, marlin, tuna like species, shark and a variety of small pelagic species.

**Ice supply:** An ice plant (10MT) located in the CFHC premises has been out of operation for some time. Ice is mainly supplied by two privately owned 5MT (Lihoni Ice) and 100MT (Lanka Ice Co.) block ice plants. Ice is also transported from far away locations such as Colombo, Negombo, Dambulla. Ice is sold at Rs. 90-110/ 50kg block, depending on the location.

**Freezing:** There is no provision for fish freezing at present.

**Chilled/ frozen storage:** There is no chilled fish storage facility. The two 40MT cold room facilities (CFHC) have been out of operation for sometime. As such there is no provision for chilled/ frozen fish storage at present.

**Fish marketing:** Most of the fish landed is transported chilled by private transporters in 3.0-3.5MT insulated or non-insulated trucks to Colombo, Kandy, Anuradhapura and other urban centres. On a day with good landings during the season (January-September) around 7-12 truck loads of fish leave the harbour. The CFHC landing site also supplies fish to around 15-25 cycle/ motor-cycle vendors and retailers.

Trincomalee also has retail and wholesale fish markets belonging to the municipal council. The retail market (daily rental of Rs. 25/ stall) has 38 stalls while the wholesale market has 44 stalls (annual fee of Rs. 12,000-15,000). Both are very poorly maintained and have no running water, no proper illumination and sanitary facilities. Several lorries also leave the wholesale market daily with fish destined to Colombo and other urban centres. It is interesting to note that a large number of small boats in Trincomalee are now engaged in long-lining for tuna, for export. Large sized fish, mainly tuna, for export is stored chilled in fiberglass/ fiberglass lined wooden boxes. Each box measuring 4'x10' and costing around Rs. 125,000-150,000 to build, can hold 2-2.5MT of fish on ice.

**Fish auction hall:** There is no fish auction hall at the Cod Bay fishery harbour. From the boat, fish is loaded directly on the transport vehicles.

## **3.2 Non-Fishery Harbours:**

### ***JAFFNA***

At present 6 ice plants are operating in Jaffna, five (05) of 1.2MT capacity (24 blocks/ day) and the other a 5MT flake ice plant. Thus the total ice production is around 11MT per day, an amount which is far from adequate to satisfy the demand. The supply is supplemented by fish transporters who bring ice from Colombo on their way back from transporting fish from Jaffna to Colombo. They keep a very good markup on ice, buying ice at around Rs. 80-90/ 50Kg block in Colombo and selling at Rs. 200-250/ block in Jaffna. The blocks are often underweight as they are transported in un-insulated or un-refrigerated vehicles, packed in wood chips for insulation.

There is no fish freezing facilities in Jaffna. There are two 5MT cold storages set up by GTZ operating in Kurunagar and Velanai. The ice plant in Point Pedro is out of operation and is now mostly used for storing shrimp on ice.

### ***BATTICALOA***

Batticaloa district has 117 beach landing sites along its coast. The only harbour in the area, Valachchenai is out of operation due to war damages and security reasons. During the season around 10 truck loads of fish leave the district to urban market centers, mainly Colombo.

The 10MT block ice plant has suffered tsunami damages and is now out of operation. Ice is transported by trucks returning from Colombo or suppliers transporting ice from Minneriya. Ice is sold at Rs. 180/ 50kg block.

### ***KALMUNAI***

Only one multi-day boat is registered under the Kalmunai district while the day-boats number 284. The only harbour in the area, Valachchenai is out of operation due to war damages and security reasons. The boats land on the beach or unload fish in harbour facilities elsewhere in the North-East.

During the season, in addition to Kalmunai, heavy fish landings can be seen at locations such as Pothuvil, Addalachchenai and Ninthavur and serve as fish pick up points for transporters. When landings are good around 10-12 truck loads of leave daily to urban market centers. After tsunami damages to the Batticaloa ice plant the district is entirely dependant on ice transported from Colombo. Ice is sold at Rs. 180/ 50kg block.

## **3.3 Damages to the Fish Marketing Network**

Tsunami has had a devastating effect on the fish marketing network in the coastal belt of the country, especially in the South and North-East.

### ***3.3.1 Municipal fish markets***

Municipal fish markets are the key fish buying points for the urban consumers and may have anything from 15-30 vendors operating from each market. Most also serve as supply points for institutional buyers. They also provide direct and indirect employment to hundreds.

Many municipal markets along the coastal belt were affected by the tsunami, the most affected being those at Galle (18 stalls), Matara (22 stalls) and Hambantota (14 stalls) which were completely destroyed by the tsunami. Some of the vendors are now operating from makeshift huts in the vicinity (Figure 4). However, re-establishing some of the facilities at the same location/ locations may face difficulties due to the government's



declaration of a 100/200 metre buffer zone and similar restrictions laid by some municipal authorities as well.

### ***3.3.2 Retail outlets belonging to CFC***

In most urban areas the Ceylon Fisheries Corporation (CFC) stalls too play an important role in fish marketing. The CFC stalls at Galle and Matara have sustained heavy damages as a result of tsunami and need urgent assistance for rehabilitation. The fish packeting plant in the Galle fishery harbour premises was completely damaged by the tsunami, including its equipment (band saw (2 units), vacuum packing machine and other ancillary equipment) – [Figure 5](#).

CFC has also lost three (03) refrigerated trucks belonging to its fish transport/ distribution fleet. Those affected were attached to Negombo, Galle and Tangalle regional offices.

### ***3.3.3 Privately owned fish stalls***

Over the last few years, private fish stalls/ outlets have increased their share in the fish retail business in the island. Privately owned fish stalls have sprung in many strategic locations on the main roads and consumer hubs. They get their supplies from fish transporters plying between fishery harbours/ fish landing sites and urban centres or directly from the source.

