FISHERIES SECTOR DEVELOPMENT STRATEGY

2010-2013

Ministry of Fisheries and Aquatic Resources Development
New Secretariat, Maligawatta
Colombo 10

CHAPTER 1

1.0 Introduction

1.1 Fishing industry- An overview

The fisheries sector is an important sector in the Sri Lankan economy of the country as it:

- Contributes to the GDP; 1.179 % (2009)
- Provides employment; 2.4 Million direct & indirect
- Contributes 70 percent to the animal protein intake of the masses
- Contributes to foreign exchange earnings. Rs 21,015 Mn (2009)

The sector can be divided into three sub sectors:

- Coastal fisheries; which take place within the continental shelf and undertaken by the fishing crafts in single day operations. The total area of the continental shelf is about 30,000km^2.

- Offshore fisheries; which take place outside the continental shelf and beyond extending up to the edge of the Exclusive Economic Zone and even in the high seas by multi-day boats.

- Inland fisheries & aquaculture.

Inland fisheries take place in perennial and seasonal tanks and reservoirs expanding economic activities which provide cheap protein, incomes and employment for the rural mass. Aquaculture is still in its infant stages and is limited to coastal shrimp (*Penaeus* spp) culture and the production of fish seed for stocking/farming of food fish in seasonal tanks and perennial tanks. The freshwater fisheries potential of Sri Lanka consists of nearly 260,000 ha while brackish water potential contain 120,000 ha of lagoons, river estuaries, mangrove swamps and salt marshes.

1.2 The Resource base

Sri Lankan fisheries and aquatic resource base includes a territorial sea of 21,500 km^2 and an Exclusive Economic Zone (EEZ) of 517,000 km^2. The country has a narrow continental shelf with an average width of 22 km. Its extent is 30,000 km^2 which is 5.8% of the country's ocean area.

Sri Lanka has a coastline of around 1,700 km and the coastal zone is of considerable socio-economic importance. More importantly it contains a variety of coastal habitats that include estuaries and lagoons, mangroves, sea grass beds, salt marshes, coral reefs and large extents of beaches and dunes that are vital to ecological functioning and maintenance of coastal bio-diversity.
Sri Lanka has an extensive freshwater and brackish water resource to sustain viable fishing activities. According to National Aquaculture Development Authority (NAQDA) these comprise around 260,000 ha of large irrigation reservoirs (70,850), Medium irrigation

reservoirs (17,004 ha), Minor Irrigation reservoirs (39,271 ha), seasonal village tanks (100,000 ha) Flood lakes (41,049 ha), upland reservoirs/estate tanks (8,097ha) and Mahaweli river basins (22,670 ha). On the basis of their size and fishery management norms the reservoirs in the country can be grouped under three broad categories: large (over 800 ha) and medium (200-800 ha) which are used for capture fisheries; small (1-200 ha) irrigation reservoirs for culture-based fisheries and seasonal tanks which hold water for 6 - 8 months a year for culture based fisheries.

