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FISHERIES TSUNAMI EMERGENCY PROGRAMME

SRI LANKA

Master Plan for the Reconstruction and Development of Anchorages and Fish Landing Centres along the coast of Sri Lanka

by
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FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

MFAR/FAO Post-tsunami Fisheries Reconstruction and Development Programme

Master Plan for the Reconstruction and Development of Anchorages and Fish Landing Centres along the coast of Sri Lanka

January 2006

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Executive Summary

There are around 700 anchorages and fish landing centres (FLCs) in Sri Lanka, some of them had few facilities but most of them were lost in the Tsunami. In response to the Sri Lankan governments request FAO is assisting on the planning of infrastructure development and providing technical assistance by preparing a master plan for infrastructure. During the mission about 120 fish landing centres were visited.

The objectives of the Infrastructure Master Plan are to assist infrastructure development in a planned and orderly way preventing ad-hoc development, to provide guidance to investors, donors, NGO's and government agencies and to assist in better coordination, avoiding overlaps and gaps and ensuring better utilization of financial resources.

A method to prioritize FLCs on basis of objective criteria is presented. Five different factors have been identified for this purpose and given weight. These are the socio-economic connected to the Tsunami and the conflict, the economic factor depending on the fishing activity at the site, the economic factor associated with development and markets, the technical criteria related to land availability and the organisational factor associated with the strength of the organisations in the society.

General recommendations for modular structures and facilities include the fishermen facility building that consists of different modules, net mending module, engine store module, gear store module, office module and rest room module. Other facilities and services include the auction shed, sanitary facilities water supply, electricity, drainage and waste disposal facilities.

Modular structures and facilities have been allocated to the visited FLCs on basis of guidelines prepared for that purpose. Typical cost for developing FLCs ranges from 20 to 90,000 US$, in total 3.6 million US$ for all the 120 visited FLCs. It is expected that during future work and follow up on the master plan the number of FLCs that need development will increase to about 200 FLC with a need for development for about 6 million US$.

The master plan includes a typical design of shore facilities and bill of quantities, the design following guidelines for design against natural disasters. Actions needed to be taken in preparation for the actual construction work are summarised.

The master plan is concerned with the development of anchorages and FLCs that serve the coastal fishery that has been rather stable over the past 25 years although the capacity of the coastal fishing fleet has increased by 30% over the last 15 years. Therefore the master plan concentrates on increasing the standard of the fish landing centres with regard to hygiene, quality of the fish, including the reduction of the post harvest losses, and living standard of the fishermen. Conflict affected areas and less developed congested areas are in need the development as well as the Tsunami affected areas.

No further studies or investigations are needed to implement the master plan with construction of shore facilities. To develop FLCs to anchorages several information and studies are needed. The need for bathymetric survey has been identified 26 sites where the cost per site is about 10,000 US$. An engineering study to establish offshore wave conditions for the east and north coast is needed with a cost estimate of 10,000 US$. Three districts or areas have been identified where feasibility study for marine facilities are needed. Cost estimate for each district or area is about 70,000 US$:

Abbreviations

ADB	Asian Development Bank
ADF	Assistant Director of Fisheries
CCD	Coast Conservation Department
CFHC	Ceylon Fishery Harbour Corporation
CRMP	Coastal Resource Management Project
FAO	Food and Agriculture Organisation of the United Nations
FI	Fisheries Inspector
FLC	Fish Landing Centre
LHI	Lanka Hydraulic Institute
LKR	Sri Lankan Rupee
MFAR	Ministry of Fisheries and Aquatic Resources
NARA	National Aquatic Resources Research & Development Agency
NHO	National Hydrographic Office
NECCDP	North East Coastal Community Development Project

Currency equivalents

Currency units used are the Sri Lanka Rupee, LKR, and United States Dollar, US$.

As of December 2005:

US$ 1.00	is equal to	LKR 100
LKR 1.00	is equal to	US$ 0.01

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Summary

Anchorages and fish landing centres

In Sri Lanka there are three types of places with fishing activity, Fishing Harbours, Anchorages and Fish Landing Centres (FLCs). The largest of these are the Fishing Harbours that provide a wide range of facilities and services required by larger motorized fishing vessels. Of the 12 main fishing harbours 10 were damaged during the Tsunami. These are looked after by big donors.

Anchorage is generally a lagoon, estuary or other naturally sheltered water body along the coast, traditionally used by fishers as safe haven, at least seasonal shelter against oceanic forces, with minimal or no shore based support facilities. There are about 35 to 38 sites identified as anchorages along the coast of Sri Lanka. Some anchorages had few facilities and most were lost in the Tsunami. ADB will support the rehabilitation of some of these.

Fish landing centres or village landings are usually beach or lagoon landings. There are around 700 of them. The landing centres provide no shelter against oceanic forces and usually they have no or very small shore facilities, most of them lost in the Tsunami.

Under the post-Tsunami rehabilitation and reconstruction strategy shore facilities at anchorages and fish landing centres need to be "built back better". And the government's policy to encourage fishers to reside outside "buffer zone" requires provision of facilities at FLCs

Infrastructure Master Plan

In response to the Sri Lankan governments request FAO is assisting on the planning of infrastructure development and providing technical assistance by preparing a master plan for infrastructure. During the mission about 120 fish landing centres were visited in all districts except the districts Jaffna, Kilinochchi and Mullaitivu. Site visit was planned to Jaffna but had to be abandoned due to security reasons.

The objectives of the Infrastructure Master Plan are to assist infrastructure development in a planned and orderly way preventing ad-hoc development, to provide guidance to investors, donors, NGO's and government agencies and to assist in better coordination, avoiding overlaps and gaps and ensuring better utilization of financial resources.

Prioritising scheme

In the master plan fish landing centres are being prioritized on basis of objective criteria, chapter 3. Five different criteria or factors have been identified for this purpose and given weight. First is the socio-economic factor, the Tsunami affected and conflict affected areas, weighted as 25%. Second is the economic factor that has been divided in two parts. One part is dependent on the fishing activity at the site, number of different type of boats, number of fishermen and amount of fish landed. This factor has been given the weight of 30%. The other part is the economic factor associated with development, markets, period of activity and if the society has lost some facilities in the Tsunami. The weight given to this factor is 20%. The third factor is the technical criteria are related to erosion, coastal protection and land availability. These have been given the weight of 15%. The fourth factor is the organisational

criteria related to the strength of the organisations in the society, their ability to manage and maintain the facilities sustainable. This has been given the weight of 10%.

Modular structures

General recommendations and outlines of modular structures and facilities suitable for the anchorages and fish landing centres have been prepared, chapter 4.1. The fishermen facility building consists of different type modules, of different sizes and or different number of each type of modules. The modules are net mending module, engine store module, gear store module, office module and rest room module. In separate buildings are the auction shed and sanitary facilities. It is also necessary to provide water supply, electricity, drainage and waist disposal facilities.

Cost estimate for developing FLCs and anchorages

Guidelines to allocate shore facilities to the landing centres and anchorages have been prepared, chapter 4.2. On basis of these guidelines facilities have been allocated to the visited landing centres and anchorages, Appendix F. Typical cost estimate for developing FLCs and anchorages with shore facilities is listed in the table 1.

Table 1 Cost estimate for developing FLCs and anchorages with shore facilities

Shore facilities	Cost in LRP	Cost in US$
Fishermen facility building	1 to 6 million LRP	10,000 to 60,000 US$
Auction shed	0.4 to 0.9 million LRP	4,000 to 9,000 US$
Sanitary facilities	0.2 to 0.5 million LRP	2,000 to 5,000 US$
Water supply, electricity	0.1 to 0.2 million LRP	1,000 to 2,000 US$
Total cost for developing FLC	2 to 9 million LRP	20 to 90,000 US$

The estimated total cost for developing the 120 visited FLCs is 360 million LRP or 3.6 million US$. It is estimated that after reappraisal of FLCs that need development with shore facilities the number of FLCs will increase to 200 with a total cost of 600 million LRP or 6 million US$.

Design of shore facilities and Bill of quantities

In the process of defining the modular structures and building up the guidelines for allocation of shore facilities to fish landing centres and anchorages the landing centre at Baddewatha and the anchorages at Kottegoda and Welipatanwila were taken as examples. For these sites design of fishermen's facility buildings and auction sheds has been prepared following guidelines from an intra ministry committee for design against natural disasters, Appendix K.

Preparation for development

Chapter 4.4 summarises the action that have to be taken in preparation for the actual construction work. These include close cooperation with the local communities and local authorities to re-evaluate the need for shore facilities, land survey, consultation with local bodies, planning and design of facilities on available land and application to CCD.

Need for marine facilities at anchorages

This master plan focuses mainly on development of shore facilities and in that sense the anchorages are in fact fish landing centres. As such they are included in the list of fish landing centres both when it comes to prioritising and allocation of facilities. In some anchorages there are plans for marine facilities like breakwaters and piers. Appendix H contains a list of anchorages proposed by CFHC with the need for development.

Fisheries statistics

In Chapter 6 fisheries statistics is examined to evaluate the level of exploitation of the fishery resources and trends in the development of the fishing fleet. The master plan is concerned with the development of anchorages and fish landing centres that serve the coastal fishery that in general has been rather stable in catch over the last 25 years. On the other hand the capacity of the coastal fishing fleet has increased by 30% over the last 15 years. The master plan will therefore concentrate on increasing the standard of the fish landing centres with regard to hygiene, quality of the fish, including the reduction of the post harvest losses, and living standard of the fishermen.

In the conflict affected areas fishery assets and infrastructure have been severely damaged. In the prioritising scheme the conflict affected areas in the north and east are given similar status as the Tsunami affected areas. Still implementation of the master plan in those areas could be slow and taking into consideration socio-political factors and development.

Although the Tsunami and conflict affected areas should get a high priority it should not be overlooked that the anchorages and FLCs in the Fishery Districts of Negombo and Puttalam have many boats and are very congested but usually have no shore facilities. Providing shore facilities in these districts is also needed.

Need for bathymetric survey

No further studies or investigations are needed to implement the master plan of shore facilities. On the other hand development of anchorages with marine structures needs bathymetric information as well as information on environmental conditions as waves, winds and water levels as well as morphological processes, chapter 8. The need for bathymetric survey has been identified at 26 anchorages and FLCs, Appendix I. As no information is available for the districts of Jaffna and Mullathive the list could be longer. The cost for bathymetric survey at each site is about 1 million LKR or 10,000 US$.

Need to establish offshore wave conditions

Coastal processes and offshore wave conditions are well known for the south and southwest coast. There is a need to establish offshore wave conditions for other parts of the coastline, the east and north coast of Sri Lanka. Cost estimate for this study is about 1 million LKR or 10,000 US$.

Need for development plans for anchorages

In many of the anchorages there exist plans for development including sheltering marine structures or structures to prevent closing of river mouths or lagoons. In other anchorages these plans do not exist. An anchorage where the boats can be safely moored either the whole year or part of the year is important for the fishery communities. It is as well valuable to increase the opening time of river mouths or lagoons to enable fishing activity for a longer period of the year.

It is proposed that initial engineering studies are undertaken at several fish landing centres mainly based on bathymetric survey. After that one or two locations are chosen for further site investigations, like sediment sampling, current measurements, water level measurements, wind measurements, near-shore wave modelling, sediment transport modelling and planning and design of sheltering structures. An initial cost estimate comprising of initial engineering study of 5 sites and detailed study for one site is about 7 million LKR or 70,000 US$. Three districts or areas have been identified where feasibility study for marine structures are needed, Appendix I

Benefits from development

The benefits from the development of anchorages and FLCs are that the livelihood sustainability of the fishers is ensured through:

- Post-harvest losses and waste will be reduced
- Increased incomes on account of quality improvement due to better hygienic conditions
- Better marketing environment
- Better security of equipment
- Improved facilities and amenities
- Development will promote pollution free coastal environment
- Possibilities of village level development

Future work and follow up

Future work and follow up on the Master Plan will include that MFAR, CFHC and will

- Consult with organisations of the fishermen on national plan
- Continue data acquisition and further investigations, at other sites / in depth
- Gather information on plans of other players – donors, NGOs, CBOs, state agencies
- Disseminate information among stakeholders
- FAO will seek funding for development at selected FLCs and anchorages

1. Introduction

The present mission is a part of the Ministry of Fisheries and Aquatic Resources (MFAR) and Food and Agricultural Organisation (FAO) Post-tsunami Fisheries Reconstruction and Development Programme.

FAO appointed Sigurdur Sigurdarson, Civil Engineer, as an International Consultant for the work. MFAR appointed Nishantha Wickramasooriya, Civil Engineer at the Ceylon Fisheries Harbours Corporation (CFHC), as a National Consultant. The international consultant stayed in Sri Lanka for two periods from September 13 to October 12 and from November 15 to December 13 2005, see itinerary in Appendix N. The national consultant worked on the project continuously. The work was guided by Claude Fernando and Leslie Joseph fisheries consultants and Lars Engvall fisheries sector advisor.

During the preparation of the master plan the consultants have visited the fisheries districts of Kalutara, Galle, Matara, Tangalle, Kalmunai, Batticaloa, Trincomalee, Mannar, Puttalam, Chilaw and Negombo. 116 landing centres have been visited of which about 27 are regarded as anchorages. There were plans to visit landing centres in Jaffna but they had to be abandoned due to security reasons. Pictures taken during the site visits have been attached to this report on a CD. A reference list for the pictures can be found in Appendix M.

To follow up the work of the master plan the MFAR did set up an Advisory Committee on Infrastructure comprised of the following members:

- A. Hettiarachchi, DG MFAR
- Dr. Ranjith Edirisinghe, Post Harvest Technology, NARA
- B. Wickramarchchi, CCD
- L.D.Wijeratne, CFHC
- A.D.P. Wijegunawardena, DFAR
- W.A.A.G.R. Fernando, CFC

Three meetings were held in the Advisory Committee on September 27, October 10 and December 2 with presentation and discussion on the master plan.

A presentation of the Master Plan for the Donor / Civil Society Post-Tsunami Steering Committee on October 10. and for the NGO coordination Meeting on December 13.

Meetings were with the following persons:

Hettiarrachchi, Director General, MFAR
G. Piyasena, Director General, Department of Fisheries and Aquatic Resources
Hiroshi Kitanai of JICA,
R.A.D.B. Samaranayake, Dr, Director, Department of Coastal Conservation.
Theja Wedaarachchi, Engineering Manager Civil, Ceylon Fishery Harbours Corporation.
Mangal Wickramanayake, Project Manager, Coastal Resources Management Project
Samantha Hettiarachchi, professor in coastal engineering in the University of Muratowa.
Malith Mendis Chief Executive Director, L.V., Lanka Hydraulic Institute
Talagala Senior Consultant, Lanka Hydraulic Institute
K. Raveenthiran, Dr, Senior Research Engineer. Lanka Hydraulic Institute
Perrera Nissanka, director ADB Projects, former DG Coastal Conservation Department

2 General information

2.1 Fishing harbours, Anchorages and Fish Landing Centres

In Sri Lanka there are three types of places with fishing activity, Fishing Harbours, Anchorages and Fish Landing Centres (FLCs). The largest of these are the Fishing Harbours that provide a wide range of facilities and services required by larger motorized fishing vessels. There are 12 main fishing harbours in Sri Lanka with basins protected by breakwaters providing year-round safe approach and navigation, anchoring and berthing for mainly inboard engine vessels. The fishing harbours have shore based facilities required by the fishing industry. Of the 12 main fishing harbours 10 were damaged during the Tsunami. These are looked after by big donors, USAID, Chinese -, Japanese - and Korean Governments and ADB. The Fishing Harbours are managed and maintained by the Ceylon Fishery Harbours Corporation. In Appendix A the fishing harbours are shown on a map of Sri Lanka.

Anchorage is generally a lagoon, estuary or other naturally sheltered water body along the coast, traditionally used by fishers as safe haven, at least seasonal shelter against oceanic forces, with minimal or no shore based support facilities. There are about 35 to 38 sites identified as anchorages along the coast of Sri Lanka, see map in Appendix B. Anchorages are usually at important fish landing centers where a substantial amount of motorized fishing vessels are operating but harbours have not been constructed but less capital intensive infrastructure facilities have been developed to support the fishing activities. The range of services in these anchorages are considerably less than those provided in the harbours and vary from place to place considering the requirements at each place. Some anchorages have been developed by the CFHC but are not directly managed by it. CFHC has identified 38 anchorages for development at locations where motorized boats are currently operating, see list in Appendix C.

Fish landing centres or village landings are usually beach or lagoon landings. There are around 700 of them. The landing centres provide no shelter against oceanic forces and usually they have no or very small shore facilities. The primary objective in formulating a Master plan for development of fish landing centres is to provide basic facilities and services that small scale fishermen will require to continue their livelihood, particularly in the context of the government's policy to encourage the fishers to move their residence from the buffer zone

2.2 Fishing Craft

The type of fishing craft used in Sri Lanka is as follows:

Multi day boats (MDB), ranging from 34' to 50' in length, made of FRP (Fibreglass Reinforced Plastic), powered by inboard engines ranging from 40 to 220 Hp, manned by 4 to 5 active fishermen and having crew accommodation, equipped with built-in insulated fish holds, navigation and communication equipment for offshore fishing, facilities to carry quantities of water and fuel allowing fishing trips of 7 to 20 days. Typical yearly catch is about 40 to 60 tonnes.

One day boats (ODB), in-boat engine, 3½ gross ton, usually 28' long, made from FRP, powered by 30 Hp inboard engines, manned by 3 to 4 active fishermen, normally single day fishing activities. Typical catch is about 20 to 25 tonnes of fish per year.

Fibreglass reinforced plastic boats (FRP) with speed boat design, ranging from 17' to 23' in length, powered by out-board engine 8 to 30 Hp, 2 to 3 active fishermen. Typical catch is about 10 to 15 tonnes of fish per year

Traditional craft with out board engine (OBTr). There are several types canoes or log rafts see next paragraph. They are powered by 8 to 15 Hp engines and are generally manned 2 to 8 active fishermen. Typical catch is about 8 to 10 tonnes of fish per year.

Non-motorized traditional craft (NMTr). There are two types:

- Outrigger canoes called "*oru*" and canoe without outrigger called "*vallam*". These used to be made from logs but now from fibre glass. They vary in length from 9' to 33'.
- Log rafts, originally logs tied together to form a platform for fishing but now many log rafts are made of FRP, called "*teppan*", ranging from 10' to 15' in length, propelled with oars.

  The NMTr operate within 2 to 3 km from the coast. Typical catch is about 4 to 6 tonnes of fish per year.

Beach seine, madel paru – Flat-bottomed boats, ranging from 30' to 36', propelled by oars and used exclusively in the beach seine fishery, used to be planked craft now also made of FRP, 2 people on board and about 60 to 80 persons are needed to pull the net ashore. Beach seine fishing, madel, is seasonal, usually 3 to 6 months of the year. By law coastal stretches allocated for beach seine fishing are almost exclusively for that kind of fishing. Typical catch is about 40 tonnes per year.

2.3 Coastal Provinces, Districts and DS Divisions in Sri Lanka

The coastal areas of Sri Lanka are divided into 5 Coastal Provinces, which again are divided into 14 Administrative Coastal Districts. Usually the Fishery Districts bear the same name as the administrative districts but not always, table 2. In the Fishery Districts the responsibility of the anchorages and fishing centres lies with the Coastal Divisional Secretariat Divisions (DS Divisions).

Fisheries Inspectors, FI, are the lowest level of field officers of the Department of Fisheries. They have been assigned smaller geographical areas within a district in which they carry out a host of activities ranging from extension, facilitating fishermen's' welfare, delivery state services such as subsidies/grants etc, collection of fishery statistics, enforcing the fisheries laws and regulations and assisting the functioning of fisher organizations.

Table 2 Coastal Provinces, Administrative Districts and Fishery Districts

Province	Administrative District	Fishery District
Northern Province	Mannar	Mannar
	Kilinochchi	Kilinochchi
	Jaffna	Jaffna
	Mulllaittivu	Mulllaittivu
Eastern Province	Trincomalee	Trincomalee
	Batticaloa	Batticaloa
	Ampara	Kalmunai
Southern Province	Galle	Galle
	Matara	Matara
	Hambantota	Tangalle
Western Province	Kalutara	Kalutara
	Colombo	Colombo
	Gampaha	Negombo
North-West Province	Puttalam	Puttalam Chilaw

There is more than one list of lancing centres in Sri Lanka. The government gazetted a list of landing centres in February 2004 according to the Fisheries and Aquatic Resources Act, No. 2 of 1996.