The stretch of main road from Beruwala to Matara alone is said be dotted with nearly 280 such stalls before tsunami, which dislodged and damaged most of them. Some of these were fairly well equipped with stainless steel/ tiled fish-on-ice display boards, insulated chilled fish storage boxes, a good clean water supply and provision for disposal of waste/ wash water. The cost of construction of these units varies widely from Rs. 20,000-250,000 depending on the structure ([Figure 6](#)).

### ***3.3.4 Cycle/ motor-cycle vendors***

Another group severely affected in the marketing chain are the cycle/ motor-cycle vendors. The nine (09) fishery harbours on the Southern coastal belt from Panadura to Kirinda alone supply fish to 150-250 cycle/ motor-cycle vendors daily. In addition to this the other major fish landing centres dotted along the coast too supply fish to a large number of cycle/ motor-cycle vendors. Thus the total number of such vendors affected would well exceed 3000.

### ***3.3.5 Trade losses***

In addition to losses in fish stocks (fresh fish, frozen fish and dry fish), tsunami also affected fish sales as many consumers refrained from consuming fish as they felt that fish has fed on dead bodies washed into the sea, resulting in a marked drop in fish sales. The situation is yet to normalize almost three months after tsunami. The situation not only





affected the fishermen, fish transporters and traders financially but also thousands of others in the marketing chain.

#### **4. Socio-Economic Impact of Damages**

The ten most tsunami affected fisheries districts of the country account for over 72% of total marine landings. Over 60% of the national fleet (72.7 % of multi-day boats, 75.8 % of day-boats, 51.9% of vessels with outboard motors and 63.2% of non-motorized boats) are registered in these ten districts. Nearly 67.3% of the total 148,830 active fishermen live in these areas while 77.4 % of the major fish landing sites are also located in them. (Table 3). Thus the tsunami affected areas are very important with respect to fish landing, fleet operation and livelihood of fishermen.

The MFAR/ FAO Post-Tsunami Fisheries Reconstruction and Development Programme has assessed the total loss in production due to tsunami at 81,000MT; 62,000MT of production loss due to the destruction of 12,438 boats and a further 13,000MT due to damaged boats numbering around 4,040. The losses are compounded by damages to infrastructure facilities at fishery harbours and landing sites (jetties, ice plants, fuel sheds), traditional processing activity along the coast, and fisher families being displaced. In the post-harvest sector, damage to fish marketing infrastructure (municipal/ retail markets, privately owned retail fish outlets) are significant. Municipal fish markets at Galle, Matara, Hambantota etc have been completely destroyed by the tsunami while a majority of CFC retail outlets and privately owned fish stalls too were damaged or destroyed incurring heavy monetary losses and loss in employment and livelihood to thousands.

The loss in trade and assets to cycle/ motor-cycle vendors is very high. Often these vendors are the sole breadwinners of their families. A large number of them have not only lost their daily income but also have lost their assets (cycles, motor-cycles, utensils) as well. In the coastal belt from Panadura to Kirinda (approximately 265km) alone, it is believed that over 3000 families would have got directly affected as a result. Poor fish sales would undoubtedly compound the negative impact on income generation among vendor community as a whole as tsunami has affected fish sales due to the fact that even to date many consumers refrain from consuming fish due to the fact that they felt that fish has fed on dead bodies washed into the sea. The situation is yet to normalize almost three months after tsunami. The situation not only affected the fishermen, fish transporters and traders financially but also thousands of others in the marketing chain.

#### **5. Rehabilitation of Post-harvest Sector**

##### ***Recommendations***

It is recommended that any assessment of short, medium/ long term rehabilitation and reconstruction needs of the fisheries post-harvest sector should focus not only on replacement of damaged assets but should also facilitate in bringing about necessary urgent improvements to ensure catch-up in the growth and sustainable development of

the sector as a whole. This is of paramount importance if the tsunami shattered industry is to re-establish itself in a well-structured manner and contribute towards national development and socio-economic upliftment in the sectors of production, processing and marketing and other ancillary occupations.

Any rehabilitation effort should also carefully assess the medium-long term needs in the sector and pattern of trade development. In this connection, based on personal observations and through discussions with relevant governmental/ industry bodies the following short-term and medium/ long term priority areas could be recommended:

### **Short-Term**

1. Rehabilitation and improvements to urban fish markets and retail outlets;
2. Re-establishing the fish landing/ receiving/ auction halls at fishery harbours and landing centres;
3. An appraisal of national requirements of ice plant, cold storage and freezing capacities;
4. Re-establishing the supply and improvements to availability of ice;
5. Promoting domestic marketing and export-processing of seafood from the North-East.

### **Medium/ Long-Term**

6. Assurance of an adequate supply of clean water at fishery harbours/ landing sites;
7. Rehabilitation and strengthening of seafood quality/ safety monitoring and fisheries R & D capabilities at NARA/ MFAR;
8. Setting up a dedicated fish market information unit;
9. Improvements to Colombo Central wholesale fish market.

### **Short-Term (6-12 months)**

#### **1. Rehabilitation and improvements to fish marketing network**

Tsunami has had a devastating effect on the fish marketing network in the coastal belt of the country, especially in the South and North-East. Many privately owned as well as CFC operated retail outlets in the tsunami affected coastal belt have been severely damaged or completely dislodged while most are out of operation. Among these are several urban retail fish markets such as those at Galle, Matara and Hambantota.

The Municipal fish markets are the key fish buying points for the urban consumers and may have anything from 15-30 vendors operating from there. Most of the markets also serve as supply points for institutional buyers. They also provide direct and indirect employment to hundreds. Most of these municipal fish markets have only very basic facilities; concrete fish display/ dressing boards, supply of tap water (hardly adequate to properly clean the area after the day's operation) and in some, a room for storing chilled fish.