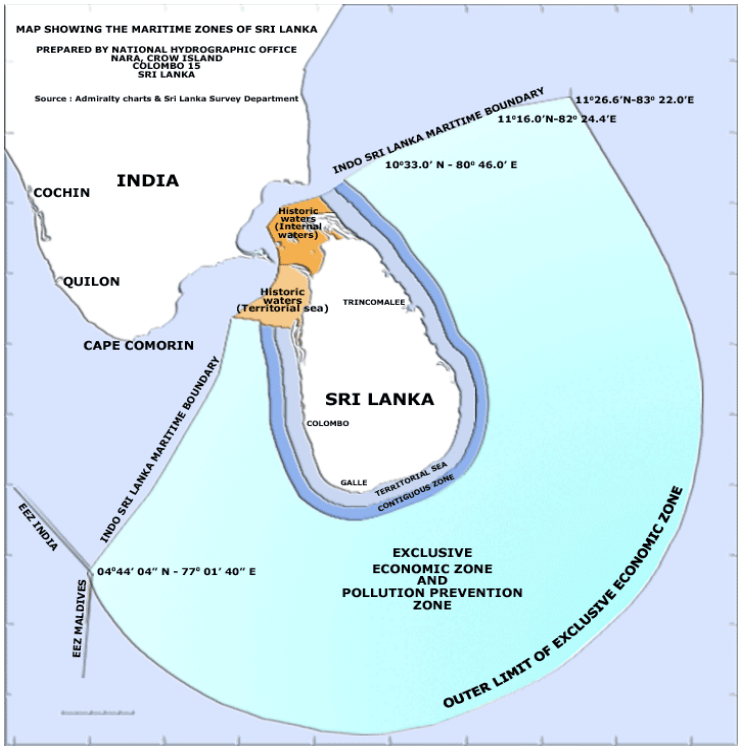

Figure 1.1 Maritime boundary of Sri Lanka

Figure 1.2 Continental shelf of Sri Lanka

The Ministry of Fisheries and Aquatic Resources Development is responsible for the overall

planning, development, promotion and management of the fisheries sector in the country. The Ministry directly engages itself with the formulation of plans, policies and strategies in the areas related to fisheries and aquatic resources.

The Ministry has four statutory bodies (earlier five), a Department (earlier two), and a public company under its purview namely, Ceylon Fisheries Corporation (CFC), Ceylon Fishery Harbors Corporation (CFHC),National Aquatic Resources Research and Development Agency (NARA), National Aquaculture Development Authority (NAQDA), Department of Fisheries and Aquatic Resources (DFAR) and Cey-nor Foundation Limited respectively.

Ceylon Fisheries Corporation (CFC)
CFC is responsible in purchasing and sale of fish, production and sale of ice, provision and maintenance of cold storage facilities and production and sale of fishery by-products.

Ceylon Fishery Harbours Corporation (CFHC)
CFHC was established to provide and maintain fisheries infrastructure facilities such as proper landing facilities through construction, maintenance and management of harbors and anchorages. CFHC is also responsible for carrying out maintenance dredging activities at its fishery harbours as well.

National Aquatic Resources Research and Development Agency (NARA)
NARA is the research arm of the Ministry and conduct research on all living and non-living aquatic resources in Sri Lanka. Besides this, it is also responsible for development, management and conservation of aquatic resources. Knowledge dissemination activities and provision of advisory services are also important functions performed by the NARA.

National Aquaculture Development Authority (NAQDA)
NAQDA has been vested with functions of development and management of all freshwater aquatic resources in the country. It promotes development of aquaculture and sea farming too.

Department of Fisheries and Aquatic Resources (DFAR)
Management, regulation, conservation and development of fisheries and aquatic resources are the functions of the Department of Fisheries and Aquatic Resources.

Cey-No Foundation Limited
Building, manufacturing and selling of fishing crafts, engines, & gear and the operation of workshops for repairing of fishing crafts, engines and other fishing equipment are carry out by the Cey-Nor Foundation Limited, the Government owned public company.

1.3 Fisheries Industry

The fishery of Sri Lanka is a primary source of animal protein. It is about 65% of the animal protein.. In 2009 approximately 68% of fish and fishery products are supplied for the consumption through local production.

Fishing activities take place around the entire coastline of Sri Lanka. There are 15 fisheries harbors in operation and three are under construction. In addition 40 anchorages and 1562

(marine 790 & 772 inland) fish landing sites provide fish landing facilities for fishing crafts except multiday boats.
Fish landed at fishery harbors are generally transported to the wholesale market for local consumption and processing factories for exportation. Fish landed at anchorages and landing sites are generally sold in the local market. Fish received at wholesale market is sold to retailers. They buy fish from wholesale dealers and distribute through urban stalls, village stalls and household distributors etc. Nowadays fish available at supermarkets are very popular among the urban consumers.

Sri Lanka exports prawns of all forms such as whole, shell-on, raw, frozen headless, cooked and deveined. Two major varieties, mainly cultured- giant tiger prawn, *Penaeus monodon* and white prawn *P. indicus*, are mostly exported to Japan, USA, Europe and Singapore.

Fish exports concentrated tuna species, yellow fin tuna and big eye tuna are the most important. Tuna exports are currently targeted at two main markets, Japan and the European Union. Fresh, chilled and frozen sashimi tuna or Grade 1 taste is mainly exported to the Japanese market. Exports to the European Union consist of Grade II quality lean meat, yellow fin tuna processed into vacuum packed fresh/chilled loins, fillets and streaks.