Another list maintained by the statistical division of the MFAR, which also has information on the number of different type of boats on every landing centre. These two lists are not completely identical.

For the purpose of the Master plan it was decided to use the list maintained by the statistical division of the MFAR as it includes the necessary information on number of boats.

3 Prioritising fish landing centres and anchorages for development

There are approximately 700 fish landing centres and about 35 to 38 anchorages along the coastline of Sri Lanka. It is not possible to develop all of them. Therefore it is necessary to build up a system that can help in prioritising sites for development. Five different criteria or factors have been identified for this purpose and given weight, Table 3. First are the socio-economic criteria or factor, the Tsunami affected and conflict affected areas. The weight given to the socio-economic criteria is 25%.

The economic criteria have been divided in two parts. Firstly they depend on the fishing activity at the site, number of different type of boats, number of fishermen and amount of fish landed. These criteria have been given the weight of 30%. Secondly are the economic criteria associated with development, markets, period of activity and if the society has lost some facilities in the Tsunami. The weight given to these criteria is 20%.

The identified technical criteria are related to erosion, coastal protection and land availability. These have been given the weight of 15%. Then there are organisational criteria related to the strength of the organisations in the society, their ability to manage and maintain the facilities sustainable. This has been given the weight of 10%.

Table 3 Prioritising scheme for landing centres and anchorages

25%	**1. Socio-economic criteria**
	a. Tsunami affected
	b. Conflict affectede
30%	**2. Economic criteria**
	a. Number of boats
	b. Number of fishermen, fisheries population
	c. Amount of fish landed, volume of catch
20%	d. Non-availability of facilities hamper development at the site
	e. Access to markets, access roads, vendors to purchase the fish
	f. Period of activity, more than 7 months
	g. Facilities damaged in Tsunami
15%	**3. Technical criteria**
	a. Coastal erosion, costal protection i. The available land may be at risk of being eroded ii. The available land is reclaimed with beach nourishment iii. Rubble mound revetment, may hinder access to beach
	b. Land availability
10%	**4. Organisational criteria**
	a. The organisations can be Fisheries cooperative society, Local body, like provincial council, NGO or CBO
	b. The capacity of the organisations to manage and maintain facilities sustainably

After identifying the different criteria that will influence the prioritising each site are given points according to its nature. To help this process guidelines have been set up. The socio-economic criteria for the Tsunami affected areas depend on how severely damaged the area is, table 4. Are the damages mainly on the land and infrastructure or are the dwellings of the fishermen also affected? For the conflict affected areas the socio-economic factors depend on how the conflict has affected the area, if it is economically backward or if the fishermen live in displaced villages.

Table 4 Socio-economic criteria

Tsunami affected	Points
Minor damage, only on infrastructure	5 – 10
Heavily damage, infrastructure and dwellings	15 - 25
Conflict affected	**Points**
Less affected, economically backward	5 – 10
Heavily affected, displaced people	15 - 25

The system for valuing the economic criteria related to the fishing activity at the site is based on general assumptions on the number of fishermen onboard the different type of boats and the yearly catch of each boat type. This makes it possible to value the fishing activity based entirely on the number of different types of boats. This data is more accurate and more accessible than data on the number of fishermen and the amount of catch. Table 5 shows the number of fishermen onboard the different type of boats and the yearly catch. This information is used to define so-called BFC-units, Boat-Fishermen-Catch units.

Table 5 Weight of different kind of boats to build up BFC-units

Type of boat	Number of fishermen	Catch (t/year)	BFC-units
ODB	3 – 4	20 – 25	5
FRP	2 – 3	10 – 15	3
OBTr	2 – 8	8 – 10	2
NMTr	1 – 2	4 – 6	1
Madel	15 – 20	40	10

The economic criteria related to fishing activity are then based on the number of BFC-units calculated for each landing centre according to Table 6.

Table 6 Economic criteria related to BFC-units

BFC-units	Points
0-50	5
50 – 100	10
100 – 150	15
150 – 200	20
200 – 250	25
> 250	30

To value the economic criteria related to development the following scheme has been setup, Table 7. Five points are given for every factor that is true.

Table 7 Economic criteria related to development

Factors	Points
Non-availability of facilities hamper development at the site	5
Access to markets, access roads, vendors to purchase the fish	5
Period of activity, more than 7 months	5
Facilities damaged in Tsunami	5

The technical criteria are valued on basis of two factors, one associated with coastal erosion and the other with land availability, Table 8. In case of coastal erosion the available land may be at risk of being eroded or available land is reclaimed with beach nourishment. In case of coastal protection has been constructed, the access to the beach may be hindered. If this is **not** the case the site gets 5 points. Secondly there is the question of land availability, which is valued higher or 10 points. In practise the land availability has been valued 10 points if there is governmental land available, 5 points is there is private land available, otherwise no points. One could ask if no land available should be valued with negative points which would give the result that the site was not suitable for development. But that is not done in the present study. It is not regarded possible to rule out development at a specific site although there at first sight is no land available for development. For one thing there are uncertainties about the implementation of the buffer zone and secondly there is always the possibility to develop some area that is used for dwellings.

Table 8 Technical criteria

Factors	Points
Coastal erosion, coastal protection, if following criteria are not valid:	5
The available land may be at risk of being eroded	
The available land is reclaimed with beach nourishment	
Rubble mound revetment, may hinder access to beach	
Land availability	
Governmental land	10
Private land	5
No land	0

The organisations managing the fisheries facilities can be a Fisheries cooperative society, a Local body like municipal council, urban council, provisional council or *pradeshiya sabha* or they can be an NGO or community based organisation (CBA). The criteria related to the capacity of the organisations in the society, their ability to manage and maintain the facilities sustainably is valued according to Table 9.

Table 9 Organisational criteria

Functioning of organisation	Points
None	0
Not functioning, weak	5
Functioning well, strong	10

After setting up the prioritising scheme all visited landing centres and anchorages were given points according to the guidelines. The table in Appendix E lists all visited landing centres and anchorages with number of different type of boats, the calculated BFC-units as well as the prioritising scheme.

4. Shore facilities

It was decided that the Master plan should only include common facilities not private facilities as privately owned and operated facilities like the fish handling/selling centres, called “wadi”.

4.1 Modular structures and facilities for anchorages and landing centres

Fishermen’s facility building

The fishermen’s facility building is composed of several modules, like net mending module, engine and gear store modules, rest room module and office module. The building can be single storey ore two storeys depending on the availability of land.

Net mending modules

The net mending shed is an open structure with 3’ high wall all around. This facility can also be used as a community hall. Four net mending modules are proposed:

NM1	20’ * 30’
NM2	20’ * 40’
NM3	20’ * 50’
NM4	20’ * 60’

Engine store module

The proposed engine store module is 8’ long and 20’ wide module with horizontal steel bars along both sides. The engines will be clamped on this steel bar. In each module 20 engines can be stored, 10 engines at each side.

ES1	20’ * 8’

Gear store module

Two types of gear store modules are proposed, one with concrete boxes and the other with open space. The box type module is proposed as 10’ long and 20’ wide with boxes two in height along each side. The proposed boxes are 3’ wide, 3’ high and 3’ in depth. Open space modules are also proposed, 10’ to 20’ long.

GS1	20’ * 10’ w/boxes
GS2	20’ * 10’ open space
GS2	20’ * 20’ open space

Office module

Office modules provide space for the fishermen’s cooperative society, welfare office, fishermen’s bank, some times FI office or for other agencies. Two module lengths are proposed:

OM1	20’ * 14’
OM2	20’ * 20’

Rest room modules

Two rest room modules are proposed:

RR1	20’ * 20’
RR2	20’ * 30’

Fishermen’s facility building

The doors on the closed modules will be on the long side of the building which means that more modules, e.g. engine or gear stores, can be added if needed.

The pavement around the building will extend the width of the building 3 to 5’ at all sides.

The two storey building has an outward stair case, 5’ wide, and a balcony along one side for access into the different rooms on the first floor. Usually the ground floor will be an open net mending hall and the first floor will be closed rooms with windows used for other purposes. Access to the closed rooms on first floor will be from the balcony along the long side of the building.

Provisional cost estimate for single storey building is 1300 Rp/ft^2.

Provisional cost estimate for two storey building is 1400 Rp/ft^2.

Auction shed

Open structure with roof, easy to clean with drainage connected to a soakage pit appropriate to the auction area. Possibilities to store cool boxes in one end of the shed. Floor should be smooth and easy to wash, either tiles or hardened cement rendering. Provisional cost estimate is 1000 Rp/ft^2. Three types are defined:

AS1	small	12’ * 18’	220,000 Rp
AS2	medium	20’ * 30’	600,000 Rp
AS3	large	20’ * 40’	800,000 Rp

Sanitary facilities

Sanitary facilities include toilets, urinals, wash basins and showers. The sanitary facilities should be placed as far from the auction shed as possible. Two types are defined with provisional cost estimate:

SF1	small	2 toilets, 2 urinals, 2 wash basins, shower	400,000 Rp
SF2	large	6 toilets, 4 urinals, 4 wash basins, showers	

Water supply

Three taps, for auction shed, drinking and sanitary facilities. Provisional cost estimate:

WS	3 taps	50,000 Rp

Electricity

Provisional cost estimate for:

Two storeys building	75,000 Rp
Single storey building	60,000 Rp
Action shed	60,000 Rp
Street lamp, 1 post	75,000 Rp

Access road

Proper access road to transport the catch to the market is one of the most important factors for development of the landing centres and anchorages. Maintaining the access road must be done by local authorities.

Concrete surface

Beacon lamps

Often the beacon lamps are not in working order at the landing sites. It is essential to have a certain procedure to maintain the beacon lamps and replace light bulbs when needed.

Waste disposal

Bins should be provided for disposal of solid waste and arrangement should be made with local authorities for maintenance.

4.2 Allocation of shore facilities to landing centres and anchorages

The next task is to allocated shore facilities to the landing centres and anchorages. This is done on basis of the activity at the site and for that purpose we use the already introduced BFC-units. Few landing centres differ from the others due to the type of activities needed and location. These are mainly beach seine centres, long line places and places used for drying fish. These landing centres are considered as exceptional cases and attend to their necessities independently, see later this chapter.

No shore facilities are allocated to fish landing centres where there is very low activity. A preliminary threshold value of 30 BFC-units have been chosen.

Following shore facilities are allocated to each landing centre:

- ✓ Net Mending Modules
- ✓ Engine Store Modules
- ✓ Gear Store Modules
- ✓ Office Modules
- ✓ Auction Shed Modules
- ✓ Rest Room Modules
- ✓ Sanitary Facilities

Net Mending Modules

Providing net mending facilities is very useful to the fishermen. But it is not practicable to provide this facility to adequate to all. The aim of this is proved minimum facilities to share with others.

Following method is adopted to assign Net Mending Modules:

BFC 30 to 100	NM1
BFC 100 to 150	NM1
BFC 150 to 250	NM2
BFC 250 to 450	NM3
BFC above 450	NM3

Fish landing centres with BFC units between 30 and 100 will only be assigned NM1 module and sanitary facilities.

Engine Store Module

The assigning Engine Store facility provides room for at least 50% of the engine in each landing place. It is assumed that at one occasion around 50% of engines being using or keeps at home or other places.

Following method is adopted to assign Engine Store Module:

Number of FRP	Engine Store Module
30-40	1ES1
40-80	2ES1
80-120	3ES1
120-160	4ES1
160-200	5ES1
200-240	6ES1

Auction Shed Module

Following method is adopted to assign Auction Shed Modules for the landing sites.

The places which are less than 100 BFC-units have not been accommodated auction facility.

BFC units	Auction Shed Module
100-300	AS1
300-600	AS2
600-800	AS3
800-1000	3AS2

Gear Store Module

Following method is adopted to assign Auction Shed Module for landing site

BFC units	Gear Store Module
Less than 100	GS1
100-200	2GS1
200-400	3GS1
400-650	4GS1
Above 650	5GS1

Sanitary facilities

All landing site has been assigned the sanitary facilities in two categories. The places with less than 300 BFC-units have been assigned SF1 Modules. The places with more than 300 BFC-units have been assigned SF2 Modules.

Allocation of shore facilities

On basis of these guidelines shore facilities have been allocated to the visited landing centres and anchorages, Appendix F.

In the process of defining the modular structures and building up the guidelines for allocation of shore facilities to fish landing centres and anchorages the following sites were taken as examples:

- Baddawatta(Palana South), fish landing centre
  - Fishermen's facility building:
    - Net mending module 30'
    - Office module 14'
    - 2 engine store modules 16'
    - 2 gear store modules 20'
    - Single storey building, total length 80'
  - Auction shed 12' * 18'
  - Sanitary facilities
  - Water supply
  - Electricity
- Kottegoda, anchorage
  - Fishermen's facility building:
    - Net mending module 50'
    - Office module 14'
    - 2 engine store modules 16'
    - 2 gear store modules 20'
    - Two storey building, total length 50'
  - Auction shed 20' * 30'
  - Sanitary facilities
  - Water supply
  - Electricity

- Welipatanwila, anchorage and beach seine place
  - Fishermen's facility building:
    - Net mending module 30'
    - Rest room module 20'
    - Office module 14'
    - Gear store module, open space 20'
    - Partly two storey partly single storey building
  - Auction shed 12' * 18'
  - Sanitary facilities
  - Water supply
  - Electricity

4.3 Design against Natural Disasters

The proposed shore facilities are located in coastal zone close to the sea. As such there is a higher probability that they will be exposed to natural disasters, such as cyclones, flooding and Tsunami, than structures further from the sea. As other structures the shore facilities have to withstand earthquakes too. This has to be considered in the designing of these structures.

Guidelines on Construction of structures

After the Tsunami an intra ministry committee was setup to revise building standards in the coastal zone and make recommendation on infrastructure improvements. The members of the committee are experts in the civil engineering field. Guidelines introduced by the committee set up additional safety measure for building to prevent them from being pushed sideways and lifted off upward.

CFHC has also adopted some what similar preventative measure when put up buildings in fishery harbours.

Deviation to the guideline

In designing building in landing site, slight deviation to the Guidelines on Construction of structures has to be done due to restrictions of land and keep on the fisheries activities smooth. This deviation mainly occurred on direction in locating the building, and the raising of foundation level up to 3 meters. If floor level of building lift up to 3m from MSL would difficult on fish handling and processing work in the landing site. Locating the buildings as shorter face of the building facing to the wind direction is not realistic due to limitation of lands.

Except the above mention deviation, other structural and material requirements to the buildings can easily adopt.

Design Consideration of Shore facilities

Designing of the buildings for Baddewatta, Kottegoda, Welipatanwila landing centres was completed in accordance with the Guidelines on Construction of structures, Appendix K. The guidelines were followed as much as possible. The following safety measures were adopted:

- ✓ Concrete structure 25 grade concrete
- ✓ Foundation is more than 3' deep
- ✓ Footing for columns minimum 2½' * 2½'
- ✓ Column grid around 10' to 15'

- ✓ Plinth beams to tie the columns at floor level
- ✓ Plinth beams support the masonry works
- ✓ Lintel beams to tie the columns upper levels
- ✓ No simply support beams
- ✓ Ground floor with openings

Design of shore facilities for Baddewatha, Kottegoda and Welipatanwila

Design of fishermen's facility buildings and auction sheds has been prepared for the fish landing centre at Baddewatha and the anchorages at Kottegoda and Welipatanwila, Appendix _. The latter anchorage is also a beach seine place.

4.4 Preparation for developing a specific site

In the present master plan modular structures have been assigned to fish landing centres and anchorages. To date this has mainly been done for the sites that have been visited during the preparation of the master plan. During the visits it was emphasised to talk to representatives from the fishermen co-operative societies and discuss and evaluate their needs. Detailed discussions on what would be proposed for the landing centres were not opened. When a landing centre has been chosen for development it is therefore very important make the final proposal for infrastructure in close cooperation with the local communities as well as local authorities.

After re-evaluating the need for shore facilities they should be arranged according to the available land and a layout plan of the building prepared.

After the select the landing site to be developed following steps has to be taken to prior to attend the work.

Land survey

Land survey should be carried out to point out the margins of the land, the existing features such as building in the land plot and the shore line.

Consult with local bodies

Before go for design it is advisable to consult local bodies to their restriction

Design of structure

This is mainly arranging the assigned facilities according to the land availability. It is advisable to keep Net mending Module, gear store module in ground floor of the facility building.

Lay out plan

It should be indicate in the layout plan of the proposed buildings. It is important to mark the distance from the shore line to the proposed buildings.

Architectural design and Structural design

It is also needed to have Architectural drawing and Structural drawing of the proposed buildings and certified by Engineer or Architect according to the condition of the local bodies.

Bill of quantities

Bill of Quantities is not requested by any agencies but it will be useful to the party who is funding for the facilities.

Application to CCD

It is necessary to obtain a permit issued by the Director of Coast Conservation for implemented proposed facilities.

Documents required with an application for CCD

1. Three coppices of Survey plans of proposed site
2. Three copies of building plans including floor area
3. Proof of payment for the specified payment fee

5 Development of anchorages

Anchorages were defined in chapter 2 as water bodies naturally sheltered used by fishers as safe haven either seasonal or for the whole year. The number of anchorages or fish landing centres that can be developed as anchorages varies from list to list but generally between 35 and 38. Some anchorages are attached to or serve only one fish landing centre and can be found in the list of fish landing centres from the MFAR used in the previous chapters. Other anchorages are attached to or serve more than one fish landing centre and go under different name than the fish landing centres.

Development of anchorages can both mean building up shore facilities as well as marine facilities where marine facilities can both be breakwaters providing additional shelter and piers for the boats to be moored at and to land their catch.

This master plan mainly focuses on development of shore facilities and in that sense the anchorages are in fact fish landing centres. As such they are included in the list of fish landing centres both when it comes to prioritising and allocation of facilities.

Appendix H contains a list of anchorages proposed by CFHC with the need for development including information if they are Tsunami or conflict affected or not and the status of land availability.

In two cases the construction of breakwaters has started. In Thoduwawa CFHC has started construction of breakwaters to stabilise a river or lagoon mouth and prevent siltation. And in Nilwella construction of breakwaters has started to make a harbour basin. In both cases the available funds are not necessary to complete the work. In both cases it is necessary to check if the structures have been approved by CCD.

In Serakkuliya there are plans to build a jetty. In Batticaloa there are plans to build a quay wall and in Kapparathota there is a need for dredging after considerable sedimentation due to the Tsunami.

ADB has provided 584 million Rp for development of anchorages in the CRMP area that is the Fishery Districts: Puttalam, Gampaha, Colombo, Kalutara, Galle, Matara, Hambantota.

6 Fisheries resources and fishing fleet

It this chapter fishery statistics and information is examined to evaluate the level of exploitation of the fishery resources and trends in the development of the fishing fleet. The chapter is based on reports and data provided by the Statistics Unit of the MFAR. These are "Fishery Statistics 2004", "Monthly Fisheries Statistics, December 2005" and an Excel file called "Forecast 2000 to 2010". These reports and files include more information on the Sri Lankan fisheries than is interpreted in this report. They are therefore provided as a soft copy on attached CD disk also containing the pictures taken during the mission.

6.1 The trend in catch by fisheries districts

Table 8 in Fisheries Statistics 2004, Appendix G, shows the development in the fish catch by fisheries districts over the period from 1983 to 2004. The total catch has varied from 184,000 tonnes in 1983 to about 250,000 tonnes in 2004, with a drop down to 145,000 tonnes in 1990 and a peak up to 275,000 in 2002.

The catch in the Western fisheries districts north of Colombo, Puttalam, Chilaw, Colombo and Negombo has increased considerably from 1983 to 2000 from 48,000 tonnes to 93,000 tonnes or nearly doubled. Since then the catch has decreased to the same level as it was in 1990 or 55,000 tonnes.

The trend in the South and South-western districts, Kalutara, Galle, Matara and Tangalle, has been characterised by more increase. From 1983 to 2000 the catch four-doubled from 32,500 to 130,000 tonnes. From 2000 to 2004 it has decreased to about 90,000 tonnes.

In the Eastern Province there has not been as much increase in the fisheries as in the west and south. In 1983 the total catch is nearly 30,000 tonnes, then drops to less than 25,000 in 1990 and 1995 but has increased since to about 55,000 tonnes.

In contrast to other part of Sri Lanka the Northern Province has experienced a downward trend in the total catch since 1983 when it was 75,000 tonnes to about 55,000 tonnes in 2004, with a drop to 25,000 tonne in 1990. This is mainly due to the ethnic conflict in the area.