In most urban areas, the Ceylon Fisheries Corporation (CFC) stalls too play an important role in fish marketing. The stalls, which are fairly well equipped and often well maintained, retail both fresh and frozen fish, including packeted fish. Fish is priced competitively in line with its declared objective of price stabilization. However, with a market share of only 1-2%, CFC is yet to consolidate a reasonable market share for it to be effective in this capacity to be a price leader. The CFC stalls at Galle and Matara have sustained heavy damages as a result of tsunami and needs urgent assistance for rehabilitation.

Over the last few years, private fish stalls/ outlets have increased their share in the fish retail business in the island. Privately owned fish stalls have sprung in many strategic locations on main roads and consumer hubs. They get their supplies from fish transporters plying between fishery harbours/ fish landing sites and urban centres or directly from the source. The stretch of main road from Beruwala to Matara alone is said be dotted with nearly 280 such stalls before tsunami, which dislodged and damaged most of them. Some of these were fairly well equipped with stainless steel/ tiled fish-on-ice display boards, insulated chilled fish storage boxes, a good clean water supply and provision for disposal of waste/ wash water. It is recommended that setting up such units should be encouraged by laying down some guidelines for fish retail outlets. In this respect it would also be useful to consider an incentive package (50% cost sharing) for setting up such facilities at 50 selected locations in the affected areas.

A large number cycle/ motor-cycle vendors have not only lost their daily income but also have lost their assets (cycles, motor-cycles, utensils) as well. In the coastal belt from Panadura to Kirinda (approximately 265km) alone, it is believed that over 3000 families would have got directly affected as a result.

Tsunami has thus severely affected not only the fish retailing network but also employment of thousands directly or indirectly in the sector. Hence it is important to rebuild/ rehabilitate the facilities affected and also to provide support to private traders to establish themselves in business by providing financial/ technical/ logistical support as appropriate. However, re-establishing of some facilities at the same location/ locations may be difficult due to the government's declaration of a 100/200 metre buffer zone and similar restrictions laid by some municipal authorities.

In the case of rehabilitation of privately owned fish retail outlets and the network of cycle/ motor-cycle vendors, support by way of grants, debt relief or new loans at favorable conditions for acquiring assets and restarting their business activities should be considered. The following can be identified as areas where urgent attention should be focused with respect re-establishing the fish marketing network:

*a) Re-establishing municipal fish markets at Galle, Matara, Hambantota and rehabilitating others:* There is an urgent need to re-establish the three municipal fish market areas at Galle, Matara and Hambantota which were completely destroyed.

*b) Re-establishing CFC retail outlets at Galle and Matara and rehabilitating others:* There is an urgent need to re-establish the two retail outlets at Galle and Matara and the fish packeting plant at Galle.

*c) Re-establishment/ rehabilitation of privately owned network of fish retail outlets:* It is recommended that in addition to supporting the affected with the provision of support through financial institutions as per approved schemes to support setting up 50 model retail outlets (a specific number in each affected district) under a 50% cost-sharing scheme for those who were most severely affected.

*d) Re-establishment/ rehabilitation of the fleet of cycle/ motor-cycle vendors:* It is recommended that in addition to supporting the affected with the provision of support through financial institutions as per approved schemes, to release 500 model fish vending cycles fitted with fish 40-50kg capacity fish storage boxes a specific number in each affected district) under a 50% cost-sharing scheme for those who were most severely affected.

**INDICATIVE COST ESTIMATE:**

**a) Cost of setting up the municipal fish markets at Galle, Matara and Hambantota:**

*Galle:*

- Building (40' x 100' floor area at Rs. 2000/ sq ft) and service areas = Rs. 8.0 million

*Matara:*

- Building (40' x 100' floor area at Rs. 2000/ sq ft) and service areas = Rs. 8.0 million

*Hambantota:*

- Building (40' x 70' floor area at Rs. 2000/ sq ft) and service areas = Rs. 5.6 million

**Total :** **Rs. 21.6 million (US\$ 216,000)**

**b) Re-establishing the CFC retail outlets at Galle and Matara and the fish packeting plant at Galle (CFC estimates):**

Re-establishing CFC retail outlet (building + equipment), Galle = Rs. 2.2 million

Re-establishing CFC retail outlet (building + equipment), Matara = Rs. 2.2 million

Re-establishing CFC fish packeting plant (building+equipment), Galle = Rs. 7.5 million

**Total :** **Rs. 11.9 million (US\$ 119,000)**

**c) Constructing 50 model fish retail outlets on 50% cost sharing basis:**

Building and services (12' x 18') at Rs. 1400/ sq ft = Rs. 302,400

Equipment and utensils:

(16cu ft freezer, balance, cutting boards, knives etc) = Rs. 140,000

Unit cost = Rs. 442,400

50% of unit cost = Rs. 221,200

**Total for 50% cost sharing for 50 units :** **Rs. 11.06 million (US\$ 110,600)**

**d) Establishing a fleet of 500 model fish vending cycles:**

Unit cost

(cycle, fiberglass 40-50kg fish box, weighing scale/ cutting board/ knives)

= Rs. 9,000

**Total cost of 500 units :**

**Rs. 4.5 million (US\$ 45,000)**

**2. Re-establishing the fish receiving/ auction halls at fishery harbours and landing centres**

Varying degrees of damages were caused by the tsunami to most of the fish receiving/ auction halls at fishery harbours and fish landing sites and in some locations the facilities sustained severe damages and destruction. The facilities, commonly known as “Auction halls”, are used for a variety of activities; washing, dressing, repacking, icing and holding containers for chilled fish. However, the facilities available at various auction halls vary widely, some have an adequate supply of potable fresh water, a good supply of ice and clean floors with satisfactory surface drainage and waste disposal mechanisms while in some these are lacking. The layout of most of the auction halls, quite a distance from the fishing vessels, has dissuaded the use of these facilities, encouraging the unloading of fish on to the quayside, contaminating/ damaging the fish.