Shark fin, squid and cuttlefish attract the Singaporean and the Thai markets and beach-de-mer and shark fins are mainly exported to Japan, Taiwan, Singapore and Hong Kong. Chanks and other shells are exported to Pakistan and Bangladesh. Seaweeds are exported in small quantities to Europe and Japan.

Fish marketing is handled almost exclusively by the private sector. The government has set up a public cooperation, the Ceylon Fisheries Cooperation (CFC) to interference the fish market to the best advantage of both the producer and consumer. The government policy of Sri Lanka is not to control the activities of private traders but to encourage more persons and organizations to enter the trade and thereby to enlarge the field of competition. The CFC has never handled more than one percent of the total production. Foreign fishing vessles are regulated to sell Grade III quality fish of export varieties and all non- export varieties to CFC. CFC sells this fish at their regional stalls scattered in the country.

More emphasis needed to be made on quality assurance process of export fish. Quality Control Unit of the Department of Fisheries and Aquatic Resources has taken steps to improve the quality of fish landed and issue of health certificates.

1.4 Fishing Technology

Depending on ethnicity and religion, and the targeted resources, diverse of craft-gear combinations are used by fishers. Given the open access nature of marine fisheries, access to technology determines fish workers' access to a particular resource. According to the size of capital investment and the area of operation types of the craft will vary.

The common indigenous crafts exploiting coastal fish resources of Sri Lanka are beach seine craft, the log raft and the outrigger canoe. Fishing techniques commonly employed by these craft are small meshed gill netting and cast netting. Those who use the above craft-gear combinations are called artisanal fishermen and the technology used by them are considered eco-friendly and sustainable.

The mechanized fleet consists of mechanized traditional craft fitted with outboard engines, the 17-23 feet fiber reinforced plastic boat with outboard motor, the 28-32 feet day boat with inboard engine and the multi-day boat with crew cabin, ice and fuel holds and equipped with communication and navigation equipment. Gill netting and trawling are the most common fishing techniques employed by the small mechanized craft. Recently, a ring seine has become quite popular among the coastal fishermen who use craft with outboard motors.

The day boat with inboard engine was introduced into the offshore fishery in late 1950s' and became quite popular due to its ability to exploit fish resources that remain under utilized until then. It operates in offshore waters employing techniques such as large –meshed gill netting, long lining, single hook and multi hook trolling, and purse seine. However, this boat is not equipped with facilities to ice the fish catch and, therefore, the fishers are forced to confine their fishing activities to one day fishing trips. Some fishermen have modified this craft by inserting an ice hold which fishers engage in fishing trips of 4-5 days.

Deep sea fishing is of fairly recent origin in Sri Lanka. In fact, exploitation of deep sea resources commenced in late 1980s' with the introduction of the multi-day boat which was large in length and equipped with ice hold, fuel and water tanks, and cabin for the crew. Some of these crafts operated today are 45-50 feet in length and are powered by >50HP engines. These boats are generally equipped with radio communication equipment and satellite navigators. Large meshed gill netting and long lining are the common techniques of fishing employed by these crafts.

Today, the offshore and deep sea resources are being exploited both by Sri Lankan fishermen using day boats with inboard engines and multi-day boats and by foreign fishing vessels permitted to land fish in Sri Lankan harbors.

Table 1.1- Fleet Composition in 2009

Boat type	**Number**
Inboard multi-day	2,934
Inboard one-day	958
Out board FRP	17,193
Non-motorized traditional	18,243
Motorized traditional	2,126
Inland crafts	6,820
Total	**48,274**

Source: Fisheries statistic, MFARD

1.5 Fish production -2009

Marine fish production of Sri Lanka is dominated by coastal fish production. Fisheries statistics of the last four years demonstrates that the contribution from coastal fisheries is always exceeding the deep sea/ off shore production.