But the increase in the fish catch since 1980 has been not so much in the coastal fishery but much more in the offshore fishery. Table called "Table 1: Estimated Fish production by Fishing sectors", Appendix G, from the statistics unit of the MFAR shows that the coastal fishery has bee rather constant in that period with fluctuations between 140,000 to 180,000 tonnes. It reached a peak in 1983 184,000 tonnes. After that it suffered a drop down to 140,000 tonnes mainly due to the conflict in the north and east. Since there has been a slow recovery but still the coastal fishery has not reached the 1983 volume.

The offshore fishery on the other hand has increased from nearly 0 tonnes in the early eighties to 100,000 in recent years. The offshore fishery has not been affected by the ethnic conflict because it is mainly concentrated in the western and southern districts.

6.2 The trend in type and number of boats

Table 27 in Fisheries Statistics 2004, Appendix G, shows the development in the number of operating fishing boats by types over the years from 1990 to 2004. The multi day boats have decreased in number from 1990 when they were 2,364, but have been rather stable from 1995, ranging from 1,420 to 1,640. One day boats have increased in number from 2001, from about 1,000 to about 1,500, but earlier to that they were 1,357 in 1995. There has been continuous growth FRP boats have since 1995 from 8,564 to 11,559, an increase of 35%. Number of traditional out board engine boats has on the other hand decreased from 1,274 in 1994 when their number was highest to 674 in 2004, a decrease of nearly 50%. The number of non motorized traditional boats has been very stable between 14,580 and 15,600. The total number of boats was rather stable from 1990 to 2001 but has since then increased by 12.5%.

The capacity of the fishing fleet is calculated on basis of the typical catch volume given in chapter on fishing craft. In the period from 1995 to 2001 the capacity was rather stable or about 300,000 tonnes per year. In 2003 the capacity increased to about 330,000 tonnes and in 2004 to 340,000 tonnes, and increase of 13%. But the capacity of the boats that are doing coastal fishing, that is all boats except MDB, has increased mort. Their capacity has been increasing from 200,000 tonnes in 1990 to about 260,000 tonnes in 2004 or about 30% increase.

6.3 Conclusions

The master plan is concerned with the development of anchorages and fish landing centres that serve the coastal fishery that in general has been rather stable in catch over the last 25 years. On the other hand the capacity of the coastal fishing fleet has increased by 30% over the last 15 years. The master plan will therefore concentrate on increasing the standard of the fish landing centres with regard to hygiene, quality of the fish, including the reduction of the post harvest losses, and living standard of the fishermen.

In the conflict affected areas fishery assets and infrastructure have been severely damaged. In the prioritising scheme the conflict affected areas in the north and east are given similar status as the Tsunami affected areas. Still implementation of the master plan in those areas could be slow and taking into consideration socio-political factors and development.

Although the Tsunami and conflict affected areas should get a high priority it should not be overlooked that the anchorages and FLCs in the Fishery Districts of Negombo and Puttalam have many boats and are very congested but usually have no shore facilities. Providing shore facilities in these districts is also needed.

7 Management of facilities

It is important to identify bodies to manage the provided facilities in a sustainable manner and manage revenue from the facilities for maintenance and repair.

- Anchorages and larger landing centres should be taken over by CFHC or provincial councils
- Medium size landing centres should be run by local authorities
- Small size landing centres should be run by the cooperative societies or community based organisation

The overall technical leadership or guidelines will have to come from CFHC

8. Further studies and investigations

No further studies or investigations are needed to implement the master plan of shore facilities. On the other hand development of anchorages with marine structures needs bathymetric information as well as information on environmental conditions as waves, winds and water levels as well as morphological processes.

For basic planning of anchorages both bathymetric information and simple wave refraction analysis is needed. The wave information, wave height, period and direction, is needed to estimate the need for sheltering structures as well as the design load of the sheltering structures.

8.1 Bathymetric survey

Nautical maps are only available for very few areas along the coastline of Sri Lanka.

Bathymetric survey is mainly undertaken by the National Hydrographic Office (NHO), a part of NARA, but LHI and CFHC have also been doing survey. NHO has two units to undertake near shore measurements. These include a small boat, single beam echo sounder (Atlas, Bathy 1500), GPS positioning system where RTK is available, datalogger and software for processing and storing of measurements (HYPACK). CFHC has a small boat and a single beam echo sounder. Positioning is done with 3 theodolid's and the analysis and plotting is manual. A survey for an anchorage with CFHC will usually cover a 200 to 500 m long area along the coast and about 500 to 1000 m cross shore down to a water depth of 10 to 20 m.

In the Tsunami NHO lost their large hydrographic survey vessel Sayuri with all equipment onboard including both multi-beam and single-beam echo sounders. This boat was mainly used for nautical mapping in water depths up to -7 m.

It is proposed that FAO or other donor organisation will provide funds to perform hydrograpich survey for the anchorages where this information is lacking. Providing this information will help developing these anchorages. The survey should include an area of 2 to 5 km along the coast and about 2 to 3 km cross shore or out to about 30 to 50 m water depth. Where the water depth is more than about 10 m the mapping should be done with a line spacing of 50 to 100 m, but with tighter survey lines in more shallow areas. The reason to survey down to water depth of 30 to 50 m is to enable wave refraction analysis up to the anchorages or landing centres of interest on the coast.

NHO is working according to a charting program but they are flexible when it comes to consultancy work like this. A rough cost estimate for a hydrographic survey for each site is about 1.0 million Sri Lankan Rupee (LKR) or 10,000 US$. The survey should be delivered as a harbour/anchorage map or small nautical map on paper size of A4 or A3 and in a scale of 1:2,000 to 1:5,000. Using the paper size of A4 or A3 makes it easy to copy the maps and distribute. This will enable the discussion and exchange of knowledge between the local fishermen and the engineers working on plans for improvement.

LHI is also capable of undertaking the bathymetric survey and their cost estimate is roughly the same as NHO.

It should be noted that hydrographic survey in near shore areas need calm wave conditions and the monsoon periods are therefore out for each area.

A list of anchorages and landing centres where bathymetric survey is needed can be found in Appendix

8.2 Offshore wave information

Coastal processes and offshore wave conditions are well known for the south and southwest coast. the coastline from Hambantota to Chilaw. Offshore wave data is lacking for other parts of the coastline. This data is very important for the planning of anchorages and design of sheltering marine structures.

There are two main monsoon periods that govern the wave climate in Sri Lanka. The SW-monsoon is active on the SW coast from May/June to September/October. The NE- monsoon is active on the N and E coast from November/December to January/February.

It is proposed that FAO or other donor organisation will provide funds to establish offshore wave conditions for other parts of the coastline. As there are no or very limited existing wave measurement for the other parts of the coastline this study needs to be based on all available data as the Global Wave Statistics from the British Maritime Technology, wave hind cast and projects like the Oleville Harbour Project. The main national institution in this field is Lanka Hydraulic Institute (LHI). Their cost estimate for this study is 1 million LKR or 10,000 US$.

8.3 Feasibility study for marine structures at anchorages

In many of the anchorages there exist plans for development including sheltering marine structures or structures to prevent closing of river mouths or lagoons. In other anchorages these plans do not exist. An anchorage where the boats can be safely moored either the whole year or part of the year is important for the fishery communities. It is as well valuable to increase the opening time of river mouths or lagoons to enable fishing activity for a longer period of the year.

It is proposed that initial engineering studies are undertaken at several fish landing centres mainly based on bathymetric survey. After that one or two locations are chosen for further site investigations, like sediment sampling, current measurements, water level measurements, wind measurements, near-shore wave modelling, sediment transport modelling and planning and design of sheltering structures. An initial cost estimate from LHI comprising of initial engineering study of 5 sites and detailed study for one site is about 7 million LKR or 70,000 US$.

Three districts or areas have been identified where feasibility study for marine structures are needed, Kalmunai/Batticaloa, Mannar and in Back Bay in Trincomalee Town

It is proposed that FAO or other donor organisation will provide funds for a feasibility study at some anchorages for marine structures to shelter or to stabilise river mouths or openings of lagoons.

The main national institution in this field is LHI and they are equipped to undertake all investigations. The following universities have been doing coastal engineering consultancy. University of Moratuwa, University of Peradeniya and University of Ruhuna.

9 Observations of visited anchorages and fish landing centres

Kalutara district

Site visit to fishing ports, anchorages and fish landing centres in the district of Kalutara with Mr. Mahinda De Silva, Fisheries Inspector for Fisheries Office, Kalutara. Mr Da Siva classified 3 landing centres as large, Wadduwa, Kudawa / Maggona, Maradana as well as the Beruwala Fishery harbour.

Panadura fishing harbour lies in a river mouth and there are siltation problems. Breakwater protecting the southern side of the river mouth suffered damages on its inner site during the Tsunami. Rehabilitation work has been carried out by Chinese support.

Katukurunda North fish landing centre lies on a beach in lea of shore parallel breakwaters. The breakwaters were built ca. 2002 to prevent erosion. After the Tsunami sand has been pumped ashore by a Dutch dredger funded by ADB in a Coastal Resource Management Project.
Craft: *Traditional boats 60*, operated during fishing season November to April, *Beach seine* 2
Land: Availability of land is very limited, it is not recommended to build on reclaimed land and all other land is privately owned. The landing site lies adjacent to a hotel resort and according to Da Silva it has promised to give some land for the facilities needed.
Facilities needed: Facilities needed are auction hall and net mending shed in one two storey building, toilets and water supply and electricity.

Kudawa, Maggona fish landing centre is located in a small pocket beach close to the southern headland. The land of the landing centre is owned by the church and all facilities are operated by the church. There is a community hall at the site and engine and gear stores are under construction.
Craft: FRP 50, operated all over the year. Traditional boats 20, operated during fishing season November to April. Beach seine 2.
Land: There is available land which belongs to the church.
Facilities needed: Facilities needed are auction hall and net mending shed in one building.

Kalametiya, anchorage was proposed as a fishing port but abandoned as the construction cost was to high compared to the benefits from the harbour.

Mahawella landing centre, beach seine centre

Weligama landing centre, beach seine centre

Dodanduwa. The Dodanduwa fish landing centre is located on a narrow beach in the lea of a large rock formation that lies about 150 m from the beach. In the lea of the rock formation is an estuary of a small lagoon leading to the Dodanduwa anchorage. The estuary is closed during dry period and the south west monsoon period. The CFHC started to construct a curved breakwater to protect the anchorage in 2001. From the shore the breakwater was to have a direction towards the rock formation without connection to it, leaving space for navigation between the rock and the breakwater into the lagoon. After an accident where a boat perished this plan was abandoned and a new plan was made by the Engineering Design Centre of University of Peradeniya. The plan changed the curved breakwater into an offshore breakwater approximately parallel to the coast and connecting one end to the rock formation. Part of the curved breakwater was used as an access road towards the rock and construction of the offshore breakwater started in 2002. During construction the breakwater experienced high waves and construction was stopped. Early 2005 CCD made plans for and an 80 m long offshore breakwater from a headland about 250 to the west of Dodanduwa landing site. The breakwater was under construction during the site visit in September 2005. The reported purpose of the breakwater was both to stop erosion at the site as well as to create a beach for fishing boats to land on.

Mannar district

November 24 and 25

The **Pallaimunai** landing centre is close to the fish market of Mannar town on the south side of the bridge over to Mannar Island. It lacks all facilities except for auctioning and selling the fish although this would gain very much especially in hygiene if modernised. Adjacent to the landing centre is a low-lying land, partly flooded at the time of visit due to high water levels as a result of heavy raining for some days. This land that was reported to be governmentally owned could be utilised for development by filling under fisherman facility building. The landing centre is in rather shallow water and the main problem of the landing centre is that during low tide the centre is closed by a sand band bar. According to the AD of Fisheries in Mannar the sand bar closes the landing centre from June to September. The local fishermen also requested to create an anchorage facility including a pier to be able to land fish from larger boats.

The development of the Pallaimunai landing centre should include dredging of a navigational channel through the sand bar. To avoid silting up of the navigational channel it is necessary to reinforce the banks, probably the most economical solution would be to use a timber sheet, using the easily available "palmera" tree. It should be possible to dredge the channel with land based equipment during the period of June to September when the sand bar closes the landing centre.

The landing centre is located near the bridge over to Mannar Island. It has the potential to be protected for waves and currents by breakwaters. It should not be expensive to dredge a basin and navigational channel.

In order to develop the Pallaimunai landing centre it is necessary to have a good bathymetric survey of a rather large area surrounding it. This should be used together with wave analysis to clarify the formation of the sand bar and make proposals for a navigation channel as well as sheltering breakwaters.

The **Panankaddikoddu** landing centre is on the north side of the Mannar Island about 2 to 3 km from the town. It is therefore in an area influenced by the NE-monsoon. The AD in Mannar requested for an anchorage at the site.

The site is located in rather shallow water. Although it is located on an open beach the wave climate seems to be mild because of limited fetch for the NE-monsoon. Therefore sheltering breakwaters are not expected to have much effect on adjacent beaches. After bathymetric survey and coastal engineering considerations the site could be developed as an anchorage with sheltering breakwaters.

The **Talvupadu** landing centre is on an open coast on the south side of the Mannar Island and therefore subjected to the SW-monsoon. It has sufficient water depth. According to the AD in Mannar there is a need for anchorage facilities, as well as fishermen facility building and auction shed. The catch is bout 15 t per day over the fishing season from October to April. There is an ice plant under construction funded by UNDP.

As the landing centre is on an open coast with no headland or fix points it is not recommended to shelter it with breakwaters unless it is based on comprehensive coastal engineering studies.

The **Pesalai** landing centre is located on an open beach on the north side of the Mannar Island and subjected to the NE-monsoon. In contrast to Panankaddikoddu there is sufficient fetch to build up waves and the sea is rough during the NE-monsoon. The fishing season is from October to May but other time of the year the fishermen go to the south side of Mannar Island for fishing.

The AD in Mannar requested for an anchorage. There are about 60 ODB doing trawling from the site, and the catch is expensive species like prawn and crab. The ODB lay at anchor out side the coast. There are no headlands or fix point on the coast that can be utilised for constructing safe anchorage. To develop the site as a safe anchorage will need comprehensive coastal engineering studies including bathymetric survey, wave analysis and morphological considerations.

Talimannar West is a landing centre on an open coast on the west side of the Mannar Island. The coast is rather flat and low indicating mild wave climate. It is some distance from the village and there is enough land for shore facilities.

Talimannar Pier is a fish landing centre on an open coast on the north side of the Mannar Island, close to a lighthouse and a pier that was used while there was a ferry connection to India. The site must be subjected to similar wave climate as Pesalai during the NE-monsoon.

The **Vankalai** fish landing centre is located on the main land south of Mannar Island. It is located on an eroding coast that has been protected by 3 newly built groins. It was visited after it was getting dark, which limits the information acquired at the site. According a representative of the fisherman cooperative there are plans to dredge a navigational channel into a lagoon and make an anchorage. These need to be studied with morphological considerations.

Trincomalee district

November 25 to 28

In the **FI Division of Trinco Town I**, **Wegra Nagar** and **Div No. 10**. These two centres lie side by side on an open coast. They are very congested with houses built right to the coast line and narrow access roads to the beach. Close by is the **Sinnakadai** landing centre that was said to be similar to the two visited further along the coast. In these fishing centres there is no land available for development. In Div. No. 10 there is an old building on the coast owned by the Vivenkanantha Fisheries Co-operative Society that serves as a community hall.

The fishermen of Div. No. 10 asked for structures to shelter the landing centre. They described that about 150 m outside a cemetery north of the Wegra Nagar centre there is a submerged rock and wanted a breakwater to be built out to the submerged rock and from there a shore parallel breakwater to south.

The coastline curves out towards the underwater rock could be a tombolo. If there were plans to build a full scale fishing harbour the idea of the fishermen could be used and developed through investigations. But it is important to note that a breakwater structure like the one proposed by the fishermen is very likely to cause some local erosion on the shore southward from the end of the shore parallel breakwater. The harbour layout would have to take this into account with some measures to prevent this. As the houses are built right into the coast a construction of a full scale fishing harbour should include pumping of sand on to the coast. Planning a new fishing harbour at the site would need detailed investigations including bathymetric survey, wave analysis and morphological studies.

The **Pulmoddal** fish landing centre in Kuchchavely F.I. Division is about 50 km north of Trincomalee about 3 hour drive during the rainy season. There are four divisions belonging to that landing centre, Div no II and Div no IV are the largest each with separate fisheries society.

The fishing season is from March to October with migration boats coming from other parts of the country.

The **Pulmoddel Jinnapurm div IV** is also located on an open coast north of the export pier of the ilmanide sand, some distance from the village. Temporary sheds are the only facilities. Originally the coast has been rather high but is now characterised by the ilmanide mining.

The **Pulmoddel Arsimalei div II** fish landing centre is located on an open coast, south of the ilmanide sand export pier, some distance from the village. There were temporary sheds on the coast that were washed away during the Tsunami.

The **Thona** landing centre in **Kinniya** F.I. Division is located on an open beach inside the Koddiyar Bay. The area is heavily affected by the Tsunami.

In **Muthur** F.I. Division three adjacent landing centres were visited, from east to west, **Vaddam**, **Thakwa Nagar** and **Habeed Nagar**. They are located on a 2.25 km long open coastline inside the Koddiyar Bay between two river branches. The area is heavily affected by the Tsunami and many of the fishermen are living in a refuge camp. The Fisheries Inspector in Muthur reported that during some period of time there has been an erosion of the coastline, from having a protrusion in the middle or convex to a concave form. No immediate reason for the erosion was spotted.

In **Thakwa Nagar** 33 private fish *wadi*'s are under construction, as well as a cool room that will be operated by the Fishermen cooperative Society. This infrastructure is donated by the Foundation de France. The size of the wadi's is 20'x12'.

The FI in Muthur reported that the price of ice was high in Muthur or 150 Rp per 50 kg block.

Batticaloa district

November 28

Two fish landing centres were visited in the **Valaichenai** F.I. Division, **Pethalai** and **Kalkudah**. Both are relatively small. The largest landing centre in the F.I. Division **Valaichenai 4** is to be developed as an anchorage. Reconstruction of it has been taken over by the North East Coastal Community Development Project (NECCDP). It was not visited due to lack of time.

Pethalai landing centre is located in a very narrow area between the road and the river bank. The river mouth is open all year. A small lot of land is available for development.

Kalkudah landing centre is located in a river mouth close to the beach. It is in an area heavily affected by the Tsunami. The fishermen using the landing centre were living in a village close to the centre but are now living in a refuge camp. There were no facilities before the Tsunami. Land is available for development.

November 29

Kaluwankerny in F.I. Division **Chenkalady** is an open coast landing centre partly used by ocean going FRP and NMTr, as well as beach seine. There is a newly constructed community centre (20' by 30').

Palameenmadu fish landing centre in F.I. Division **Manuunai** (N-1) has two sites, one is used by the sea going boats and the other mainly used by the lagoon fishermen.

The site used by the sea going boats, multi day boats, day boats and FRP as well as traditional craft, has been proposed to be developed as an anchorage by the CFHC. It seems to be ideal for this purpose about 3 km away from Batticaloa town, located in a small side lagoon from the main lagoon. It has a depth of about 2.5 m. As the mouth or entrance of this side lagoon has less water depth that the lagoon itself it might need some dredging. For a small dredging work like this it is proposed to check if a light weight manually operated jet-pump can be used for this purpose.

The site is near the Palammenmadu General Hospital. The land is owned by the Urban Development Authority but there are plans to move the hospital to another location. If the land can be acquired from the Urban Development Authority there is space for considerable development. There are possibilities to construct a gabion type quay wall at the site as well as all major shore facilities.

The site that is mainly used by the lagoon fishermen is located closer to the town in the main lagoon. Governmental land is available for development.

In **Manmunai** (N-2) F.I. Division two landing centres were visited, **Navalady** and **Poonochchimunai**. **Navalady** fish landing centre is heavily affected by the Tsunami and the people from the village are living in a refuge camp. It is located on an open coast on the southern side of the lagoon mouth. Land is available for development for shore facilities. **Poonochchimunai** fish landing centre is located on an open coast adjacent to a small lagoon. The lagoon opens and closes seasonally, open from August to January. It is not considered feasible to increase the opening time of the lagoon by structures or dredging. Land is available for development for shore facilities.