As a result of tsunami damages, most of the auction halls are now in a state of disrepair and disuse and need early rehabilitation. It is recommended that in the initial phase the basic facilities such as water supply and drainage are re-established with necessary repairs to roofs/ floor areas, fish storage boxes, weighing machinery as appropriate.

Meanwhile, it is important to make necessary changes to the layout of the halls to ensure proper usage of the facility for hygienic handling of fish as discussed earlier. With respect to layout, the suggestions given below could be recommended to encourage/ ensure that all the fish landed will pass through the auction hall where washing and repacking/ re-icing could be carried out easily to ensure quality of fish. However, some of these recommendations would entail a significant sacrifice of convenience and in fact may face resistance. For example, the discontinuation of the practice of direct loading of ice from the truck to the boats and unloading of fish directly to the quayside/ trucks is something fishermen have got used to over the years. However, this practice often allows the fish to be exposed to elements and contaminated floor of the quays:

- extension of the auction hall (width-wise) to facilitate landing of fish from the boats directly on to the auction hall, where feasible;
- extension of the hall (length-wise) to facilitate more boats to unload fish at a given time directly to the auction hall;
- where feasible, raise the floor of the auction hall to enable easy unloading of the fish from the boats and loading of fish on to trucks;
- supervision by harbour management that proper sanitation/ hygiene guidelines are adhered to by auction hall users.

It would be the responsibility of harbour management to ensure an adequate supply of water/ ice and to provide ice/ chilled-fish storage facilities and maintenance of the general cleanliness of the environs.

### **3. An appraisal of national requirements of ice plant, cold storage and freezing capacities**

A survey conducted in 1998 has assessed the installed capacity of ice plants in the island to be around 1099MT/ day. However, the present production capacity at the time of the survey is believed to be around 550MT/ day. The production capacity in some areas has recently increased due to expansion of some existing plants (Kalutara and Trincomalee) and could be expected to increase further due to planned new investments (the planned Rs. 65 million, 70MT plant to be built in Nilaveli). However, it is difficult to assess the actual ice supply situation due to unavailability of reliable data on the scale of operation and availability of ice due to scanty and patchy reporting mechanisms.

Most of the ice plants and cold storages belonging to the public sector (CFHC and CFC) are old (many are over 20- 30 years old) and quite a number have been out of operation for sometime, while those in operation incur heavy maintenance/ repair bills. Some large units were set up with expansion in fisheries in mind which never materialized (e.g. Galle) for various reasons. Lack of proper planning, taking into account the actual needs of the location and the techno-economic feasibility of setting up a plant at a particular location, has had disastrous effects. Same could be said about cold storages and freezing facilities.

As an aid in policy making and planning, and to ensure optimum utilization of resources, it is recommended that a detailed assessment of national requirements of fisheries post-harvest infrastructure (ice plants/ cold storages/ freezing plants) be conducted. Such an exercise should ideally be carried out in close consultation with relevant experts (refrigeration/ fishing and fish processing/ harbour management/ fish marketing/ economist) and field staff, as appropriate. The study should examine not only the engineering and economic aspects but also potential developments in fishing technology, fish handling/ transport options, trade flow/ forecasts etc with due consideration to national development plan and national aspirations in developing the socio-economic status of the fishing communities. The study should also clearly define specific roles of the private sector, CFC/ CFHC and other stakeholders and their mechanisms of interaction.

### **4. Re-establishing the supply and improvements to availability of ice**

Poor availability of ice is often cited as the main reason for heavy post-harvest loses, both physical and quality, in the post-harvest sector. Ice usage in fisheries in Sri Lanka has always been relatively low, except among some fishermen and transporters who specially cater for export-processors. However, ice usage has improved considerably over the years,

mainly due to the improved quality awareness among consumers and the price premium for quality fish.

Poor availability and relatively high cost of ice is another factor which limits the usage of ice. The availability and cost of ice varies widely depending on the location and demand. Ice priced at around Rs. 80.00/ 50kg block in Colombo costs Rs. 100.00 at Beruwala on the West Coast, Rs. 140.00 at Kirinda located far South and around Rs. 200-250 in Jaffna, in the North.

Damages caused to ice plants and ice storage facilities by the tsunami has further compounded this situation. However, supplies from Colombo and private sector owned ice plants located in areas unaffected by tsunami has helped somewhat to satisfy the urgent demand for ice, in the short-term.

**Table 5 : Ice Plants and their Production Capacities (1998)**

<b>Location</b>	<b>No. of Plants</b>	<b>Capacity MT/ day</b>
Puttlam	3	75
Chilaw	6	101
Negombo	8	274
Colombo	3	100
Kalutara	4	105
Galle	3	100
Matara	8	180
Tangalle	5	31
Kalmunai	2	15
Batticaloa	2	25
Trincomalee	2	45
Jaffna	2	15
Mannar	2	15
Others*	2	15
<b>Total</b>	<b>52</b>	<b>1099</b>

*Source: Statistical Unit of MFAR (Ice Plant Survey, NARA-1998)*

\* Anuradhapura and Minneriya

The installed capacity of ice plants has been estimated at 1099 MT/day (Table 5) in a survey carried out by NARA in 1998, though the actual production capacity could be assumed to be much less. Industry sources believe that the actual island wide production of ice to be around 500-550MT/ day. Most of the ice plants belonging to the public sector establishments such as CFHC/ CFC have exceeded their life-span and are either out of service or running at below capacity, with heavy maintenance/ repair costs. The void is filled by supplies from privately owned ice plants. Thus, there is an urgent need to ensure an adequate supply of ice at the fishery harbours and landing sites if the quality of the fish landed is to be maintained and to minimize post-harvest losses.