Table 1.2- Annual marine fish production

Year	Total marine catch (Mt)	Marine fish catch (Mt)			
		Coastal	%	Deep sea/ offshore	%
2009	293,170	180,410	62	112,760	38
2008	274,630	165,320	60	109,310	40
2007	252,670	150,110	59	102,560	41
2006	215,980	121,360	56	94,620	44

Source: Fisheries statistic, MFARD

Table 1.3- Fish production -2009 (Mt)

Fish production -2009 (Mt)		% share of production
Marine	**293,170**	**86%**
-Coastal	180,410	
-Offshore/deep sea	112,760	
Inland & aquaculture	**46560**	**14%**
-Shrimp farms	3,550	
-Inland culture	3,980	
-Inland capture	39,030	
Total	**339,730**	

Source: Fisheries statistic, MFAR

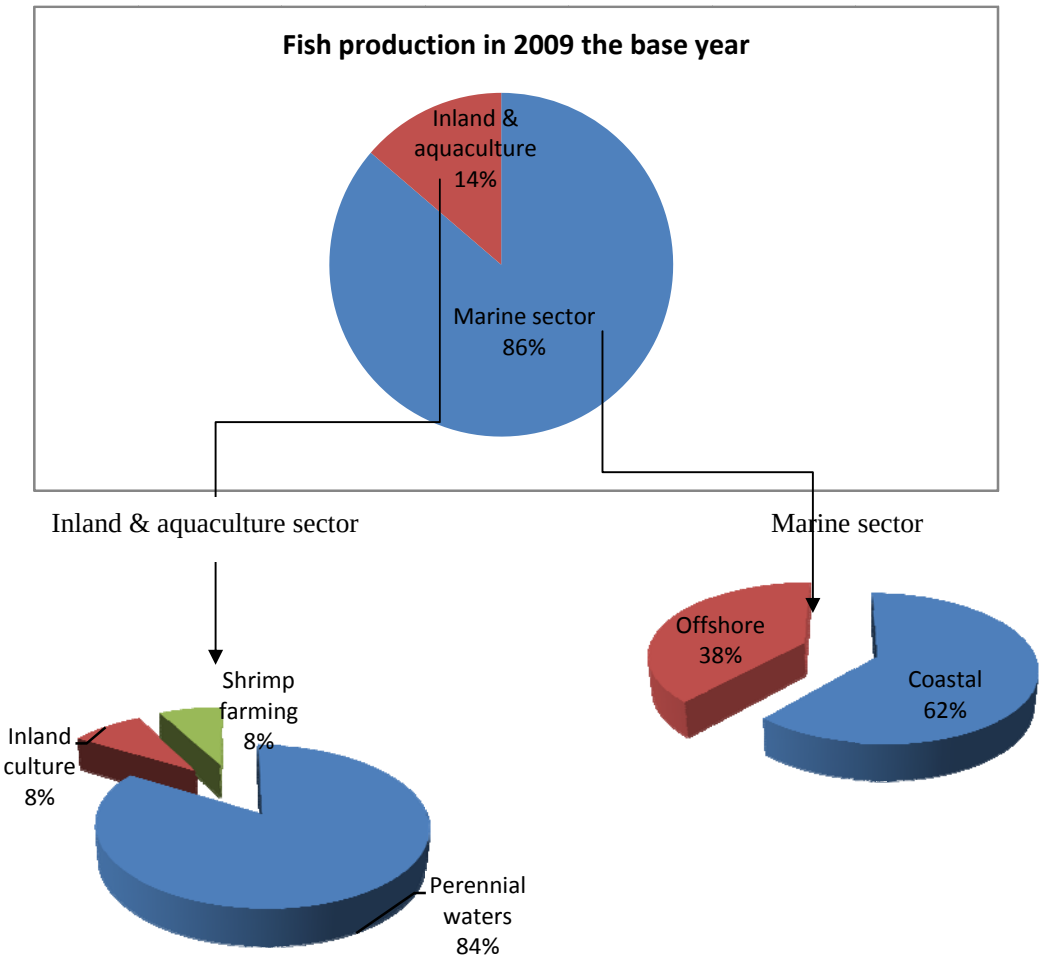

Figure 1.3- Illustration of fish production from different sectors in the base year 2009

1.6 Fish production contribution from Northern Province

Prior to the civil conflict in the Northern Province fisheries sub-sector played an important role in the regional economy and also contributed substantially by means of providing employment, income and the nutrition to the communities. In 1983 the contribution from the three districts (Mullaitivu, Jaffna & Mannar) of this province to the total marine fish production of the country was 40 percent while the contribution from the Jaffna District was 26 percent. However, with the conflict situation prevailing for more than 25 years in the Northern peninsular, the fisheries subsector has underperformed. In 2009 the Northern Province contributed only 7 percent of the total marine fish production. In order to re-build the industry, development of fisheries infrastructure in these areas is essential. Coastal fish production reported from the North and East during last three decades was negligible. Since the normalcy is prevailing in the entire country, there is an opportunity to develop marine fisheries in these regions in an accelerated phase. Thus it is possible to increase both coastal and deep sea fishing fleets considerably in these areas.