Eathukai Naduththurai landing centre in **Kattankudy** F.I. Division is heavily affected by the Tsunami. It is on an open coast with coast road along the coast. There were several privately owned *wadi*'s on the coastal side of the coast road, but all totally damaged. On the land side of the road was a community centre funded by NORAD, now totally damaged. Rather small lot owned by the cooperative society is available for development but more land can be purchased. Representatives from the cooperative society expressed their will to operate a cool room. As the fishermen bring their catch ashore at different times and the lorries usually come in the afternoon it adds to the quality of the fish if it can be kept in a refrigerated storage.

Table 10 provided by the Assistant Director of Fisheries in Batticaloa lists damaged Fisheries Community Halls (FCH), Idiwara Bank Buildings (IBB) and Fisheries Cooperative Society Buildings (FCSB) destroyed by the Tsunami. It can be seen that there is need for reconstruction of infrastructure in many more landing centres than the infrastructure team was able to visit.

Table 10 List of damaged infrastructure buildings in Batticaloa district

F.I. Division	Landing Centre	FCH	IBB	FCSB	Site visit
Vahari	Kathiravelly	1			
	Vaddawan	1			
	Mankerny	1			
	Panichenkerny	1			
	Vaharai Central		1		
	Ward No.5, Vaharai		1		
Valaichenai	Pasikudah	1			
Kiran	Palayadithona	1			
Chenkalady	Kaluwankerny	1			X
	Punnaikudah	1			
	Thalawai	1			
Manmunai North	Palameenmadu	1			X
	Mattikalli	1			
	Amirthakali		1		
	Navalady	1			X
	Poonachimunai	1			X
Kattankudy	Eathukkal (Jailani)	1			X
Manmunaipattu	Palamunai	1		1	

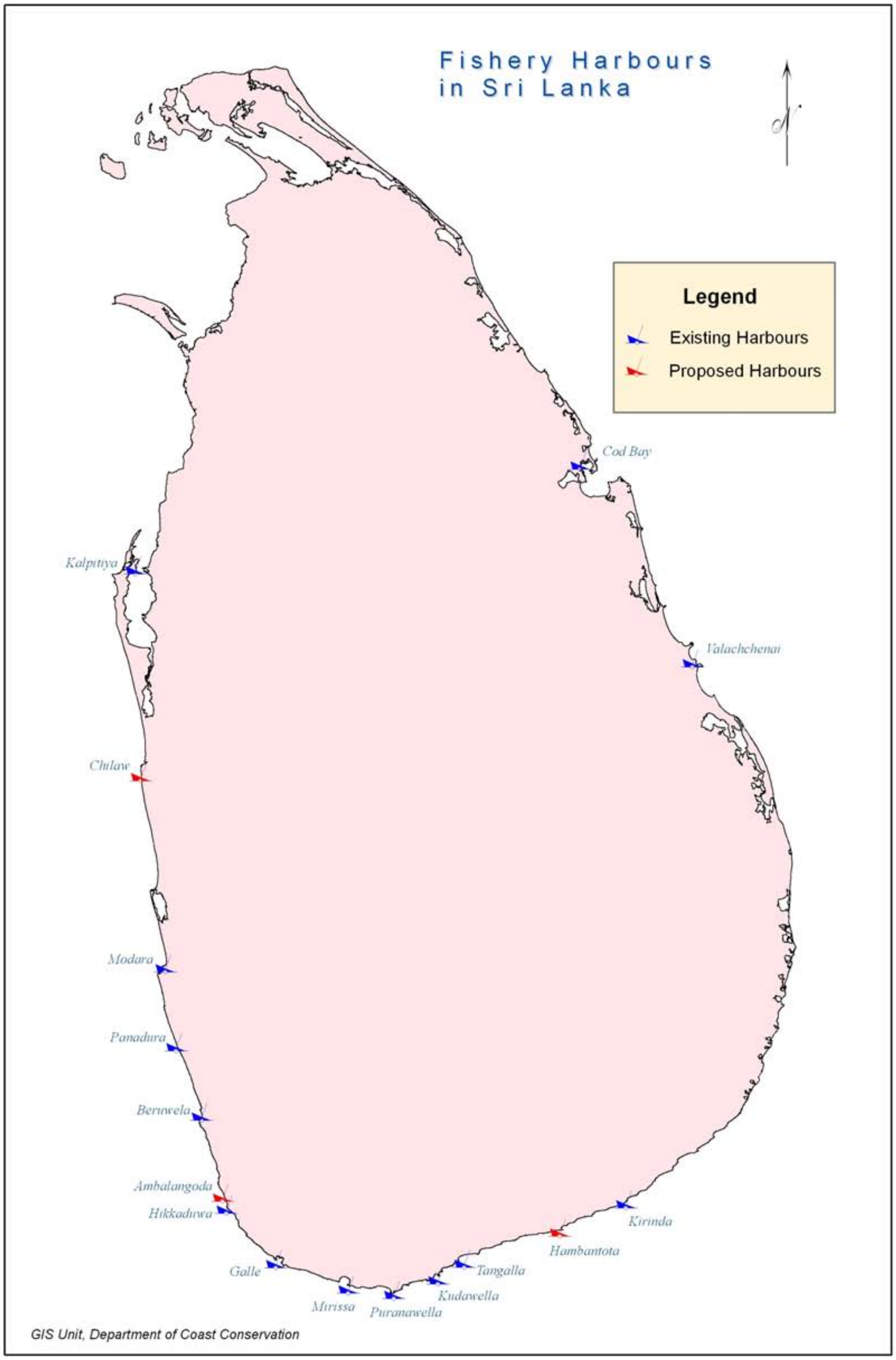
	Puthukudyiruppu	1			
	Kirankulam	1			
Kaluwanchikudy	Cheddipalayam	1			
	Onthachchimadam	1	1		
	Mankadu	1			
	Thettatheevu	1			
	Koddaikallar	1			
	Total	22	4	1	5

Appendixes

Appendix A	Fishing harbours in Sri Lanka
Appendix B	Anchorages in Sri Lanka
Appendix C	Anchorages proposed by CFHC
Appendix D	Locations of visited fish landing centres
Appendix E	Prioritising scheme for visited landing centres and anchorages
Appendix F	Allocation of shore facilities to landing centres and anchorages
Appendix G	Fisheries statistics
Appendix H	Anchorages, needs for infrastructure
Appendix I	Anchorages and landing centres, needs for bathymetric survey and feasibility study for marine structures
Appendix J	Proposal for shore facilities for the project FAO 504
Appendix K	Drawings of modular structures
Appendix L	Bill of Quantity of modular structures
Appendix M	Reference list of pictures on attached CD
Appendix N	Itinerary
Appendix O	Terms of reference

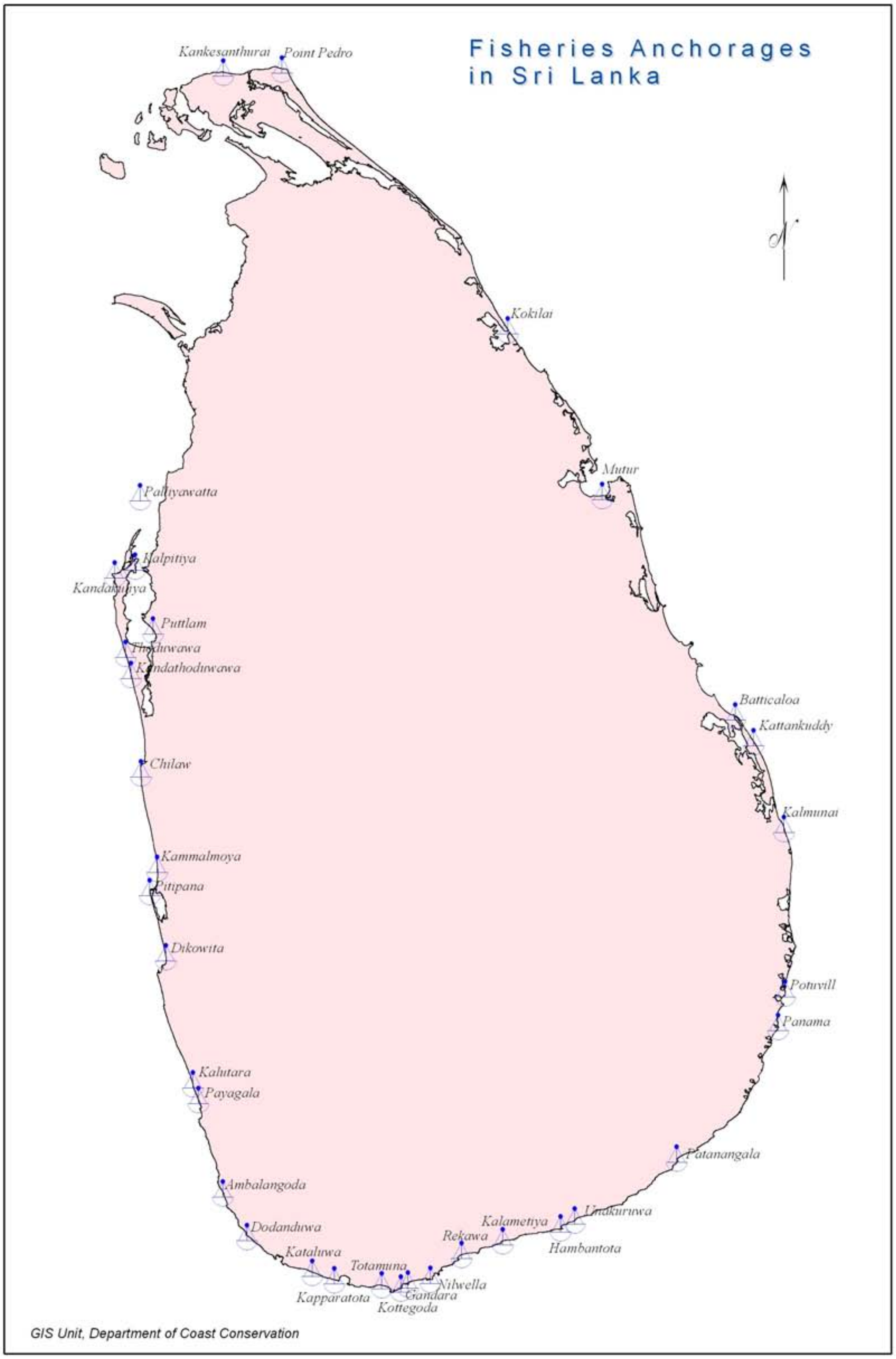
Appendix A Fishing harbours in Sri Lanka

The map shows the fishing harbours in Sri Lanka, existing and proposed, map from CCD.



Appendix B Anchorages in Sri Lanka

The map shows the anchorages in Sri Lanka, existing and proposed, map from CCD.



Appendix C Anchorages proposed by CFHC

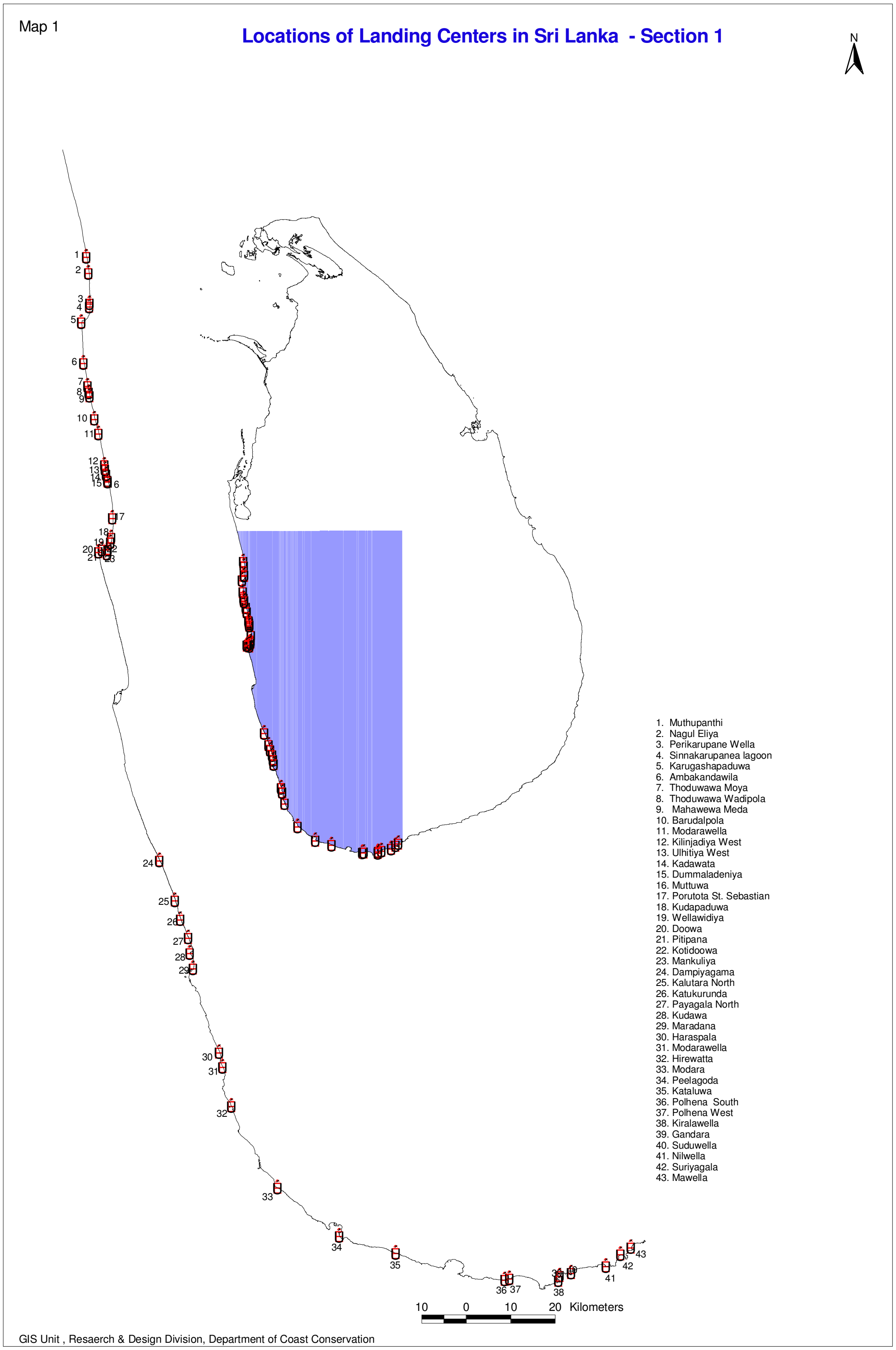
List of anchorages proposed by CFHC

Nr	Name of anchorage	Fisheries District	Visited	Comment
1	Pitipana Negombo*	Negombo	X	
2	Kammal-Moya	Negombo		
3	Wellamankara	Puttalam	X	
4	Thoduwawa	Puttalam	X	
5	Serakkuliya	Puttalam	X	
6	Kandakuliya	Puttalam	X	
7	Palliyawatte	Puttalam	X	
8	Arnolda Canal	Mannar		In uncleared area
9	Point Pedro	Jaffna		Visit to Jaffna cancelled
10	Kankasanthurei (KKS)	Jaffna		Visit to Jaffna cancelled
11	Thondamannar	Jaffna		Visit to Jaffna cancelled
12	Kokilai	Mullathive		In uncleared area
13	Muttur	Trincomalee	X	
14	Batticaloa	Batticaloa	X	
15	Kattankudi	Batticaloa	X	
16	Kalmunai	Kalmunai	X	
17	Sainthamaruthu	Kalmunai	X	
18	Pottuwil	Kalmunai	X	
19	Panama	Kalmunai	X	
20	Patanangala	Hambanthota		Inside national part
21	Welipatanwila	Hambanthota	X	
22	Kalametiya	Hambanthota	X	
23	Reawa	Hambanthota	X	
24	Unakuruwa	Hambanthota		Visit not suggested by ADF
25	Nilwella	Matara	X	
26	Kottegoda	Matara	X	
27	Gandara	Matara	X	
28	Thotamuna	Matara		Visit not suggested by ADF
29	Polathumodera	Matara		Visit not suggested by ADF
30	Kapparathota	Matara	X	
31	Kathaluwa	Galle	X	
32	Dodanduwa	Galle	X	
33	Haraspola	Galle	X	
34	Maradana	Kalutara	X	
35	Payagala*	Kalutara		
36	Beruwala south	Kalutara	X	
37	Maggona	Kalutara	X	
38	Kalutara	Kalutara		

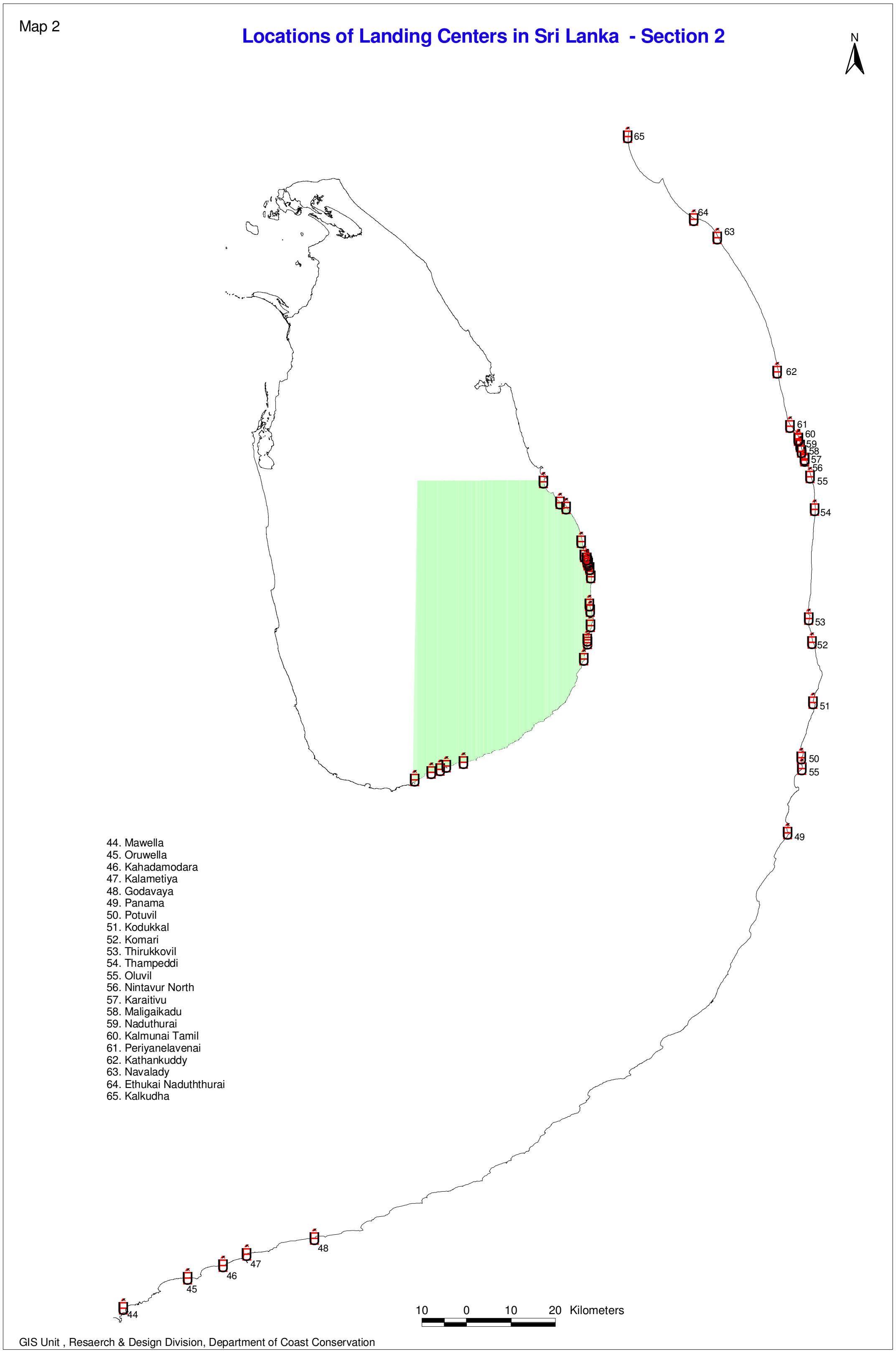
* There is more than one list and anchorages with asterisk are not in all lists.