**Table 6 : Assessment of the Required Installed Capacity of Ice Plants in relation to Annual Fish Landings**

<b>Total landings (MT)</b>	<b>Average daily Landings* (MT)</b>	<b>Ice requirement (at 70% usage)</b>	<b>Installed capacity** Requirement MT/ day</b>
300,000	1070	750	1065
350,000	1250	875	1330
400,000	1430	1000	1520
450,000	1610	1130	1720
500,000	1785	1250	1900

\* assuming 280 days of fishing on an average per annum.

\*\* assuming a 300 day operation/ annum at 80% capacity.

Assuming a total annual landing of 300,000MT in the near future (in fact it exceeded 300,000 in 2002), 280 days of fishing operations/ annum, 70% ice usage (ice : fish ratio), the required average daily installed capacity to satisfy fisheries sector requirements could be assessed at around 1065MT (Table 6). However, it should be noted that the requirements may widely vary depending on the location and the fishing season.

Thus assuming a present ice production level of 550MT/ day (and assuming that 80% of the total amount is used by the fisheries sector), based on the above assessment, the deficit in ice production to satisfy the urgent needs of the fisheries sector alone amounts to around 625 MT/ day. However, if the industry is to cater to the anticipated growth in fish production, especially from off-shore and deep sea fisheries, a progressive increase in ice availability would be necessary to assure fish quality and safety.

**Table 7: Ice Plants, Cold/ Ice Storage Rooms – Indicative Costs\***

<b>Capacity (MT)</b>	<b>Ice Plant</b>			<b>Cold Rooms</b>
	<b>Flake Ice</b>	<b>Slurry Ice</b>	<b>Block Ice</b>	
5 MT	60-80,000	100-116,000	50,000	12,000 (ice storage)
10 MT	90-120,000	-	90,000	18-27,000 (cold storage)
15 MT	150-185,000	-	-	-
20 MT	180-200,000	-	120-145,000	32-47,000 (cold storage)
25 MT	-	200-250,000	-	-
50 MT	260-280,000	-	220,000	28,000 (ice storage)

\* cost covers all expenses including installation and test running and depends on the country of origin.

On the other hand, possible introduction of on-board handling practices such as use of refrigerated seawater (RSW) and/or installation of freezing/ sea-water ice slurry units onboard larger vessels in the future, could possibly help to reduce pressure on the demand for ice.

In setting up an ice plant, the location and capacity are two aspects which have to be critically evaluated:

**Capacity:** The capacity of an ice plant significantly influences the cost of production of ice. Smaller plants have relatively higher capital/ operational costs when compared to larger plants. Smaller plants operate on costly synthetic refrigerants whereas larger plants can operate economically with ammonia as a refrigerant. On the other hand, smaller units alone may not be able to satisfy the growing ice demand at many fishery harbours, especially from the growing multi-day fleet, with a multi-day boat requiring 300-400 blocks of ice (1.5-2MT)/ trip.

**Location:** It is logical to assume that an ice plant should be located in close proximity to the fishery harbour/ fish landing site. However, in some instances poor access to potable water and a regular supply of electricity and other cost/ logistical considerations may make it more feasible to have an ice plant in a location away from the fishery harbour, as is the case with some privately owned ice plants presently supplying to some of the fishery harbours. Sometimes, it would be feasible to have a suitably located large central ice plant to serve several harbours/ landing sites, instead of locating smaller plants at each landing site. For example, following is a cluster arrangement for the tsunami affected areas in the North-East and the South of the country, which could be considered after a careful assessment of techno-economic feasibility:

- Kalutara/ **Beruwala**/ Ambalangoda
- Ambalangoda/ **Galle**/ Mirissa
- Mirissa/ **Puranawella**/ Kudawella
- Kudawella, **Tangalle**/ Hambantota/ Kirinda
- **Batticaloa**/ Kalmunai/ Pothuvil/ Oluvil
- **Jaffna**/ Kilinochchi/ Mulativu
- **Trincomalee**/Muttur/Kinniya/Kokilai

In most instances, the low unit cost of production of a larger facility, far outweigh transport/ operational and other ancillary costs (Table 7). However, if ice is to be transported from a central plant, it would require a suitable ice storage facility to be set up at the point of sale, which could also double up as a chilled fish (fish-on-ice) store. Based on the assessments on ice requirements carried out during the field survey either a cluster arrangement or a stand alone chain of ice plants can be recommended as follows:

### **a) Cluster arrangement**

Locations (07) recommended for 50-100MT ice plants (in 2-3 smaller units):  
Beruwala, Galle, Puranawella, Tangalle, Batticaloa, Trincomalee and Jaffna.

Locations (08) recommended for ice storage units/cold rooms:  
Mirissa, Kudawella, Hambantota, Kirinda, Kalmunai, Pothuvil, Kilinochchi and Mulativu.

### **b) Stand alone chain of ice plants**

Locations (07) recommended for 50-100MT ice plants (in 2-3 smaller units):  
Beruwala, Galle, Puranawella, Tangalle, Batticaloa, Trincomalee and Jaffna.

Locations (08) recommended for smaller (20MT) ice plants:  
Mirissa, Kudawella, Hambantota, Kirinda, Kalmunai, Pothuvil, Kilinochchi, Mulativu.