Table 1.4 - Change in fish production contribution from Northern Province

Fish production (Mt)	1983	1990	1995	2000	2005	2007	2008	2009
Northern province	75,740	24,150	4,500	8,100	24,410	15,250	13,840	21,210
Total production (Mt)	184,740	145,790	217,500	263,680	130,400	252,670	274,630	293,170
Percentage contribution	40	16	2	3	18	6	5	7

Source: Statistics Unit - Ministry of Fisheries and Aquatic Resources Development
Department of Fisheries and Aquatic Resources

1.7 Fish consumption requirement:

The Medical Research Institute (MRI) of Sri Lanka has indicated that an average per capita consumption of 60 g of fish per day would be a satisfactory level to ensure adequate nutritional status.

Availability:
In terms of food availability, the country's present net fish production does not meet the demand.

Fish balance sheet-2009

Mid year population in 2009 **20450000**

Fish production (Mt)

	(Marine	293,170 Mt
	Inland	46,560 Mt)
Total fish production		**339,730 Mt**
Export		**18,199 (Mt)**
Total production for consumption		**321,531(Mt)**
Imported wet fish		**11,406 Mt**
		332,937 Mt
Total consumable production		**233,055 (Mt)**
(Average fish recovery percentage 70%)		

Availability for consumption= Availability from production + imports
= 233,055 Mt

Per capita fish availability 11.4 kg/year (wet weight)

Per capita fish availability 31 g/day

Figure 1.4 - Fish balance sheet - 2009

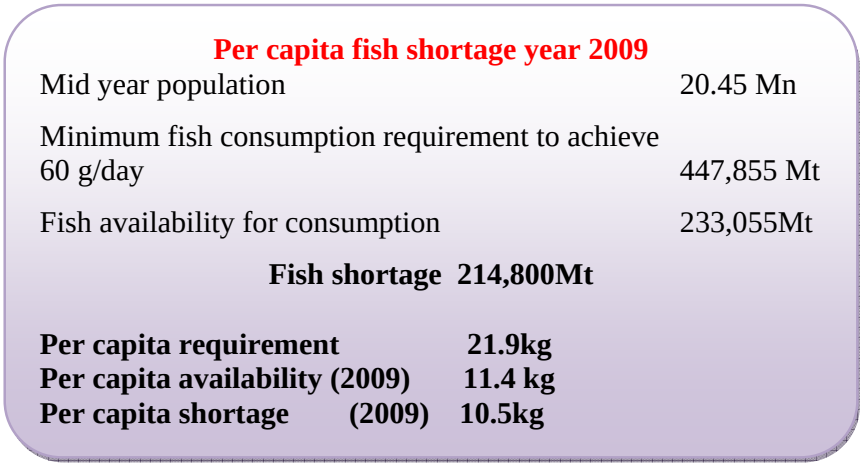

Figure1. 5- Per capita fish shortage in 2009

1.8 Fisheries Sector Development Strategy 2010-2013

The national fisheries sector development strategy for 2010-2013 has been formulated based on the *Mahinda Chintana Idiri Dekma*. It has assumed that the Sri Lankan population by 2015 would be 21.167 (http://www.statistics.gov.lk/home.asp- *http://data.un.org*) and minimum per capita fish requirement recommended by the Medical Research Institute (MRI) of Sri Lanka would be 60g per day. On this basis, fish production projections in this strategy has been formulated considering 2009 as the base year.

The major focused of the strategy are as follows:

- Increased annual per capita fish consumption of 21.9 kg by 2013;
- Increased local fish production. It has been targeted to double the national fish production of the based year by 2013;
- Established price competiveness by means of promoting marketing;
- Adopt measures for fisheries social development through fisheries development;
- Implementation and management of fisheries sustainably by using novel techniques and responding to international treaties on Law of the Sea.