Appendix D Locations of visited fish landing centres

SW – Sri Lanka



SE – Sri Lanka


Map 2
Locations of Landing Centers in Sri Lanka - Section 2
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44. Mawella
45. Oruwella
46. Kahadamodara
47. Kalametiya
48. Godavaya
49. Panama
50. Potuvil
51. Kodukkal
52. Komari
53. Thirukkovil
54. Thampeddi
55. Oluvil
56. Nintavur North
57. Karaitivu
58. Maligaikadu
59. Naduthurai
60. Kalmunai Tamil
61. Periyanelavenai
62. Kathankuddy
63. Navalady
64. Ethukai Naduththurai
65. Kalkudha
10 0 10 20 Kilometers
GIS Unit , Resaerch & Design Division, Department of Coast Conservation

Appendix E Prioritising scheme for visited landing centres and anchorages

Fisheries District	F.I.Division	Landing centre / Anchorage (A)	Number and type of craft							PR.SQ					
			MDB	ODB	FRP	OBTr	NMTr	Madel Paru	BFC units	Socio-economic	Economic BFC units	Economic develmt	Technical	Organisat	Total points
										25%	30%	20%	15%	10%	Σμ
Kalmunai															
	Kalmunai Tamil	Kalmunai Tamil			4	3	14	2	52	25	10	20	15	10	80
	Kalmunai Tamil	Periyaneelavanai					20	5	70	25	10	20	15	10	80
	Kamunai Muslim	Thaika mosque	1	15	10	6	12	1	149	25	30	20	15	10	100
	Sainthamarathu	Naduthurai		44	5	4	8	2	271	25	30	20	15	10	100
	Karaithivu	Maligaikadu		27		4	20	2	183	25	20	20	15	10	90
	Karaithivu	Karaithivu			4	1	38	20	252	20	25	15	15	10	85
	Nintavur	Nintavur North			3		6	1	25	20	5	15	15	10	65
	Addalachenai	Oluvil - 7			3	20		7	119	5	15	15	15	10	60
	Thirukovil	Thampaddai					45		45	20	5	20	15	10	70
	Thirukovil	Thirukkovil				10	25		45	25	5	20	15	10	75
	Thirukovil	Vinayagapuram				5	5		15	25	5	20	15	10	75
	Thirukovil	Thanadiyadi				1	7		9	15	5	15	15	10	60
	Panama	Panama Lagoon					38		38	10	25	15	15	10	75
	Pothuvil	Sinnaullai			48	1	9	1	165	15	20	15	15	10	75
	Pothuvil	Komari					11		11	20	5	15	15	10	65
	Pothuvil	Kuddakkalli						9	90	25	10	20	15	10	80
	Pothuvil	Jalaldeen square						1	10	15	5	15	15	10	60
	Pothuvil	Kadimarathady			2	3	8		20	20	5	20	15	10	70
Batticaloa															
	Valaichenai	Pethalai		3	16		12		75	15	10	15	15	10	65
	Valaichenai	Kalkudah			11		40	4	113	5	15	15	15	10	60
	Chenkalady	Kaluwankerny-1			19		59	5	166	15	20	15	15	10	75
	Manuunai (N-1)	Palameenmadu		4	63		65		274	5	30	15	15	10	75
	Manmunai (N-2)	Navalady			24		89	10	261	25	30	20	15	10	100
	Manmunai (N-2)	Poonochchimunai		30	6		23		191	20	20	15	15	10	80
	Kattankudy	Eathukai Naduththurai		8	7		12		73	25	10	20	15	10	80
Trincomalee															
	Trinco Town I	Periyakadai			38		140	30	554	15	30	15	10	10	80
	Trinco Town I	Sandybay			30		15	37	475	5	30	15	15	10	75
	Trinco Town I	Div. No.10			61		26	4	249	10	25	15	5	10	65
	Trinco Town I	Wegra Nagar		14	45		25		230	10	25	15	5	10	65
	Trinco Town ii	Sinnakadai	19	117	140		52		1247	15	30	15	15	10	85
	Trinco North I	Sally		4	140		18		458	5	30	10	5	10	60
	Trinco North I	Irakandy			81	10	18	8	361	10	30	15	15	10	80
	Trinco North ii	Srimapura	14	14	57		54		435	15	30	15	5	10	75
	Kuchchavely	Pulmoddal			180		10		550	10	30	15	15	10	80
	Kuchchavely	Kallarawn						24	240	5	25	10	15	10	65
	Kuchchavely	Pudayakattu	1	4	31		8	7	201	10	20	15	15	10	70
	Kuchchavely	Kuchchavely			64		7	3	229	25	25	15	15	10	90
	Muthur	Thakwa Nagar			90		133		403	20	30	15	15	10	90
	Muthur	Vaddam			18		42		96	20	10	15	15	10	70
	Muthur	Habeeb Nagar			11		36		69	20	10	15	15	10	70
	Kinniya	Thona			30		55	10	245	25	25	15	15	10	90
Jaffna															
Kllinochchi															
Mannar															
	Mannar	Pallaimunai			90	26	60		382						
	Mannar	Panankaddikoddu			92	30	57		393						
	Mannar	Talvupadu			138				414						
		Talaimannar West			74		40		262						
	Pesalai	Talaimannar Pier			57		23		194						
	Pesalai	Pesalai	1	59	166		35		838						
	Nanattan	Vankalai			156		10		478						
Puttalam															
	Palakuda	Mampuriya			125		8	8	463						
	Palakuda	Ealanthadiya			61			4	223						
	Palakuda	Thalawila			69		8	4	255						
	Puttlam	Puttalam							0						
	Kalpitiya (Land)	Kalpitiya			44		48		180						
	Kalpitiya (Land)	Anawazal (Lagoon)					14		14						
	Kalpitiya (Land)	Janasaviepura (Lagoon)			24		18		90						
	Kalpitiya (Land)	Sinnakudirippu							0						
	Kalpitiya (Land)	Kandakuliya (North)			41		15	8	218						
	Kalpitiya (Land)	Kandakuliya							0						
	Kalpitiya (Land)	Kudawa			78				234						
	Kalpitiya (Land)	Eachankaduwa			50		20		170						
	Puttlam	Mulliepuram (Lagoon)					42		42						
	Wanathavilluwa	Karathive (Sarakkuliya)			52		33		189						
Chillaw															
	Arachchikattuwa	Sinnakarupanea Wella			25		26	5	151	0	20	15	15	5	55
24.1.2006	Arachchikattuwa	Periyakarupanea Wella			30		27	2	137	0	15	15	15	5	50

Fisheries District	F.I.Division	Landing centre / Anchorage (A)	Number and type of craft							PR.SQ					
			MDB	ODB	FRP	OBTr	NMTr	Madel Paru	BFC units	Socio-economic	Economic BFC units	Economic develmt	Technical	Organisat	Total points
										25%	30%	20%	15%	10%	Σμ
	Arachchikattuwa	Nagul elya					4		4	0	5	15	15	5	40
	Arachchikattuwa	Mutupantiya			40		40		160	0	20	10	15	5	50
	Chilaw North	Kurusagahapaduwa(S)			19				57	0	10	15	15	5	45
	Wennappuwa	Kadawatha			28		21		105	0	15	15	15	5	50
	Wennappuwa	Ulhitiyawa(W)			36		24		132		15	15	15	5	50
Chillaw	Chilaw North	Egodawatta			120		4		364						
	Chilaw North	Madapaduwella			62		80		266						
	Chilaw North	Near *Guhawa*			41		8		131						
	Chilaw North	Kurusagahapaduwa			46		15		153						
	Chilaw South	Abakadavila			41		64		187						
	Mahawawa North	Toduwawa Moya			17		22	2	93						
	Mahawawa North	Toduwawa Wadipola			12		13		49						
	Mahawawa Mada	Kudamaduwalla			20		30		90						
	Mahawawa (W)	Barudalpola			27		52		133						
	Mahawawa South	Modarawalla			9		9	3	66						
	Wennappuwa (N)	Kolinjadiya West			18		28		82						
Chillaw	Wennappuwa (S)	Dummaladeniya			26		30		108						
	Wennappuwa (S)	Muttuwa			30		38		128						
Negombo															
	Kammalthurei	Poruthota St Sebastiyan			40	25	45		215	0	20	10	10	5	45
	Kudapaduwa	Kudapaduwa	8		314		16		1038	0	30	15	10	5	60
	Town iii	Mankuliya	28	10	13		50		419	0	30	15	10	5	60
	Town iii	Munnakkrya	18	5	4		54		271	0	30	15	5	5	55
	Town i	Kuttidoowa	7		91		15		358	0	30	15	10	5	60
	Town i	Wella weediya							0						
	Doowa	Doowa	6		45		53		248						
	Pitipana	Pitipana	6	7	102		168		569						

Appendix F Allocation of shore facilities to landing centres and anchorages

						Proposed Facilities									
				Total points Σy	Government land available	NMM	ESM	GSM	OM	RRM	ASM	SFM	WS	ES	TOTAL COST RS. Million
Kalmunai															
	Kalmunai Tamil	Kalmunai Tamil	52	80	G/L Ava	NM1						SF1	√	√	1,2
	Kalmunai Tamil	Periyaneelavanai	70	80	G/L Ava	NM1						SF1	√	√	1,2
	Kamunai Muslim	Thaika mosque	149	100	P/L Ava	NM1	2ES1	2GS1	1OM1		1AS1	SF1	√	√	3,3
	Sainthamarathu	Naduthurai	271	100	G/L Ava	NM3	2ES1	3GS1	1OM1		1AS1	SF1	√	√	4,2
	Karaithivu	Maligaikadu	183	90	P/L Ava	NM2	2ES1	2GS1	1OM1		1AS1	SF1	√	√	3,6
	Karaithivu	Karaithivu	252	85	P/L Ava	NM3	2ES1	3GS1	1OM1		1AS1	SF1	√	√	4,2
	Nintavur	Nintavur North	25	65	P/L Ava	n/f	n/f	n/f	n/f	n/f	n/f	n/f	n/f	n/f	0
	Addalachenai	Oluvil - 7	119	60	Planning to Develop Commercial Habour										0
	Thirukovil	Thampaddai	45	70	G/L Ava	NM1						SF1	√	√	1,2
	Thirukovil	Thirukkovil	45	75	G/L Ava	NM1						SF1	√	√	1,2
	Thirukovil	Vinayagapuram	15	75	G/L Ava	n/f	n/f	n/f	n/f	n/f	n/f	n/f	n/f	n/f	0
	Thirukovil	Thanadiyadi	9	60	Availabl	n/f	n/f	n/f	n/f	n/f	n/f	n/f	n/f	n/f	0
	Panama	Panama Lagoon	38	75	Availabl	NM1						SF1	√	√	1,2
	Pothuvil	Sinnaullai	165	75	Availabl	NM2	2ES1	2GS1	1OM1		1AS1	SF1	√	√	3,6
	Pothuvil	Komari	11	65		n/f	n/f	n/f	n/f	n/f	n/f	n/f	n/f	n/f	0
	Pothuvil	Kuddakkalli	90	80	Availabl	NM1						SF1	√	√	1,2
	Pothuvil	Jalaldeen square	10	60	Availabl	n/f	n/f	n/f	n/f	n/f	n/f	n/f	n/f	n/f	0
	Pothuvil	Kadimarathady	20	70	Availabl	n/f	n/f	n/f	n/f	n/f	n/f	n/f	n/f	n/f	0
Batticaloa															
	Valaichenai	Pethalai	75	65	Availabl	NM1						SF1	√	√	1,2
	Valaichenai	Kalkudah	113	60	Availabl	NM1	1ES1	2GS1	1OM1		1AS1	SF1	√	√	3,0
	Chenkalady	Kaluwankerny-1	166	75	Availabl	NM2	ES1	2GS1			1AS1	SF1	√	√	2,6
	Manuunai (N-1)	Palameenmadu	274	75	Availabl	NM3	2ES1	3GS1	1OM1		1AS1	SF1	√	√	4,2
	Manmunai (N-2)	Navalady	261	100											0
	Manmunai (N-2)	Poonochchimunai	191	80											

24.1.2006 1

Fisheries District	F.I.Division	Landing centre / Anchorage (A)	BFC units	Total points Σy	Government land available	NMM	ESM	GSM	OM	RRM	ASM	SFM	WS	ES	TOTAL COST RS. Million
					Proposed Facilities										
Puttalam															
	Palakuda	Mampuriya	463		G/L Ava	NM4	4ES1	4GS1	2OM1		1AS2	SF2	√	√	6,6
	Palakuda	Ealanthadiya	223		G/L Ava	NM2	2ES1	3GS1	1OM1		AS1	SF1	√	√	3,5
	Palakuda	Thalawila	255		G/L Ava	NM3	2ES1	3GS1	1OM1		AS1	SF1	√	√	3,8
	Puttlam	Puttalam	0		N/A	n/f	n/f	n/f	n/f	n/f	n/f	n/f	n/f	n/f	0
	Kalpitiya (Land)	Kalpitiya	180		Filling	NM2	2ES1	2GS1	1OM1		1AS1	SF1	√	√	3,6
	Kalpitiya (Land)	Anawazal (Lagoon)	14		G/L Ava	n/f	n/f	n/f	n/f	n/f	n/f	n/f	n/f	n/f	0
	Kalpitiya (Land)	Janasaviepura (Lagoon	90		G/L Ava	NM1						SF1	√	√	1,2
	Kalpitiya (Land)	Sinnakudirippu	0		Filling	n/f	n/f	n/f	n/f	n/f	n/f	n/f	n/f	n/f	0
	Kalpitiya (Land)	Kandakuliya (North)	218		G/L Ava	NM2	2ES1	3GS1	1OM1		AS2	SF1	√	√	3,5
	Kalpitiya (Land)	Kandakuliya	0		Filling	n/f	n/f	n/f	n/f	n/f	n/f	n/f	n/f	n/f	0
	Kalpitiya (Land)	Kudawa	234		G/L Ava	NM2	2ES1	3GS1	1OM1		1AS1	SF1	√	√	3,9
	Kalpitiya (Land)	Eachankaduwa	170		G/L Ava	NM2	2ES1	2GS1	1OM1		1AS1	SF1	√	√	3,6
	Puttlam	Mulliepuram (Lagoon)	42		Not ava	NM1									
	Wanathavilluwa	Karathive (Sarakkuliya)	189		G/L Ava	NM2	2ES1	2GS1	1OM1		1AS1	SF1	√	√	3,6
Chillaw															
	Arachchikattuwa	Sinnakarupanea Wella	151	55	G/L Ava	NM2	3ES1	2GS1	1OM1		1AS1	SF1	√	√	3,9
	Arachchikattuwa	Periyakarupanea Wella	137	50	G/L Ava	NM1	3ES1	2GS1	1OM1		1AS1	SF1	√	√	3,6
	Arachchikattuwa	Nagul elya	4	40	G/L Ava	NM1	n/f	n/f	n/f	n/f	n/f	n/f	n/f	n/f	
	Arachchikattuwa	Mutupantiya	160	50	G/L Ava	NM2	1ES1	2GS1	1OM1		1AS1	SF1	√	√	3,3
	Chilaw North	Kurusagahapaduwa(S)	57	45	G/L Ava	NM1						SF1	√	√	1,2
	Wennappuwa	Kadawatha	105	50	G/L Ava	NM1	2ES1	2GS1	1OM1		1AS1	SF1	√	√	3,3
	Wennappuwa	Ulhitiyawa(W)	132	50	G/L Ava	NM1	1ES1	2GS1	1OM1		1AS1	SF1	√	√	3,0
Chillaw	Chilaw North	Egodawatta	364												0
	Chilaw North	Madapaduwella	266		Not ava	NM3	2ES1	3GS1	1OM1		1AS1	SF1	√	√	4,2
	Chilaw North	Near *Guhawa*	131												0
	Chilaw North	Kurusagahapaduwa	153		G/L Ava	NM2	2ES1		1OM1		1AS1	SF1	√	√	2,9
	Chilaw South	Abakadavila	187												0
	Mahawawa North	Toduwawa Moya	93		G/L Ava	NM1						SF1	√	√	1,2
	Mahawawa North	Toduwawa Wadipola	49												0
	Mahawawa Mada	Kudamaduwalla	90		G/L Ava	NM1						SF1	√	√	1,2
	Mahawawa (W)	Barudalpola	133		G/L Ava	NM1	1ES1	2GS1	1OM1		1AS1	SF1	√	√	3,0
	Mahawawa South	Modarawalla	66		G/L Ava	NM1						SF1	√	√	1,2
	Wennappuwa (N)	Kolinjadiya West	82		G/L Ava	NM1						SF1	√	√	1,2
Chillaw	Wennappuwa (S)	Dummaladeniya	108		G/L Ava	NM1	2ES1	2GS1	1OM1		1AS1	SF1	√	√	3,3
	Wennappuwa (S)	Muttuwa	128		G/L Ava	NM1	2ES1	2GS1	1OM1		1AS1	SF1	√	√	3,3
Negombo															
	Kammalthurei	Poruthota St Sebastiya	215	45											0
	Kudapaduwa	Kudapaduwa	1038	60	G/L Ava	NM4	6ES1	5GS1	2OM1	RR1	3AS2	SF2	√	√	9,3
	Town iii	Mankuliya	419	60	G/L Ava	NM3	2ES1	4GS1	2OM1		AS2	SF2	√	√	4,8
	Town iii	Munnakkrya	271	55	Not ava	NM3	1ES1	3GS1	1OM1		1AS1	SF1	√	√	3,9
	Town i	Kuttidoowa	358	60	Not ava	NM3	3ES1	3GS1	2OM1		AS2	SF2	√	√	4,8
	Town i	Wella weediya	0												0
	Doowa	Doowa	248		Not available										0
	Pitipana	Pitipana	569		Not available										0
										Total cost for Shore Facilitie For Visited sites					253,8

24.1.2006 2

Appendix G Fisheries statistics

Table 8: MARINE SECTOR FISH CATCH BY FISHERIES DISTRICTS

(Metric tons)

Fisheries District	1983	1990	1995	2000	2002	2003	2004(1)
Puttalam	14,860	19,190	27,020	29,730	23,560	22,240	16,520
Chilaw	11,640	15,670	24,550	25,650	19,900	13,570	14,220
Colombo	2,320	2,980	2,550	3,130	2,980	1,990	1,640
Negombo	19,030	16,670	30,570	34,540	26,490	20,940	22,780
Kalutara	7,630	10,670	28,910	33,140	29,470	21,700	20,690
Galle	8,590	11,780	21,430	27,830	25,060	20,870	17,530
Matara	8,980	11,230	29,930	35,480	34,000	28,430	27,990
Tangalle	7,330	10,240	23,260	33,470	26,860	21,700	21,960
Kalmunai	10,650	7,710	7,290	9,120	17,750	21,380	19,790
Batticaloa	4,460	5,920	8,360	9,860	15,140	16,640	16,160
Trincomalee	13,510	9,580	9,130	13,540	18,980	15,030	17,540
Mullaithivu*	6,960	2,290	na	na	3,820	2,250	2,200
Killinochchi*	na	na	na	na	1,480	2,760	3,130
Jaffna*	49,740	14,450	na	na	12,340	28,550	33,980
Mannar*	19,040	7,410	na	na	16,930	16,630	17,060
* Northern Province	75,740	24,150	4,500	8,190	34,570	50,190	56,370
TOTAL	**184,740**	**145,790**	**217,500**	**263,680**	**274,760**	**254,680**	**253,190**

* Northern Province consist of Mullaithivu, Killinochchi, Jaffna, Mannar District

Source : Statistical Unit of the Ministry of Fisheries and Aquatic Resources, Departm. Fisheries & Aquatic Resources
(1) Provisional Estimates

Table 1: Estimated Fish production by Fishing sectors (t)