### **Indicative Cost Estimate:**

#### ***Scenario 1: Cluster arrangement***

<b>Ice plants (50MT) at the seven (07) locations in a):</b>	
US\$ 210,000 x 02units @ 25 MT x 07 locations	= US\$ 2.94 million
<b>Cold/ ice storage units at the eight (08) locations in b):</b>	
US\$ 45,000 x 08 units	= US\$ 360,000
<b>Total cost</b>	<b>= US\$ 3.3 million</b>

#### ***Scenario 2: Stand alone chain of ice plants***

<b>Ice plants (50MT) at the seven (07) locations in a):</b>	
US\$ 210,000 x 02units @ 25 MT x 07 locations	= US\$ 2.94 million
<b>20MT ice plants at the eight (08) locations in b):</b>	
US\$ 200,000 x 08 locations	= US\$ 1.6 million
<b>Total cost</b>	<b>= US\$ 4.54 million</b>

## **5. Promoting domestic marketing and export-processing of seafood from the North-East**

North-East districts account for nearly 42% of total fish landings of the country. In 2003 the districts Batticaloa (22,240), Kalmunai (21,380), Trincomalee (25,030),

Mullathivu (2250), Killinochchi (2670), Jaffna (18,550) and Mannar (16,630) districts landed a total of 108,730MT of fish out of the island's total of 254,680MT. The landings consisted of a relatively high proportion of exportable species such as tuna, shrimp, cuttlefish, *beche de mer* (sea cucumber), mullet etc.

Seafood production from the North-East of the country has shown an increase in the last few years mainly due to the re-establishment of fishing activity as a result of the prevailing peaceful environment in the region. Certain areas of the traditional trawling grounds (Pedro and Wadge banks) in the North have reopened for shrimp fishery. However, considering the importance of resource sustainability, fishermen in the Northern districts have voluntarily opted for trammel net fishery in place of trawling, yielding harvests rich in large sized (a high proportion of 12-16 pcs/kg size range) shrimp, mainly *Peneaus indicus*.

Similar developments are also seen in the Eastern parts of the country where tuna long-lining (using 100-150 hooks) by small-medium sized boats is fast expanding. The day-boat fishery specifically targets large sized tunas and other high value species with an export market. The trend should be welcome as the fishermen are now increasingly becoming more concerned about the quality of the fish caught than the volume of the catch. Some of the more affluent boat owners/ fish assemblers have invested in fiberglass holding tanks to keep the fish chilled after landing, until such time they dispose the fish to export-processors. However, the majority of the landing sites lack such facilities resulting in significant quality loss in the valuable catch.

The North-East of the island also exhibits heavy landings of a wide variety of small pelagic species. In the 70s and early 80s the North-East had a thriving dry fish industry, dominated by small-medium scale processors and a well established marketing network, consolidated into a network of fishermen's cooperatives in many locations. The North also had several fish meal production units mainly using Silverbelly (*Leigonathus sp.*) and other low value small pelagic species including fish waste. In fact, in the early 1980s the author was involved in setting up a factory using Silverbelly in the production of a ready to eat fish savoury mix (Fish "Sambal") under the Ceylon Fisheries Corporation.

Dry fish processing was mainly carried out by women and children who helped to augment the family income of the large fisher population in the area. Districts of the North-Eastern Sri Lanka have a relatively large fisher population. Figures for 2003 stood at a total of 86,800 for the North-East; Batticaloa (21,740) followed by Trincomalee (18,250), Kalmunai (15,500), Jaffna (14,860), Mannar (9540), Killinochchi (3660) and Mullativu (3250), accounting for nearly 58% of the estimated total population of 148,800 for the island. Thus re-establishing the small-medium scale fish processing/ marketing network would undoubtedly help to elevate the socio-economic status of the fisher populations in the North-East of the country, who were the most affected by the tsunami. On the other hand, the industry should also explore avenues of export-processing if it is to benefit fully from its valuable resource base. In this connection the following areas of action could be recommended:

**a) Technical know-how:** Infusion of technical know-how in handling and processing of various fishery resources and ensuring their safety/ quality is an urgent requirement. It is important to highlight that simple post harvest operations such as washing with clean water, cleaning the products from extraneous matter, size/ quality grading, icing and appropriate packing can add value to the products, enabling the processors to demand a better price for their produce. Often, processed products are purchased in bulk by the traders/ export-processors who reprocess/ grade/ repack the products prior to marketing/ export. Improving the quality of the processed products not only enables the processors to demand a premium price but also could open up avenues for direct domestic marketing/ export of the products. The stringent quality requirements in the export markets would however require establishing properly equipped processing plants, staffed by trained/ skilled personnel, an area which would not only need considerable investment but also technical back up especially on quality/ safety assurance of exports, which could be achieved by strengthening such capabilities at the two universities in the North-East and facilitating them to network with the established facilities elsewhere on the island.

**b) Marketing support:** Fish assemblers/ middlemen /transporters/ traders play an important role in the fish marketing network in the island, heavily influencing the beach price of fish. However, increased demand for fish and heavy competition, improved transport/ communication facilities etc have somewhat diminished their domineering role in the marketing network. However, due to poor access to urban market centers, the fish assemblers/ processors in the North-East are yet to benefit from such developments elsewhere in the island. In such a scenario, the processors would benefit if there is improved access to market/ price information and by facilitating buyer-seller matching through appropriate informal/ formal mechanisms.

**c) Fiscal incentives:** Provision of suitable fiscal incentives (credit/loans) could play an important role in re-establishing/ rehabilitating the tsunami affected small-medium scale processing sectors by enabling them to re-establish their livelihoods. Considering the significant resource base the North-East of the country holds, extension of fiscal incentives for setting up of export-processing facilities could be considered favourably.

### **Medium-Long Term**

## **6. Assurance of an adequate supply of clean water at fishery harbours/ landing sites**

Clean water is an essential requirement in fish handling and processing; for washing the fish landed, cleaning fish, handling and processing areas/ utensils, deck and fish holds of vessels etc. Thus, a plentiful supply of clean, potable water is a must at any fishery harbour/ fish landing site. Clean water too is necessary to manufacture good quality ice.