CHAPTER 2

2.1 Objectives of the Fisheries Sector Development Strategy

- Increase the national fish production in order to enhance the nutritional status of the nation by means of higher per capita consumption of fish.
- Promote exploitation of Sri Lankan fisheries and aquatic resources while maintaining biological sustainability through application of novel techniques.
- Diversify the fishing industry to facilitate adaptation with the present environmental scenarios such as climatic change and episodic coastal disasters.
- Enhance the socio-economic status of the fishing communities
- Develop fisheries infrastructure in the northern and the eastern region compliance with the present and future requirements

2.2 Specific Objectives of the Strategy

The specific objectives of this plan are to:

- Increase per capita fish consumption by 60 grams per day by 2013
- Increase the local fish production by 685,690 Mt by 2013
- Price competiveness by means of promoting marketing
- Fisheries social development through enhancement of socio-economic status of the productive poor
- Implementation and management of fisheries sustainably by using novel techniques while maintaining biological sustainability.
- Assure compliance with the international treaties on Law of the Sea.
- Increase foreign exchange earnings through enhancement of fish and non-traditional fish product exports

2.3 Performance indicators

Key measurable indicators of progress in projecting fish production for the next three years are:

- Per capita availability of fish;
- Fleet size;
- Level of post harvest losses
- Contribution to GDP;
- The level of application of modern technology
- Level of employment in the fisheries sector
- Reduction of cost incurred on fish and fishery product imports
- Reduction of the mal nourished population;
- Awaiting cost in health;
- Increased market share of the CFC.

2.4 The National fish production targets (Mt)

Table: 2.1 - National fish production targets by main sectors (Mt)

Year	**2009**	**2010**	**2011**	**2012**	**2013**
Marine	293,170	349,300	416,200	495,900	590,900
Inland & aquaculture	46,560	55,500	66,400	79,300	94,800
Total	**339,730**	**404,800**	**482,600**	**575,200**	**685,700**

Table: 2.2- Production targets by marine sub sectors (Mt)

Year	**2009**	**2010**	**2011**	**2012**	**2013**
Coastal	180,410	197,400	216,000	236,370	258,600
Offshore/deep sea	112,760	151,900	200,200	259,530	332,300
Total	**293,170**	**349,300**	**416,200**	**495,900**	**590,900**

2.4.1 Coastal fishery sub sector:

In terms of production and employment, those fisheries taking place within the continental shelf and undertaking by fishing craft in single day operation was the dominant sub sector and always made the largest contribution to the national fish production. This will be continued up to a certain extent in the plan period as well. In view of the bio physical limitations and the changes being taken place in the near shore coastal environment, it is important to forecast and place more emphasis on the inland, offshore/deep sea and brackish water fishery resources adapting effective technologies to increase the fish production. Strategies have been made in this plan to exceed the coastal production by offshore/deep sea fishing after the mid 2011. The principal marine fish resources within the continental shelf and the annual sustainable yield within the continental shelf have been estimated by Fridjoft

Nansen surveys and were reported as 170,000 Mt (100,000 Mt pelagic fish and 70,000Mt demersal fish).

The vessel did not survey inshore waters of less than 10m depth and whole of Palk Bay / Gulf of Mannar shallow water areas in the north. Therefore the potential yield from areas not covered by the survey was estimated at 80,000 Mt (70,000 Mt pelagic fish and 10,000 Mt demersal fish). Hence the total sustainable yield from the coastal sector would be 250,000 Mt assuming the same density of biomass as obtained during the surveys in the northwest.

Although the coastal fish production by 2013 has been targeted around 258,000 Mt in this strategy assuming the areas that were not properly surveyed are the most productive fishing grounds in the coastal waters of Sri Lanka and therefore it is sensible to assume that the density of biomass is highest in these areas and the potential in reality be higher than the estimated 80,000 Mt.

2.4.2. Offshore/deep sea sub sector:

Those fisheries that take place outside the continental shelf and beyond, extending up to the edge of the EEZ and high sea is the fastest growing subsector. There are some offshore areas, in the northwest, discovered during a survey by the Soviet vessel *Optimist* in 1972, (and in the south) which may be capable of sustaining trawling operations for deep-sea lobsters, shrimp and a few commercially important species of fish (Joseph, 1993). However reliable estimates of the potential yield from the offshore/deep sea areas of Sri Lanka are not available.