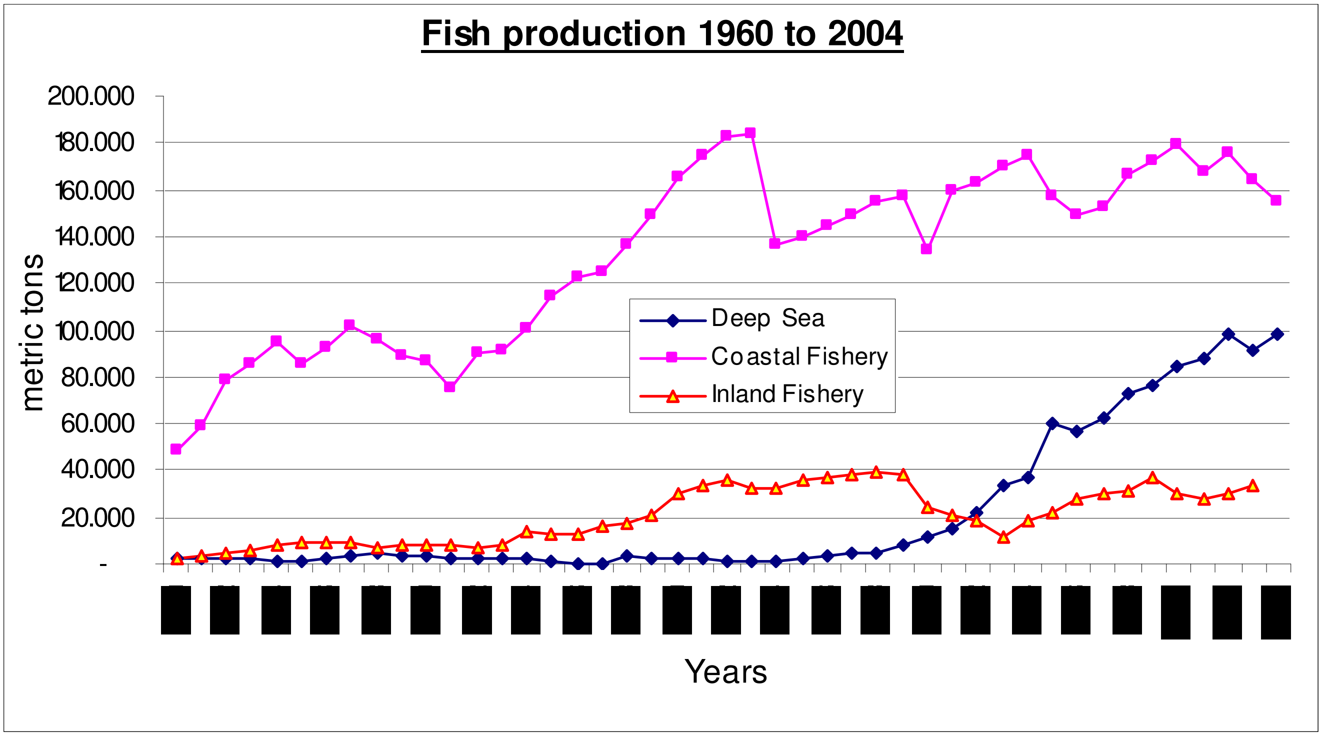


TABLE 27 : OPERATING FISHING BOATS BY TYPES

YEAR	TOTAL FISHING CRAFTS	INBOARD ENGINES		OUT BOARD ENGINES		NON MOTORIZED TRADITIONAL
		MULTIDAY	DAY	FIBRE GLASS	TRADITIONAL (OB)	
1990	27,675	2,364	**	9,758	973	14,580
1995	27,269	1,639	1,357	8,564	1,060	14,649
1999	27,491	1,419	1,275	8,623	1,274	14,900
2000	27,595	1,430	1,170	8,690	1,205	15,100
2001(1)	27,149	1,572	993	8,744	640	15,200
2002	28,135	1,614	1,112	9,033	776	15,600
2003	29,694	1,530	1,486	11,020	618	15,040
2004(2)	30,567	1,581	1,493	11,559	674	15,260

Source : Statistical Unit of the Ministry of Fisheries and Aquatic Resources

(1) Census of Motorized Fishing Boats- August to December 2001 (Estimated for Traditional Craft)

(2) Estimates based on monthly statistical retunes(January to November 2004) received from DFAR

Appendix H Anchorages, needs for infrastructure

Nr	Name of anchorage	Fisheries District	Tsunami Conflict	Land available	Need for development / Remark
1	Pitipana Negombo	Negombo	No	Coopert.	Shore facilities being constructed
2	Kammal-Moya	Negombo	No	Govment	Shore facilities
3	Wellamankara	Puttalam	No	Govment	Shore facilities
4	Thoduwawa	Puttalam	No	Private	Shore facilities Continue work on breakwater, check CCD
5	Serakkuliya	Puttalam	No	Govment	Shore facilities and jetty
6	Kandakuliya	Puttalam	No	CFHC	Shore facilities
7	Palliyawatte	Puttalam	No	Govment	Shore facilities
8	Arnolda Canal	Mannar	Confl	Govment	Shore facilities
9	Point Pedro	Jaffna	Confl	No infm.	No information
10	Kankasanthurei	Jaffna	Confl	No infm.	No information
11	Thondamannar	Jaffna	Confl	No infm.	No information
12	Kokilai	Mullathive	Confl	Govment	Shore facilities
13	Muttur	Trincomalee	Tsm/cnfl	Private	Shore facilities
14	Batticaloa	Batticaloa	Tsm/cnfl	Govment	Shore facilities and quay wall
15	Kattankudi	Batticaloa	Tsm/cnfl	Govment /Private	Shore facilities
16	Kalmunai	Kalmunai	Tsunami	CFHC	Shore facilities
17	Sainthamaruthu	Kalmunai	Tsunami	Govment	Shore facilities
18	Pottuwil	Kalmunai	Tsunami	Private	Shore facilities
19	Panama	Kalmunai	Tsunami	Govment	Shore facilities
20	Patanangala	Hambanthota	Tsunami	Govment	Shore facilities Difficult to develop as inside national park
21	Welipatanwila	Hambanthota	Tsunami	Govment	Shore facilities
22	Kalametiya	Hambanthota	Tsunami	Govment	Most shore facilities are available
23	Reawa	Hambanthota	Tsunami	Govment /Private	Shore facilities
24	Unakuruwa	Hambanthota	Tsunami	Govment /Private	Shore facilities
25	Nilwella	Matara	Tsunami	Govment	Shore facilities Continue work on breakwater, check CCD
26	Kottegoda	Matara	Tsunami	Govment	Shore facilities partly provided prjFAO504
27	Gandara	Matara	Tsunami	Govment	Shore facilities
28	Thotamuna	Matara	Tsunami	Govment	Shore facilities
29	Polathumodera	Matara	Tsunami	Private	Shore facilities
30	Kapparathota	Matara	Tsunami	Govment	Most shore facilities available Dredging, sedimentation due to Tsunami
31	Kathaluwa	Galle	Tsunami	Private/ Govment	Shore facilities
32	Dodanduwa	Galle	Tsunami	Govment	Shore facilities CFHC have started work on breakwaters
33	Haraspola	Galle	Tsunami	Private	Shore facilities
34	Maradana	Kalutara	Tsunami	Private/ Govment	Shore facilities
35	Payagala*	Kalutara	Tsunami		Shore facilities
36	Beruwala south	Kalutara	Tsunami		Shore facilities
37	Maggona	Kalutara	Tsunami	Govment	Shore facilities
38	Kalutara	Kalutara	Tsunami	Govment	Shore facilities

Appendix I Further investigations and studies at anchorages and fish landing centres

Nr	Name of anchorage	Fisheries District	Tsunami Conflict	Bathymetric survey	Feasibility study marine structures
1	Pitipana Negombo	Negombo	No		
2	Kammal-Moya	Negombo	No		
3	Wellamankara	Puttalam	No		
4	Thoduwawa	Puttalam	No		
5	Serakkuliya	Puttalam	No		
6	Kandakuliya	Puttalam	No		
7	Palliyawatte	Puttalam	No		
8	Arnolda Canal	Mannar	Confl	Bathymetric survey	
9	Point Pedro	Jaffna	Confl	No information	
10	Kankasanthurei	Jaffna	Confl	No information	
11	Thondamannar	Jaffna	Confl	No information	
12	Kokilai	Mullathive	Confl	No information	
13	Muttur	Trincomalee	Tsm/cnfl	Bathymetric survey	
14	Batticaloa	Batticaloa	Tsm/cnfl	Bathymetric survey	
15	Kattankudi	Batticaloa	Tsm/cnfl	Bathymetric survey	Feasibility study
16	Kalmunai	Kalmunai	Tsunami	Bathymetric survey	Feasibility study
17	Sainthamaruthu	Kalmunai	Tsunami	Bathymetric survey	Feasibility study
18	Pottuwil	Kalmunai	Tsunami	Bathymetric survey	Feasibility study
19	Panama	Kalmunai	Tsunami	Bathymetric survey	Feasibility study
20	Patanangala	Hambanthota	Tsunami		
21	Welipatanwila	Hambanthota	Tsunami	Bathymetric survey	
22	Kalametiya	Hambanthota	Tsunami		
23	Reawa	Hambanthota	Tsunami	Bathymetric survey	
24	Unakuruwa	Hambanthota	Tsunami	Bathymetric survey	
25	Nilwella	Matara	Tsunami		
26	Kottegoda	Matara	Tsunami	Bathymetric survey	
27	Gandara	Matara	Tsunami		
28	Thotamuna	Matara	Tsunami	Bathymetric survey	
29	Polathumodera	Matara	Tsunami	Bathymetric survey	
30	Kapparathota	Matara	Tsunami	Bathymetric survey	
31	Kathaluwa	Galle	Tsunami	Bathymetric survey	
32	Dodanduwa	Galle	Tsunami		
33	Haraspola	Galle	Tsunami		
34	Maradana	Kalutara	Tsunami	Bathymetric survey	
35	Payagala	Kalutara	Tsunami		
36	Beruwala south	Kalutara	Tsunami	Bathymetric survey	
37	Maggona	Kalutara	Tsunami	Bathymetric survey	
38	Kalutara	Kalutara	Tsunami		
1	Pallaimunai	Mannar	No	Bathymetric survey	Feasibility study
2	Panankaddikoddu	Mannar	No	Bathymetric survey	Feasibility study
3	Talvupadu	Mannar	No	Bathymetric survey	Feasibility study
4	Pesalai	Mannar	Tsunami	Bathymetric survey	Feasibility study
5	Talimannar West	Mannar	Tsunami	Bathymetric survey	Feasibility study
6	Vankalai	Mannar	Tsunami	Bathymetric survey	Feasibility study
7	Back Bay: Wegra Nagar, Div.No10, Sinnakadai	Trincomalee	Tsunami	Bathymetric survey	Feasibility study

Appendix J Proposal for shore facilities for the project FAO 504

Baddewatha landing centre

The proposed Fishermen's facility building for the Baddewatha landing centre is a single storey building, composed of a 30' long net mending module NM1, office module, OM1, two engine store modules, ES1, capacity 40 engines, and two gear store modules with boxes, GS1, with a capacity of 48 boxes. Total length of the structure is 80'. The building can be extended if needed.

Facility		Provisional cost estimate
Fishermen's facility building	FFB	2,080,000 Rp
Auction shed	AS1	220,000 Rp
Sanitary facilities	SF1	400,000 Rp
Water supply	WS	50,000 Rp
Electricity	EL	210,000 Rp
	Total:	2,960,000 Rp

Kottegoda anchorage

The proposed Fishermen's facility building for the Kottegoda anchorage is a two storey building. The ground floor will be a 50' long net mending module, NM3. The first floor will accommodate two engine store modules, ES1, two gear store modules and a 14' long office module, OM1. Total length of building is 50'.

Facility		Provisional cost estimate
Fishermen's facility building	FFB	2,800,000 Rp
Auction shed	AS2	600,000 Rp
Sanitary facilities	SF1	400,000 Rp
Water supply	WS	50,000 Rp
Electricity	EL	210,000 Rp
	Total:	4,060,000 Rp

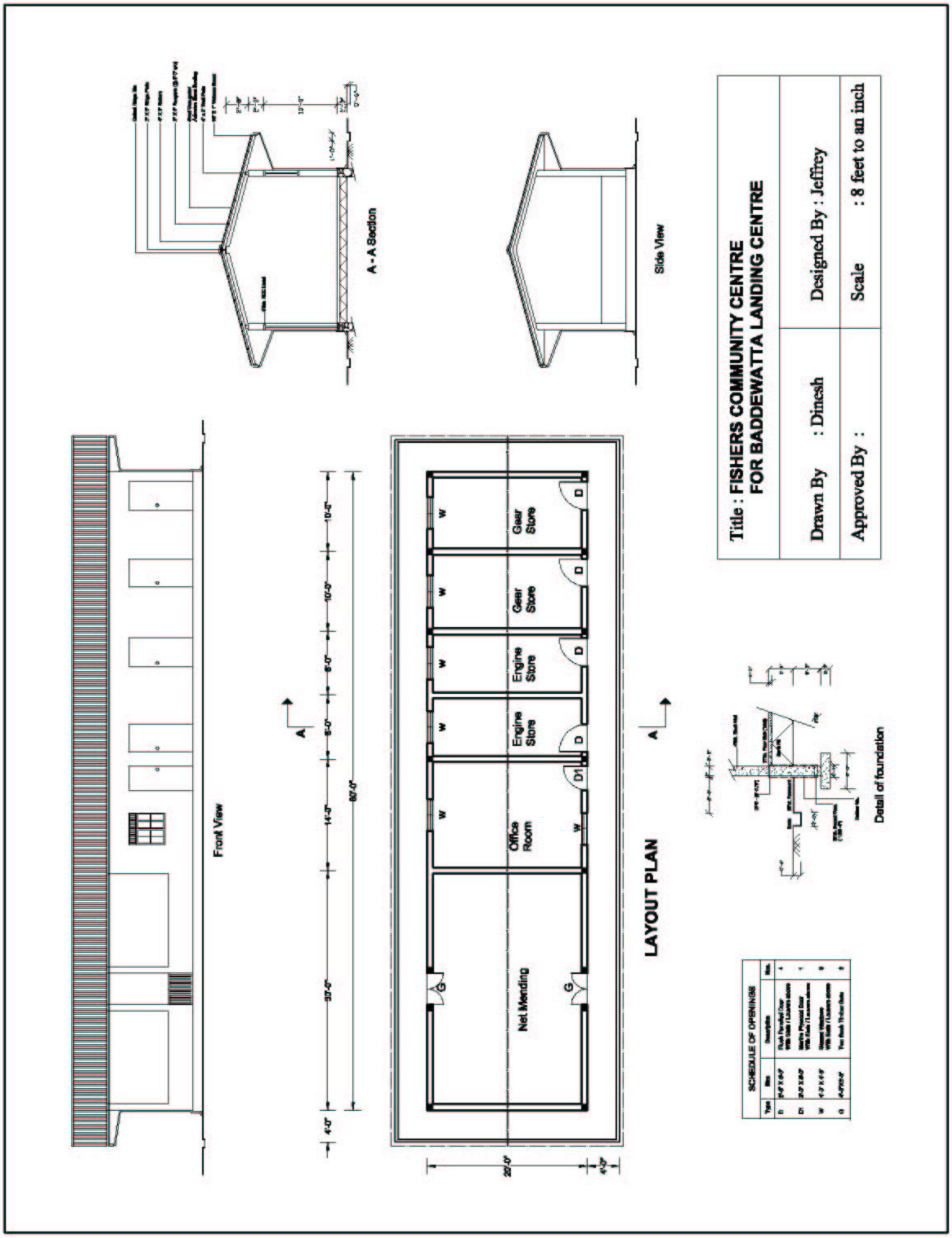
Welipatannwila - anchorage

The proposed Fishermen's facility building for the Welipatannwila anchorage is a one storey building composed of a 30' long net mending module, NM1, a 20' long rest room module, RR1, a 14' long office module and a 20' long open space gear store module, GS3. Total length of the building is 84'.

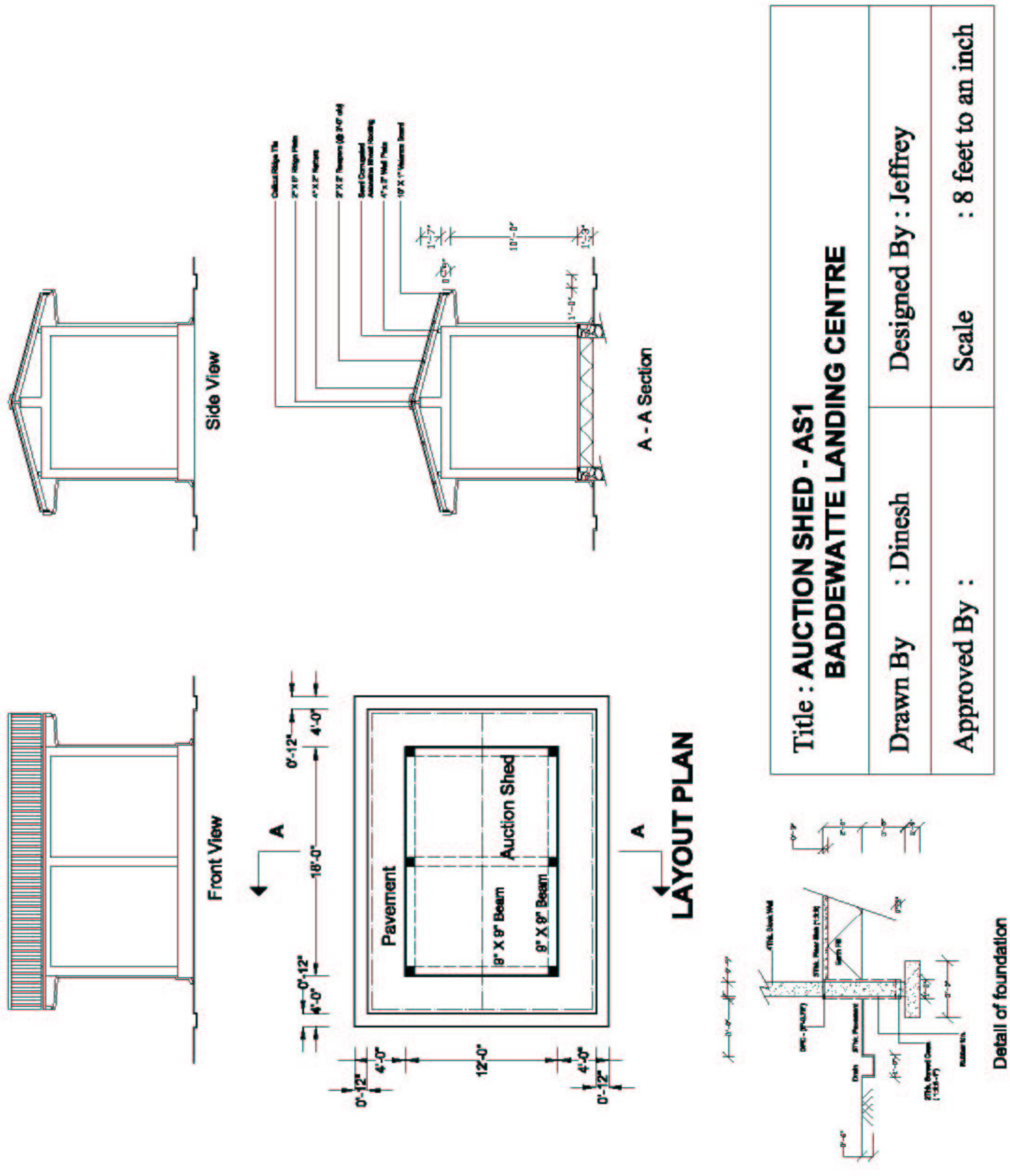
Facility		Provisional cost estimate
Fishermen's facility building	FFB	2,184,000 Rp
Auction shed	AS1	220,000 Rp
Sanitary facilities	SF1	400,000 Rp
Water supply	WS	50,000 Rp
Electricity	EL	210,000 Rp
	Total:	3,064,000 Rp