Water supply in the fish harbours/ fish landing sites in the tsunami affected areas of the island need much improvements to satisfy even the above basic requirements. The common source of fresh water is the municipal supply or water from wells/ tube wells delivered via an overhead supply tank. At most harbours boat owners have to buy their

requirements of water from the harbour management or private suppliers. In some locations, the entire water requirement is catered by private suppliers. For example at Kudawella, private suppliers, transporting fresh water by truck in plastic tanks charge anything from Rs. 500-1000 (US\$ 5-10) per 1000 litres. Each multi-day boat takes around 1000-2000 litres of fresh water depending on the planned duration of the fishing trip.

Where water is supplied by the harbour management, water is supplied (through 1" hoses) often by several (2-4) supply stations located on the pier. The water supply to fish receiving areas / auction halls is very poor and erratic, while some have no water supply at all. The acute shortage of water at some locations has resulted in the use of untreated harbour water for washing/ cleaning purposes, including, at times, washing fish. The main supply sources of water at the fishery harbours in the affected areas are:

*Municipal supply:* municipal supply of fresh water by pipe is often available only at certain times of the day and hence a sump/ overhead tank system is required. In some locations water rates are relatively high. At some locations, due to the distance from the main supply line, a special supply line is required. In most fishery harbours the management charges Rs. 250/ 1000 litres (pre-tsunami Rs. 200/=);

*Well water:* the supply from wells/ tube wells are the best/ most economical source at some locations. However, the seasonal variation of quality/ quantity of water available, brackishness of water, high iron content at some locations, limits its usage. Here again often a sump/ overhead tank system is required. The bacterial quality of the water is uncertain;

*Outsourcing:* The water from private suppliers is relatively costly due to high transport costs. The supply is erratic and the quality of water is uncertain.

To ensure safety and quality of fish landed, it is important for the harbour management to ensure an adequate supply of clean water to harbour users. The relatively high tariff on municipal supplies acts as a disincentive in using such water for washing/ cleaning purposes. Well/ tube well sources are a more attractive option in this respect. However, this too is not an option for all the locations, due to uncertain quality and the seasonal variation in quality/ quantity of water available.

Considering the relatively high cost and various other limitations of established supply sources, it is also worthwhile to explore the techno-economic feasibility of using treated seawater for general cleaning/ washing. However, such an operation would entail setting up of a out-harbour seawater pumping station/ on-shore water purification plant and a gravitational water delivery system.

## **7. Rehabilitation and strengthening of seafood quality/ safety monitoring and fisheries R & D capabilities at NARA/ MFAR**

As per Fisheries and Aquatic Resources Act, No. 2 of 1996, Director of Fisheries and Aquatic Resources is the “Competent Authority” and the Fishery Products Quality Control (FPQC) unit of the Ministry of Fisheries and Aquatic Resources is the national seafood certification body empowered with the function of issuing operating licenses for seafood export processing facilities and issuance of health certificates for consignments of seafood exports. The operating licenses are issued on an annual basis. Factory inspections/ audits are carried out jointly by FPQC/ MFAR and the Sri Lanka Standards Institution (SLSI). Sample analysis is carried out by one or more of five accredited laboratories with ISO 17250 certification; Industrial Technology Institute (ITI), National Aquatic Resources Agency (NARA), Sri Lanka Standards Institution (SLSI), Bamber and Bruce Ltd., and SGS Laboratories.

During the last two years, FPQC/ MFAR has further strengthened the fish safety/ quality assurance programmes carried out by the unit taking note of emerging requirements of major markets based on Hazard Analysis Critical Control Points (HACCP) principles and is now in the process of incorporating elements of risk assessment and traceability to the programmes. The unit joins hands with National Aquatic Resources Agency (NARA), the national research and development arm of MFAR, which is also one of the five laboratories accredited for seafood testing. Such efforts were mooted taking note of impending Country of Origin Labeling (COOL) by US and mandatory traceability and labeling requirements of the EU market.

The Post-Harvest Technology Division (PHTD), set up in the mid seventies through an FAO/ DANIDA project, is the key arm of NARA responsible for conducting research, developmental and extension activities related to seafood quality/ safety assurance including improved utilization of aquatic resources for human consumption through product development/ by-catch utilization and sustainable use of fishery resources.

PHTD has chemical and microbiological laboratory facilities which play an active part in the seafood inspection and certification programmes conducted by MFAR. Routine microbiological analytical work carried out by its ISO 17025 certified microbiological laboratory and chemistry laboratory units includes testing of samples for total plate count, total coliforms, E. coli, salmonella, vibrio etc and histamine testing for tuna.

The laboratory facilities at NARA, mostly housed in the ground floor areas of the three storey building located by the sea at the mouth of the Kelani river sea outfall were completely damaged by the tsunami. Nearly 80% of the equipment belonging to the Chemistry, Nutrition, Microbiology and Quality Control laboratories and fish processing equipment of the Pilot Fish Processing unit were damaged as a result of the tsunami and needs urgent replacement. This is especially important as the damages came at a time when MFAR and IPHD/ NARA were embarking on a plan to accelerate product and market diversification of sea food exports from Sri Lanka and ensuring their safety.

Under the programme special focus was laid to enhance the laboratories heavy metal and drug/ antibiotic residue testing capabilities through procurement of a Gas Chromatograph (GC) for pesticide residue analysis, High Performance Liquid Chromatograph (HPLC) for detection of drug/ antibiotic residues and an Atomic Absorption Spectrometre with necessary accessories and other ancillary equipment needed for chemical/ microbiological analytical work.

Purchase of these equipment would have to be coupled with appropriate staff training. Provision of these equipment would help the laboratory to address growing fish safety assurance requirements by importing countries. Considering the focus of the Sri Lankan seafood industry on shrimp and tuna, special focus should be laid, among other things, to enhance routine testing of samples for antibiotics and other drug residues, pesticide and other chemical contaminants and histamine and mercury.

**Indicative Cost Estimate:**

1. Replacement of damaged laboratory equipment and purchase of urgent new equipment	US\$ 700,000
2. Training staff (01) in advance chemical analytical techniques (histamine/ nitrofurans/ pesticides/ antibiotics etc); total of 03 months	US\$ 14,000
3. Training staff (01) in microbiological assay methods; total of 03 months	US\$ 14,000
4. Training/ study tour on industry level implementation of traceability (01); total of 02 months	US\$ 8,000
5. Training/ study tour on seafood quality assurance/ HACCP auditing (02); total of 02 months	US\$ 12,000
<b>Total</b>	<b>US\$ 748,000</b>

**The total estimated cost for this activity is US\$ 748,000/=.**

**8. Setting up a dedicated fish market information unit**

The value of exports of fish and fishery products from Sri Lanka has increased several fold over the 1990-2003 period, the exports in 2003 recorded a value of Rs. 9542 million or over US\$ 100 million. Shrimp and fin-fish accounted for nearly 80% of exports by value.

Even though the value of exports in volume and value in rupee terms have shown a significant increase, the unit value of exports have not shown much change or the increase has been marginal. Though the stagnating commodity prices in fisheries has been a feature in many developing countries, some (ex. Thailand, Vietnam, Indonesia etc) have taken decisive steps to remedy this situation through value addition and product/ market diversification. Even though Sri Lanka has shown progress in product and market

diversification of its tuna resources, there is much to be achieved in this respect with shrimp.

Considering the yet untapped vast areas with aquaculture potential in the North-East of the country and rapidly growing tuna landings from off-shore fisheries, Sri Lanka has good potential to benefit further from its seafood exports. However, even though the country has a very enterprising, aggressive, broad-based export sector, entrepreneurship development in the fisheries export sector has been somewhat slow, despite the support and guidance extended by MFAR and Sri Lanka Export Development Board (SLEDB).

An area which needs special attention in export promotion is ready access to trade and marketing information. The fisheries sector of the country has poor access to such information, though both Sri Lanka Export Development Board and MFAR do their best to extend their support in this direction. Hence, it is recommended that a dedicated fish marketing information unit be set up either at MFAR or SLEDB. The facility would have as its main focus the facilitation of transfer of fisheries information to private/ public sector entities and to governmental policy makers and planners. Thus it should build up extensive databases on areas such as:

- Fish production/ trade data; national/ international price- market information;
- national/ international trade regulations/ enactments/ standards;
- vessel/ gear/ equipment manufacturers and suppliers;
- national/ international buyers/ sellers of fish and fishery products.

It would be also useful to have within the outfit, a centralized, dedicated, trade information unit (TIU or a library), open to public/ industry, to enable the users of the facility to have direct access to relevant technical/ trade/ marketing information. Such a facility would also help policy makers/ planners to have ready access to data/ information on the global markets and their trends. A basic cost estimate for setting up such a unit, excluding staff costs, is given below.

**Indicative Cost Estimate = US\$ 95,000/= (as below):**

### Indicative Cost Estimate for setting up a trade promotion unit:

	<u>Year 1</u>	<u>Year 2</u>
<b>a) Setting up Databases</b>		
- high end computers (02) and software	US\$ 4 000	2 000
- high speed modem linkage and electronic data transmission aides	US\$ 5 000	2 000
- Technical support ( 2mm x 1mm)	US\$ 14 000	7 000
<b>b) Information unit</b>		
- Publications (journals, periodicals, magazines)	US\$ 8 000	3 000
- audio-visual material	US\$ 5 000	2 000
- audio-visual equipment	US\$ 6 000	2 000
<b>c) Trade fair participation (2 staffs x 2 visits)</b>	US\$ 8 000	8 000
<b>d) Staff (02)training (database management/ web-design)</b>	US\$ 5 000	3 000
Sub total	US\$ 63 000	32 000
<b>Total (for two years)</b>	<b>US\$ 95 000</b>	

## 9. Restructuring the Colombo Central wholesale fish market

Colombo has the main wholesale fish market of the island, St John's Market (SJM), located at a strategic, central location in one of the busiest commercial areas of the city. It receives on an average 120-150 vehicles (3-5MT capacity)/ day, carrying 2-3MT of fish each. Fish received is either sold to retailers, institutional buyers, caterers or consumers, or is redirected to various parts of the island. Thus, SJM receives nearly 30% of the total fish landed in the island.

The present facility has limited floor space, inadequate to handle such a volume of fish in the manner it is traded at the market. The ground floor of the fish market has a floor area of approximately 15,000 sq ft, and nearly 200 stalls and vendors (number of registered stalls much lower) operating in the area. Even though there are tiled fish display areas in each stall, fish is often displayed on the floor or in/on the transport boxes, on either side of the over-crowded walkways. The market floor has poor drainage and is very poorly maintained. Fish is often displayed without ice and is also prone to physical damage the way it is displayed/ handled.

Space is the single most important aspect to any improvements to the market. It would be very difficult to improve the situation in the market without expanding the trading floor

by at least increasing it by 60% for the time being. Ideally, a floor area should be double the size of the present one to cater for the huge flow of human traffic within the premises. The volume and nature of vehicles (mainly 3-5MT trucks) precludes the option of an underground vehicle parking arrangement. Thus the option is either, a) relocate the market or b) acquire the adjoining vehicle park for expansion.