Appendix K Drawings of modular structures

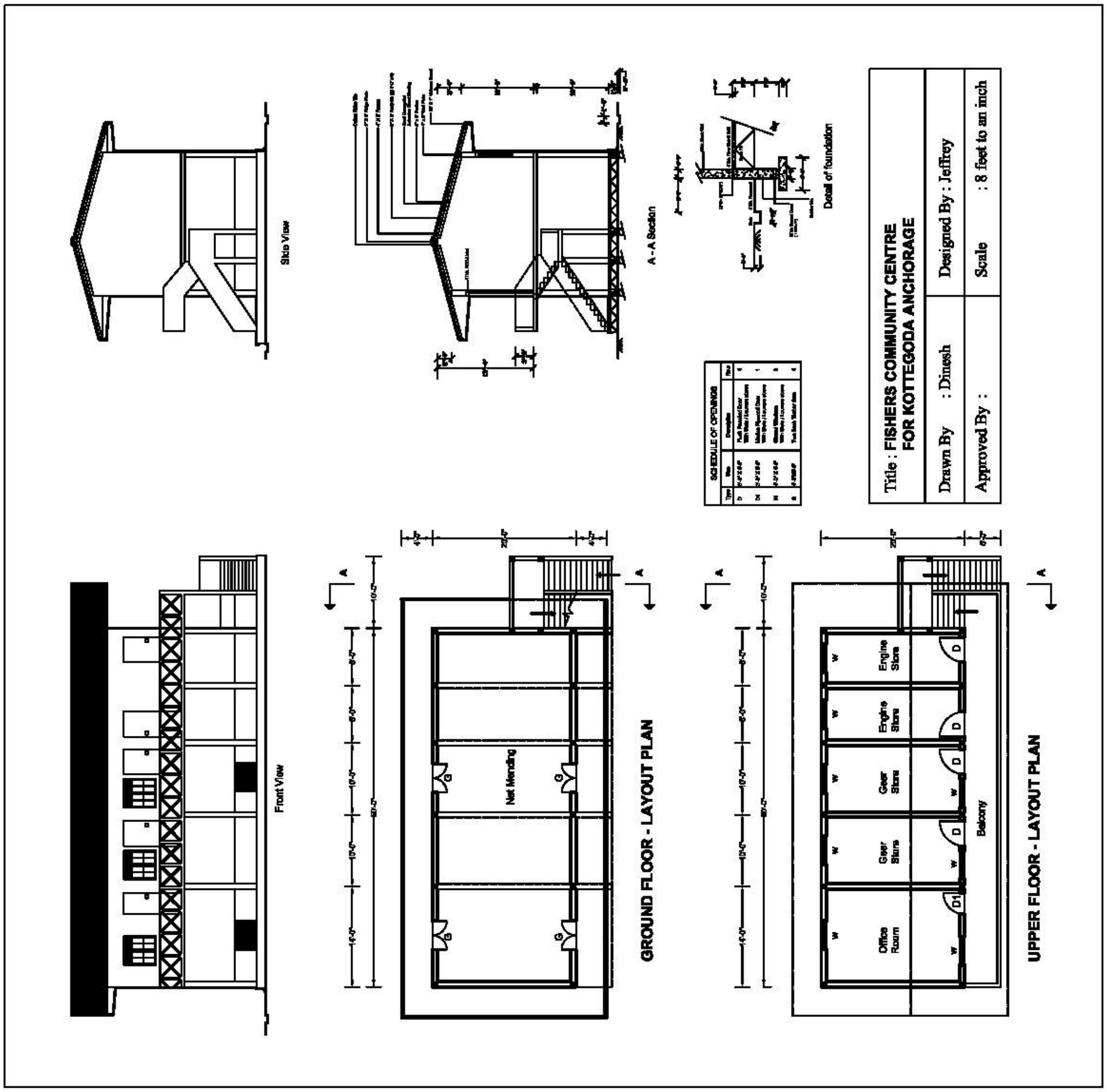
Baddewatha, Fishermen's facility building



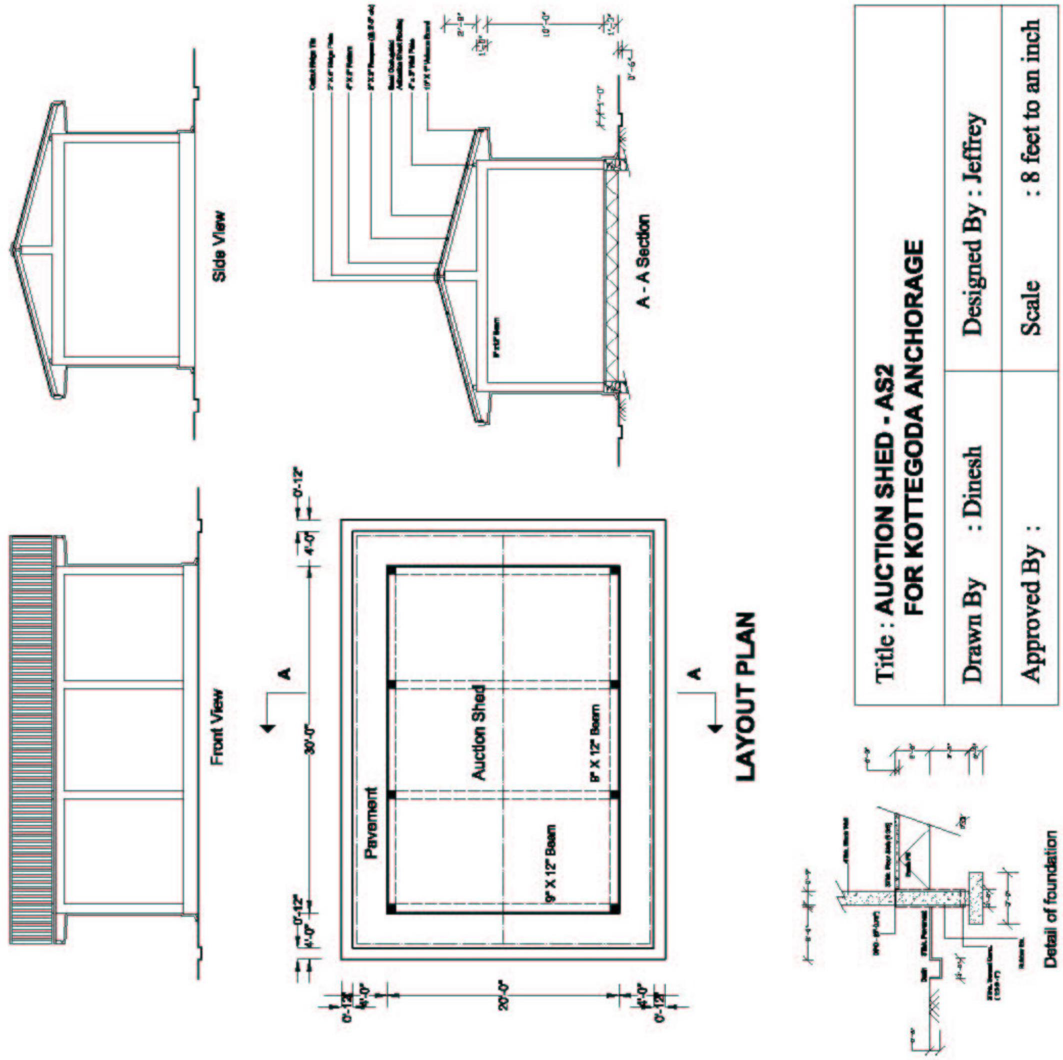
Baddewatha, Auction shed



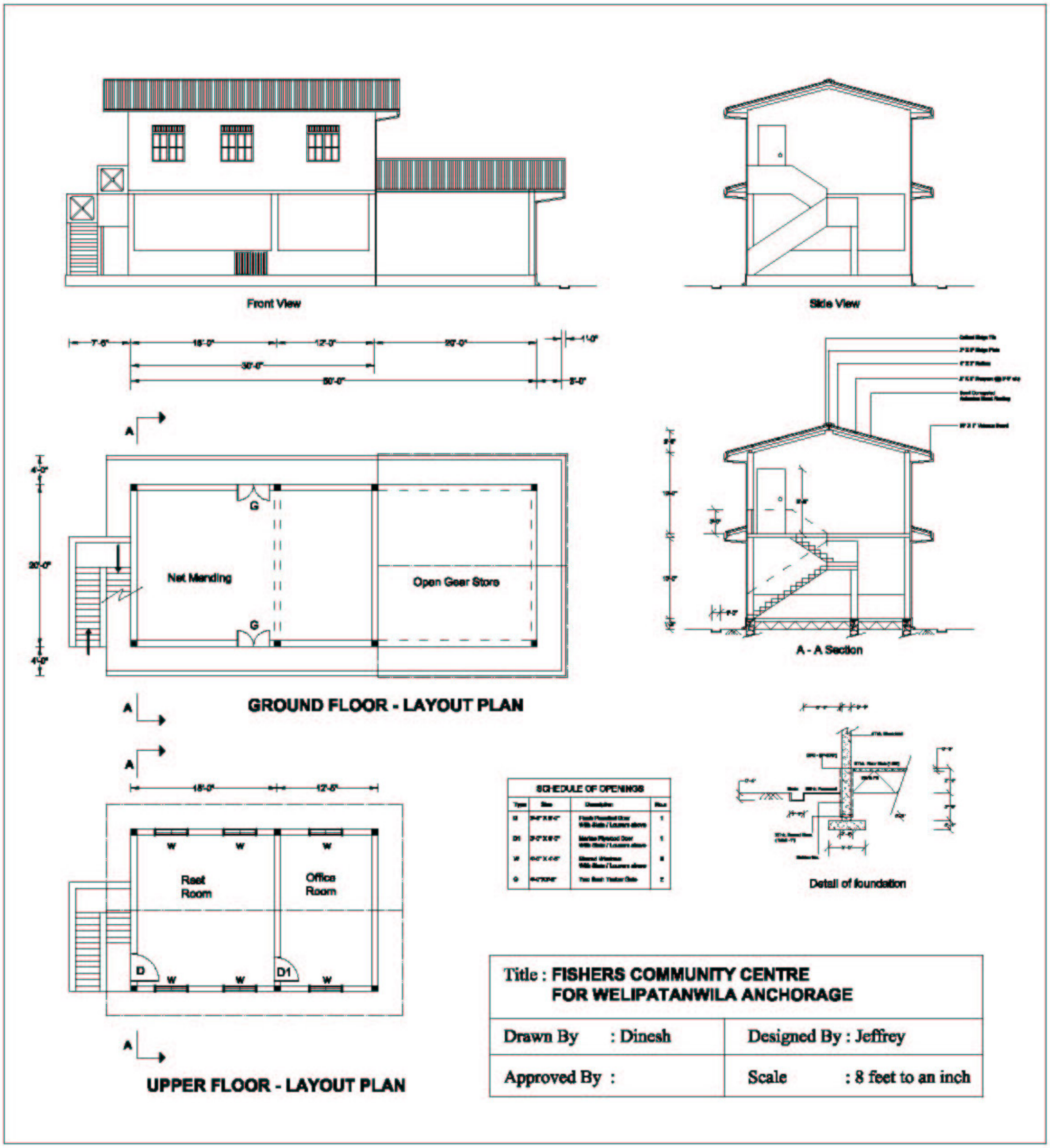
Kottegoda, Fishermen's facility building



Kottegoda, Auction shed



Welipatanwila, Fishermen's facility building



Appendix L Bill of Quantity of modular structures

Baddewatha, Fishermen's facility building

ENGINEERING ESTIMATE FOR FISHERS COMMUNITY CENTRE BUILDING AT BADDEWATTA					
No	**DESCRIPTION**	**UNIT**	**QTY**	**RATE**	**AMOUNT - SLRS**
A	**PRELIMINARIES**				
1	Allow for erection of temporary sheds for protection and storage of materials.	Item		Allow	25.000,00
2	Allow for setting out works.	Item		Allow	3.000,00
3	Allow for cleaning site on completion and during the programme of works, including removal of all rubbish and debris and leaving the building clean internally and externally.	Item		Allow	5.000,00
4	Allowing for supplying water for use during construction. It shall be the responsibility of the contractor to find the sources of supply and storage facilities and internal arrangements and payment for consumption to authorities. (connection charges will be borne by the Owner)	Item		Allow	25.000,00
5	Allow for lighting, watchmen and other precautions.	Item		Allow	30.000,00
6	Allow for erection of temporary site office for with electricity, water supply waste and drainage facility.	Item		Allow	30.000,00
7	Allow for temporary sanitary accommodation of site for the contractor's staff and workmen	Item		Allow	15.000,00
	TOTAL FOR PRELIMINARIES CARRIED TO SUMMARY				**133.000,00**

No	DESCRIPTION	UNIT	QTY	RATE	AMOUNT - SLRS
B	**EXCAVATION AND EARTH WORK**				
1	Rates for excavation shall include for all				
	necessary working spaces.	Note			
2	Rate for excavation shall include for dewatering				
	if required.	Note			
3	Excavation for column pits not exceeding 3'0"				
	deep commencing from the existing ground level				
	including levelling and ramming bottom part				
	return fill in and well ram and disposed excavated				
	material as directed.	Cube	4,05	915,00	3.705,75
4	- Ditto - for wall foundation - do -.	Cube	4,89	915,00	4.474,35
5	Earth filling within foundation in approved				
	selected imported materials to be well compacted				
	not less than 6" layers as directed.	Cube	12,00	1.450,00	17.400,00
	TOTAL FOR EXCAVATION & EARTH WORK				
	CARRIED TO SUMMARY			**SLRs.**	**25.580,10**

No	DESCRIPTION	UNIT	QTY	RATE	AMOUNT - SLRS
C	**CONCRETE WORK**				
1	All concrete work shall comply to the				
	specifications, filled in to formwork and well				
	packed around reinforcement.	Note			
2	Rate for concrete columns, wall shall include				
	for kickers.	Note			
	Concrete				
	Up to First Floor Level				
3	2" thick lean cement concrete 1:3:6 (1") screed				
	for column footing.	Sqr.	1,35	3.230,00	4.360,50
4	-Ditto- for wall foundation	Sqr.	4,89	3.230,00	15.794,70
5	1:3:6 mass concrete 3" thick for ground floor slab				
	and pavement.	Sqr.	7,36	4.800,00	35.328,00
	1:2:4 (3/4") concrete to the following				
6	Column shaft 9" x 9"	Cube	0,85	25.000,00	21.250,00
7	Column footing 3'x3' x 9"	Cube	1,01	25.000,00	25.250,00
8	External Drain	Cube	1,40	25.000,00	35.000,00
9	Beams 9" x 20" & 9" x 15"	Cube	1,24	25.000,00	31.000,00
10	Beams 9" x 9"	Cube	0,56	25.000,00	14.000,00
	Formwork				
11	All formwork shall be so constructed that no				
	grout shall leak out during concreting.	Note			
12	Formwork is measured as the net contact surface.	Note			
13	Formwork shall be plywood or steel shutter and				
	G.I pipe supporting system.	Note			
14	Rate for formwork shall include for necessary				
	boarding supports, erecting, framing, removing,				
	cleaning and wetting.	Note			

No	DESCRIPTION	UNIT	QTY	RATE	AMOUNT - SLRS
	Up to First Floor Level				
15	For column shaft	Sqr.	4,50	4.800,00	21.600,00
16	For column footing.	Sqr.	1,35	4.800,00	6.480,00
17	Side and soffit of beams.	Sqrs	2,60	6.250,00	16.250,00
18	Strom water drain	Sqrs	7,84	4.000,00	31.360,00
	Reinforcement				
	Up to 1st Floor Level				
19	For column footing	Cwt	4,2	6.960,00	29.371,20
20	For column shaft	Cwt	4,72	6.960,00	32.851,20
21	For beams.	Cwt	7,40	6.960,00	51.504,00
22	Storm water drain	Cwt	2,80	6.960,00	19.488,00
	Precast Lintols and beams				
	(Ground flooor all doors and windows)				
23	4" x 4" lintols including necessary formwork				
	and steel for upper, Floor.	L.ft	55,50	140,00	7.770,00
	TOTAL FOR CONCRETE WORK				
	CARRIED TO SUMMARY			**SLRs.**	**398.657,60**

No	DESCRIPTION	UNIT	QTY	RATE	AMOUNT - SLRS
D	**MASONRY WORK**				
1	Rates for masonry works shall include for				
	plumbing angles, forming rebates revels, square				
	cutting and racking of joints for plastering.	Note			
2	Bricks in all brick work shall be in Grade 1				
	quality, acceptable to the Consultant.	Note			
3	Any cost due to rejection of poor quality bricks to				
	be borne by the Contractor.	Note			
4	Rate shall include for stiffeners unless otherwise				
	measured separately.	Note			
	From D.P.C. to First Floor Level				
5	4" thick 16" x 8" cement block work in cement	Sqr.	18,37	5.750,00	105.627,50
	sand 1:5				
	Rubble work.				
6	Random rubble masonry work for foundation in				
	cement and sand 1:5	Cube	14,67	14.280,00	209.487,60
	TOTAL FOR MASONRY WORK				
	CARRIED TO SUMMARY			**SLRs.**	**315.115,10**

No	DESCRIPTION	UNIT	QTY	RATE	AMOUNT - SLRS
E	**ASPHALT WORK**				
	Water Proofing Treatment to Concrete Slab				
1	Rate shall include for:				
	a. Clean with wire brush where necessary the				
	concrete surface and remove dust etc., prepare				
	the concrete surface to receive the treatment.	Note			
2	D.P.C. in 1:3 cement and sand 3/4" thick with two				
	layers of hot tar.	Sqr.	4,89	4.560,00	22.298,40
	TOTAL FOR ASPHALT WORK				
	CARRIED TO SUMMARY			**SLRs.**	**22.298,40**

No	DESCRIPTION	UNIT	QTY	RATE	AMOUNT - SLRS
F	**CARPENTRY & JOINERY**				
	Timber Doors				
1	Timber for all doors and windows shall be treated, well seasoned, approved best quality luxury class timber and all door and window frames shall be 4" x 3" as specified and thickness of the sashes shall be 1 1/4" size for doors and windows shall be the finished size (unless otherwise specified) All timber sizes specified in the Bill of Quantities or shown in the drawing shall be finished size without allowance for planning.	Note			
2	Timber for all doors and windows shall be as follows:				
	Door frames - Balaw				
	Door sashes - Mahogany				
	Window frames - Balaw				
	Window sashes - Mahogany	Note			
3	All ironmongery locks to be supplied by the client.	Note			
4	All glass shall be clear float glass in thickness to suit with the size of glass piece but not less than 5mm thick. All glass shall be approved make.	Note			
5	Single sash timber flush panelled door type D 3'- 6"x 8' - 0" high overall with timber slats above and 4"x3" frame including all necessary ironmongery as per detail drawing	Nos.	5,00	22.000,00	110.000,00
6	Glazed timber window type W1, 4' - 0"x 4' - 6" high overall with timber slats above and 4" x 3" frame timber including all necessary ironmongery	Nos.	6,00	14.000,00	84.000,00
	TOTAL FOR CARPENTRY & JOINERY				**194.000,00**
	CARRIED TO SUMMARY				

No	DESCRIPTION	UNIT	QTY	RATE	AMOUNT - SLRS
G	**ROOFER AND ROOF PLUMBING WORK**				
1	All timber size specified in drawings shall be				
	finished size without allowance for planning.	Note			
2	Rate for timber shall include for cutting, waste,				
	transport, handling and well seasoned for insect				
	attacks with an application of wood preservative.	Note			
3	Rate shall include for timber frame work with				
	necessary cutting, hoisting, planning placing in				
	position including all wall plates, ridge plates, hip				
	rafters, rafters reepers etc. valley gutter, hip				
	ridge tiling and flashing.	Note			
4	Corrugated fiber cement roof with timber frame work,				
	and exposed rafters as per detail drawing	Sqr.	20,58	18.000,00	370.440,00
5	10" x 1" valance board Kempas fixed to eave with				
	two coats of paint as per detail drawing	L.ft	172,00	195,00	33.540,00
6	- Ditto - for barge board at eave	L.ft	52,00	195,00	10.140,00
7	3 1/2" dia. PVC down pipe with necessary				
	brackets as per detail drawing.	L.ft	96,00	115,00	11.040,00
8	4 1/2" UPVC square type gutter with necessary				
	brackets as per detail drawing.	L.ft	172,00	120,00	20.640,00
09.	Ridge	L.ft	86,00	100,00	8.600,00
	TOTAL FOR ROOFER & ROOF PLUMBING WORK				
	CARRIED TO SUMMARY			**SLRs.**	**454.400,00**

No	DESCRIPTION	UNIT	QTY	RATE	AMOUNT - SLRS
H	**FLOOR, WALL & CEILING FINISHES**				
1	Plaster of door window reveals not measured				
	separately. Rate shall include for the above cost.	Note			
	Floor Finishes				
02	Cement rendering 1:3 ,3/4" thick smooth finish				
	with coloured cement to ground floor.	Sqr.	16,00	2.640,00	42.240,00
	Skirting				
03	Cement skirting to ground floor 4" x 3/4"	L.ft	377,00	46,00	17.342,00
	Wall Finishes				
04.	Samples to be approved by Architect for good				
	quality plaster.	Note			
05	Rates for plastering shall include for forming doors				
	and windows reveals.	Note			
06	Internal plaster 5/8" thick in lime cement andsand				
	1:1:5 finished smooth with lime putty to masonry				
	walls in ground floor, including revealswith fine				
	sand top layer.	Sqr.	18,37	2.220,00	40.781,40
07.	External plaster 5/8" thick in lime cement and				
	sand 1:1:5 finished semi rough in ground floor,				
	including reveals with - do -	Sqr.	2,40	2.035,00	4.884,00
08	Plastering 1:2 cement sand 5/8" thick finished				
	smooth with coloured cement to plinth in ground	Sqr.	3,00	2.125,00	6.375,00
	floor.				
	Ceiling Finishes				
09	Beam Plastering	Sqr.	3,35	3.325,00	11.138,75
	TOTAL FOR FLOOR, WALL & CEILING FINISHES				
	CARRIED TO SUMMARY			**SLRs.**	**63.179,15**

No	DESCRIPTION	UNIT	QTY	RATE	AMOUNT - SLRS
I	**PAINTING WORK**				
1	Rate for painting to plastered areas shall include				
	for painting reveals.	Note			
2	Rate shall include for all preparation of surfaces,				
	cleaning down, smooth, protection of clean floors,				
	door window and furniture, etc.,	Note			
3	Painting cost of door window reveals not				
	measured separately.				
	Rate shall include for the above.	Note			
4	Sample approval should be obtained from				
	Architect prior to start work.				
	Internal				
	Prepare and apply one coat of primer and two				
	coats of emulsion paint of approved colour to the				
	following.				
5	To ground floor walls.	Sqr.	18,37	1.920,00	35.270,40
	External				
	Prepare and apply one coat of primer and two				
	coats of weather shield paint of approved colour				
	to the following.				
6	To ground floor walls.	Sqr.	12,47	2.280,00	28.431,60
	Ceiling				
7	Fiber cement flat ceiling with two coats of emulsion				
	and one coat of wall primer finish to ceiling.	Sqr.	10,00	2.400,00	24.000,00
8	Painting of Fiber cement roof top with Roof shield	Sqr.	20,58	2.170,00	44.658,60
	painting.				
	Doors and Windows				
9	Prepare and apply one coat of wood primer and				
	two coats of matt finish enamel paint of approved				
	colour.	Sqr.	4,50	2.085,00	9.382,50
	TOTAL FOR PAINTING WORK				
	CARRIED TO SUMMARY			**SLRs.**	**141.743,10**

No	DESCRIPTION	UNIT	QTY	RATE	AMOUNT - SLRS
J	**ELECTRICAL INSTALLATION**				
1	Rate shall include for all cables junction boxes				
	conduits, pull boxes, clips, earth cable, draw wire				
	point and other working accessories.Point wiring for				
	ceiling fan shall include for providing fan hook.	Note			
2	All MCB, ELCB, MCB's shall be in Merlin Gerinor				
	equivalent. All switches shall be "Clipsal" or				
	equivalent.	Note			
3	Cost for supplying and intallation of total electrical	Item		allow	75.000,00
	work (point wiring and lamp fittings)				
	TOTAL FOR ELECTRICAL INSTALLATION				
	CARRIED TO SUMMARY			**SLRs.**	**75.000,00**

No	DESCRIPTION	UNIT	QTY	RATE	AMOUNT - SLRS
K	**MISCELLANEOUS WORK**				
01.	Supply & fix timber double sashes gates to wall where				
	necessary including with all Iron mongary.(02 Nos	sq.ft.	24,00	450,00	10.800,00
	TOTAL FOR MISCELLANEOUS WORKS				
	CARRIED TO SUMMARY			**SLRs.**	**10.800,00**

	ENGINEERING ESTIMATE FOR FISHERS COMMUNITY CENTRE BUILDING				
	BADDEWATTA				
	S U M M A R Y				
A	PRELIMINARIES			**SLRs.**	**133.000,00**
B	EXCAVATION & EARTH WORK			**SLRs.**	**25.580,10**
C	CONCRETE WORK			**SLRs.**	**398.657,60**
D.	MASONRY WORK			**SLRs.**	**315.115,10**
E	ASPHALT WORK			**SLRs.**	**22.298,40**
F.	CARPENTRY & JOINERY			**SLRs.**	**194.000,00**
G.	ROOFER & ROOF PLUMBING WORK			**SLRs.**	**454.400,00**
H	FLOOR WALL & CEILING FINISHES			**SLRs.**	**83.671,60**
I	PAINTING WORK			**SLRs.**	**141.743,10**
J	ELECTRICAL INSTALLATION			**SLRs.**	**75.000,00**
K	MISCELLANEOUS WORK			**SLRs.**	**10.800,00**
		TOTAL SUM		**SLRs.**	**1.854.265,90**
	Add: 10% Contengencies				**185.426,59**
	GRAND TOTAL				**2.039.692,49**
I hreby certify that the above rates are fair and reasonable.					
			……………………………..		
………………………..					
			QUANTITY SURVEYOR		
CIVIL SUPERINTENDENT					
Date:……………..					

Baddewatha, Auction shed

Only the summary page:

	ENGINEERING ESTIMATE FOR AUCTION SHED AS' I				
	AT BADDEWATTA LANDING CENTRE.				
	SUMMARY				
A.	EXCAVATION & EARTH WORK			**SLRs.**	**7.866,05**
B	CONCRETE WORK			**SLRs.**	**143.255,00**
C	MASONRY WORK			**SLRs.**	**35.324,10**
D	ASPHALT WORK			**SLRs.**	**3.978,00**
E	ROOFER & ROOF PLUMBING WORK			**SLRs.**	**117.570,00**
F.	FLOOR WALL & CEILING FINISHES			**SLRs.**	**30.137,75**
G	PAINTING WORK			**SLRs.**	**18.658,80**
H	ELECTRICAL INSTALLATION			**SLRs.**	**25.000,00**
		TOTAL SUM		**SLRs.**	**381.789,70**
	Add: 10% Contengencies				38.178,97
	GRAND TOTAL				**419.968,67**
I hreby certify that the above rates are fair and reasonable.					
………………………..			…………………………..		
CIVIL SUPERINTENDENT			QUANTITY SURVEYOR		
Date:……………..					

Kottegoda, Fishermen's facility building

Only the summary page:

	ENGINEERING ESTIMATE FOR FISHERMENS' FACILITY BUILDING				
	AT KOTTEGODA ACHORAGE.				
	SUMMARY				
A	PRELIMINARIES			**SLRs.**	**133.000,00**
B	EXCAVATION & EARTH WORK			**SLRs.**	**19.694,60**
C	CONCRETE WORK			**SLRs.**	**1.142.472,95**
D.	MASONRY WORK			**SLRs.**	**203.983,40**
E	ASPHALT WORK			**SLRs.**	**37.629,10**
F.	CARPENTRY & JOINERY			**SLRs.**	**241.500,00**
G.	ROOFER & ROOF PLUMBING WORK			**SLRs.**	**397.440,00**
H	FLOOR WALL & CEILING FINISHES			**SLRs.**	**176.494,10**
I	PAINTING WORK			**SLRs.**	**224.463,44**
J	ELECTRICAL INSTALLATION			**SLRs.**	**175.000,00**
K.	MISCELLANEOUS WORK			**SLRs.**	**95.700,00**
	TOTAL SUM			**SLRs.**	**2.847.377,59**
	Add: 10% Contengencies				284.737,76
	GRAND TOTAL				3.132.115,35
In words Three Million One Hundred Thirty Two Thousand One Hundred Fifteen and Thirty Five cents					
I hreby certify that the above rates are fair and reasonable.					
………………………..			…………………………..		
CIVIL SUPERINTENDENT			QUANTITY SURVEYOR		
Date:……………..					

Kottegoda, Auction shed

Only the summary page:

ENGINEERING ESTIMATE FOR AUCTION SHED AS' 2
AT KOTTEGODA LANDING CENTRE. .

S U M M A R Y

A.	EXCAVATION & EARTH WORK	**SLRs.**	**18.172,95**
B	CONCRETE WORK	**SLRs.**	**247.706,90**
C	MASONRY WORK	**SLRs.**	**60.029,20**
D	ASPHALT WORK	**SLRs.**	**7.047,60**
E	ROOFER & ROOF PLUMBING WORK	**SLRs.**	**225.540,00**
F.	FLOOR WALL & CEILING FINISHES	**SLRs.**	**61.132,85**
G	PAINTING WORK	**SLRs.**	**40.381,20**
H	ELECTRICAL INSTALLATION	**SLRs.**	**25.000,00**
	TOTAL SUM	**SLRs.**	**685.010,70**
	Add: 10% Contengencies		**68.501,07**
	GRAND TOTAL		**753.511,77**

In wards Rupees Seven Hundred,fifty three thousand five hundred eleven and cents seventy seven only.

I hreby certify that the above rates are fair and reasonable.

……………………….. ………………………….

CIVIL SUPERINTENDENT QUANTITY SURVEYOR

Date:……………..

Welipatanwila, Fishermen's facility building

Only the summary page:

	ENGINEERING ESTIMATE FOR FISHERMENS' FACILITY BUILDING		
	AT WELIPATHANWILA ANCHORAGE.		
	S U M M A R Y		
A	PRELIMINARIES	**SLRs.**	**133.000,00**
B	EXCAVATION & EARTH WORK	**SLRs.**	**19.404,40**
C	CONCRETE WORK	**SLRs.**	**737.262,25**
D.	MASONRY WORK	**SLRs.**	**174.060,80**
E	ASPHALT WORK	**SLRs.**	**10.198,80**
F.	CARPENTRY & JOINERY	**SLRs.**	**119.500,00**
G.	ROOFER & ROOF PLUMBING WORK	**SLRs.**	**370.840,00**
H	FLOOR WALL & CEILING FINISHES	**SLRs.**	**95.508,70**
I	PAINTING WORK	**SLRs.**	**229.161,43**
J	ELECTRICAL INSTALLATION	**SLRs.**	**100.000,00**
K.	MISCELLANEOUS WORK	**SLRs.**	**34.170,00**
	TOTAL SUM	**SLRs.**	**2.023.106,38**
	Add: 10% Contengencies		**202.310,64**
	GRAND TOTAL		**2.225.417,02**

I hreby certify that the above rates are fair and reasonable.

……………………….. …………………………..

CIVIL SUPERINTENDENT QUANTITY SURVEYOR

Date:……………..

Appendix M Reference list of photos on attached CD

District	FI Division	Name of FLC, anchorage or Fishing port	Picture Numbers
COLOMBO			
		Mutwal	9630 – 9647
KALUTARA DISTRICT			
		Panadura, fishing harbour	9648 – 9665
		Katukurunda North, FLC	9669 – 9686
		Kudawa, Maggona, anchorage	9690 – 9711
		Beruwala, fishing harbour	9713 – 9752
		Maradana, anchorage	9753 – 9770
		Payagala North, FLC	9777 – 9786
		Kalutara North, FLC	9787 – 9806
		Wadduwa, FLC	9807 – 9822
GALLE DISTRICT			
		Haraspola, anchorage	9825 – 9842
		Modarawatha, FLC	9843 – 9857
		Hirawatha, FLC	9858 – 9867
		Hikkaduwa, fishing harbour	9871 – 9898
		Dodanduwa, anchorage	9899 – 0033
		Galle fish market	0045 – 0049
		Granite quarry in Galle	0073 – 0092
		Peellagoda, Unawatuna, FLC	0093 – 0105
		Kathaluwa, anchorage	0106 – 0119
MATARA DISTRICT			
		Kapparathota, anchorage	0122 – 0152
		Palliyawella, Pelana West, FLC	0153 – 0158
		Baddewatha, Pelana South, FLC	0159 – 0191
		Mirissa, fishing harbour	0192 – 0222
		Puranawella, fishing harbour	0223 – 0233
		Kiralawella, FLC	0234 – 0243
		Gandara, anchorage	0255 – 0289
		Kottegoda, anchorage	0290 – 0313
		Nilawella, anchorage	0319 – 0348
HAMBANTOTA DISTRICT			
		Kudawella, fishing harbour	0349 – 0369
		Kudawella south, FLC	0370 – 0409
		Mawella, FLC	0410 – 0427
		Rekawa, anchorage	0440 – 0468
		Kahandamodara, flc	0480 – 0500
		Kalametiya, anchorage	0501 – 0534
		Welipatanwila, anchorage	0535 – 0561
		Godawaya, flc	0566 – 0597
		Hambantota, fishing harbour	0601 – 0618
		Kirinda, fishing harbour	0619 – 0645

District	FI Division	FLC, anchorage, Fishing harbour	Picture Numbers
KALMUNAI DISTRICT			
	Pottuvil F.I. Division		
		Sinnaullai, Pottuwil, anchorage	0903 – 0916
		Kudakalli, FLC	0917 – 0928
		Jalaldeen Square, FLC	0875 – 0885
		Kodimarathady, FLC	0888 – 0902
		Panama, anchorage	0929 – 0947
		Komari, FLC	0958 – 0964
	Thirukovil F.I. Division		
		Thanadiyadi, FLC	0965 – 0979
		Vinayagampuram, FLC	0981 – 1000
		Thirukovil, FLC	1002 – 1012
		Tampetti, FLC	1019 – 1025
	Addalaichenai F.I. Division		
		Oluvil, FLC	1026 – 1040
	Ninatvur F.I. Division		
		Ninthavur, FLC	1041 – 1046
	Karaitivu F.I. Division		
		Karaitivu, FLC	1051 – 1063
		Maligaikadu, FLC	1064 – 1086
	Sainthamaruthu F.I. Division		
		Sainthamararuthu, anchorage	1087 – 1115
	Kalmunai F.I. Division		
		Kalmunai Kudy (Kadakaripalli, Thaika mosque, Thonawatha)	1116 – 1122
		Kalmunai Tamil, Kurundaiyadi, FLC	1141 – 1151
		Periyaneelawanai, landing centre	1125 – 1140
MANNAR DISTRICT			
	Mannar		
		Pallaimunai	1483 – 1495
		Panankaddikoddu	1475 – 1482
		Talvupadu	1433 – 1467
	Pesali		
		Talaimannar West	1317 – 1355
		Talaimannar Pier	1356 – 1382
		Pesalai	1399 – 1432
	Nanattan		
		Vankalai	1469 – 1474

District	FI Division	FLC, anchorage, Fishing harbour	Picture Numbers
TRINCOMALEE DISTRICT			
	Kuchchavely		
		Pulmoddal, Jinnapurm Div no IV FLC	1650 – 1660
		Pulmoddal, Arsimalei Div no II, FLC	1626 – 1649
		Kallarawn, FLC	1672 – 1681
		Pudayakattu, FLC	1682 – 1694
		Kuchchavely, FLC	1703 – 1730 and 1608 – 1613
	Trinco North I		
		Irakandy, FLC	1731 – 1747
		Sally, FLC	1748 – 1769
	Trinco Town I		
		Wegra Nagar, FLC	1545 – 1561
		Div. No. 10, FLC	1564 – 1599
		Sinnakadai, FLC	1920 – 1935
		Sandybay, FLC	1889 – 1903
		Periyakadai, FLC	1906 – 1919
	Trinco Town II		
		Srimapura, FLC	1952 – 1958
	Muthur		
		Vaddam, FLC	1783 – 1799
		Thakwa Nagar, FLC	1801 – 1837
		Habeeb Nagar, FLC	1838 – 1848
	Kinniya		
		Thona, FLC	1864 – 1882
BATTICALOA DISTRICT			
	Valaichenai		
		Pethalai, FLC	1977 – 1985
		Kalkudah, FLC	1970 – 1976
	Chenkalady, F.I: Division		
		Kaluwankerny, FLC	2071 – 2096
	Manuunai (N-1), F.I. Division		
		Palameenmadu, FLC, sea side	2004 – 2018
		Palameenmadu, FLC, lagoon side	2022 – 2042
	Manmunai (N-2)		
		Navalady, FLC	1997 – 2002
		Poonochchimunai, FLC	2060 – 2070
	Kattankudy		
		Eathukai Naduththurai,	2046 – 2059

Appendix N Itinerary

Itinerary of the Infrastructure Specialist during the first part of his mission.

Week	Calendar day	Week day	Travel	Overnight
Week 36	12.09.2005	M	Leave Reykjavik for Colombo	
	13.09.2005	T	Arrive in Colombo	Colombo
	14.09.2005	W		Colombo
	15.09.2005	T		Colombo
	16.09.2005	F		Colombo
	17.09.2005	S	Coastline of Kalutara	Colombo
	18.09.2005	S		Colombo
Week 37	19.09.2005	M		Colombo
	20.09.2005	T	Coastline of Galle	Galle
	21.09.2005	W	Coastline of Matara	Tangalle
	22.09.2005	T	Coastline of Hambantota	Tangalle
	23.09.2005	F	Coastline of Hambantota	Hambantota
	24.09.2005	S	Back to Colombo	Colombo
	25.09.2005	S		Colombo
Week 38	26.09.2005	M		Colombo
	27.09.2005	T		Colombo
	28.09.2005	W	Travel and south Ampara	Potteville
	29.09.2005	T	Coastline of Ampara	Ampara
	30.09.2005	F	Back to Colombo	Colombo
	01.10.2005	S		Colombo
	02.10.2005	S		Colombo
Week 39	03.10.2005	M		Colombo
	04.10.2005	T		Colombo
	05.10.2005	W		Colombo
	06.10.2005	T		Colombo
	07.10.2005	F		Colombo
	08.10.2005	S		Colombo
	09.10.2005	S		Colombo
Week 40	10.10.2005	M		Colombo
	11.10.2005	T		Colombo
	12.10.2005	W	Leave Colombo for Rome	Rome
	13.10.2005	T	Debriefing in Rome	Rome
	14.10.2005	F	Leave Rome for Reykjavik	

Itinerary of the Infrastructure Specialist during the second part of his mission.

Week	Calendar day	Week day	Travel	Overnight
Week 45	14.11.2005	M	Leave Reykjavik for Colombo	
	15.11.2005	T	Arrive in Colombo	Colombo
	16.11.2005	W	Office	Colombo
	17.11.2005	T	Office	Colombo
	18.11.2005	F	Office	Colombo
	19.11.2005	S	Office	Colombo
	20.11.2005	S	Office	Colombo
Week 46	21.11.2005	M	Office	Colombo
	22.11.2005	T	Office	Colombo
	23.11.2005	W	Colombo to Mannar	Mannar
	24.11.2005	T	Mannar district	Mannar
	25.11.2005	F	Mannar to Trincomalee	Trincomalee
	26.11.2005	S	Trincomalee to Pulmoddal	Trincomalee
	27.11.2005	S	Mutur and Kinniyai	Trincomalee
Week 47	28.11.2005	M	Trincomalee to Batticaloa	Batticaloa
	29.11.2005	T	Batticaloa district, to Colombo	Colombo
	30.11.2005	W	Office	Colombo
	01.12.2005	T	Office	Colombo
	02.12.2005	F	Office	Colombo
	03.12.2005	S	Office	Colombo
	04.12.2005	S	Office	Colombo
Week 48	05.12.2005	M	Office	Colombo
	06.12.2005	T	Office	Colombo
	07.12.2005	W	Office	Colombo
	08.12.2005	T	Office	Colombo
	09.12.2005	F	Office	Colombo
	10.12.2005	S	Office	Colombo
	11.12.2005	S	Office	Colombo
Week 49	12.12.2005	M	Office	Colombo
	13.12.2005	T	Leave Colombo for Rome	
	14.12.2005	W	Debriefing in Rome	Rome
	15.12.2005	T	Debriefing in Rome	Rome
	16.12.2005	F	Leave Rome for Reykjavik	

Appendix O Terms of Reference

Infrastructure Specialist

Under the overall direction of the Chief, TCEO, and the technical supervision of the Chief FIIT, in coordination with the FAO Representative in Sri Lanka, and in close collaboration with the FAO Fisheries Adviser in Sri Lanka, as well as the Ceylon Fishery Harbours Corporation, fisher communities, fish traders, local authorities including field staff of the Department of Fisheries and Aquatic Resources and other national and international fisheries consultants, the incumbent will assist the Ministry of Fisheries and Aquatic Resources to prepare a master plan for the reconstruction and development of fisheries anchorages and associated facilities along the coasts of Sri Lanka. The incumbent will in particular:

a) Consolidate and update the information on existing anchorages with regard to type, location, structures, facilities and post-tsunami status.
b) Assess the utilisation of each anchorage with regard to amount of fish landed and number of boats of different types using the facilities.
c) Identify needs for improvement, development and expansion of each anchorage with due consideration to the level of exploitation of the fishery resources, trends in the development of the fishing fleet, marketing preferences and likely costs of construction of structures and facilities.
d) Classify the anchorages on the basis of present importance, future needs and development potential.
e) Prepare general recommendations and outlines of modular structures and facilities suitable for the anchorages.
f) Identify needs for further studies and investigations required for the finalisation of a master plan for the development of the fisheries anchorages.
g) Outline the requirements for management of the master plan at CFHC and for coordination with fisher communities, local authorities and donor agencies in connection with the implementation of the plan.
h) perform any other duties as required.