Scope for increasing fish production is suggested by harnessing resources in the deep sea. It is assumed that the fish stocks at offshore/deep sea are available for the target production of 332,300 Mt over the plan period.

Yet Sri Lanka has not been able to make effective use of high valued tuna and other resources in the high seas due to non-availability of fishing vessels with requisite capacities/requirements. Hence it is a vital to introduce multi-day vessels with modern technology such as Refrigerated Sea Water system (RSW) system, line haulers, and refrigeration storage. In addition it is necessary to provide safety equipment, communication equipment, facilities for crew in line with international regulations enabling to inclusion of these vessels in the IOTC vessel registry.

2.4.3. Inland & aquaculture sub sector:

Inland and aquaculture subsector is one of the major components to achieve the production target spelt in this strategy. Besides the increase fish production, it is also envisaged to enhance the employment opportunities for the rural mass especially in the northern and the eastern provinces. The planned inland and aquaculture production targets are given in the following table.

Table 2.3 - Production targets by inland & aquaculture sub sector (Mt)

Year	2009	2010	2011	2012	2013
Total inland & aquaculture	**46,560**	**55,500**	**66,400**	**79,300**	**94,800**
Capture –based fishery	39030	46,600	55,700	66,500	79,500
Culture –based fishery	3,980	4,700	5,700	6,800	8,100
Coastal aquaculture	3,550	4,200	5,000	6,000	7,200

To achieve the desired targets during the planned period, specific attention has been placed on development of inland fisheries and aquaculture subsector. Inland fish production can be increased mainly by enhancing stocking of fingerlings/post larvae in perennial/seasonal tanks and through coastal aquaculture. Underutilized inland water resources located in the Northern and the Eastern Provinces now can be utilized for inland fisheries and aquaculture. The National Aquaculture Development Authority (NAQDA) has already mobilized its resources to develop freshwater capture fisheries and aquaculture.

2.5 Per capita fish supply based on local production for local consumption

At present, the per capita supply of fish includes both local production and imported fish and fishery products. In 2009 per capita fish supply was 11.4 kg. It is intended to increase up to 21.9 kg which would be the consumption level recommended by MRI and to be achieved by at the end of the proposed period while maintaining a rate of 5 percent fish exports from the total production. In addition it is envisage to gradual reduction of import of wet fish and thereby saving valuable foreign exchange. As per the proposed strategy the estimated per capita fish supply during the planned period is given below. According to the estimated figures, it is expected to achieve the recommended target of 21.9 kg by 2013.

Table 2.4 - Estimated per capita fish supply

Year	2009	2010	2011	2012	2013
Midyear population (Mn)	**20.450**	**20.567**	**20.686**	**20.805**	**20.925**
Total fish production (Mt)	**339,730**	**404,800**	**482,600**	**575,200**	**685,700**
Estimated export increase (Mt)	18,199	21,700	25,855	30,800	36,700
Estimated fish imports (Mt)	11,406	9,600	8,100	6,800	5,700
Estimated total amount for consumption (Mt)	**233,056**	**274,890**	**325,390**	**385,840**	**458,290**
Estimated per capita fish supply (kg)	11.4	13.4	15.7	18.5	21.9

The action program formulated in consistent with this plan will be expected to achieve 20 percent annual rate of growth production.

CHAPTER 3

3.1 Action Program

The action program is discussed under following heads.

- Fish production enhancement
- Fisheries social community development
- Fishery inputs
- Training and extension
- Research, development and capacity building
- Infrastructure development
- Fish marketing
- Trade and investment
- Resources Conservation
- Fisheries development in the Northern Province

3.2 Strategies and actions to enhanced fish production

3.2.1 Marine sector

To achieve the expected marine fish production target of 590,900 Mt by 2013, it is envisage deploying multi day vessels and long liners with a length of over 24 meters to harvest the resources from the high seas and the international waters. The new deep sea fishing fleet will be developed on the basis of private public partnership led by Ceylon Fisheries Corporation. In compliance with the international conventions, the fishing operations in the deep sea and international waters will be conducted ensuring biological sustainability while maintaining the quality standards. At the end of the planned period it is expected to deploy 1000 long liners under the proposed public – private joint venture project.

In addition to the new fleet development, emphasis will be placed on modernization and upgrading the existing multiday fleet with required long line facilities, RSW and CSW systems to overcome the underperforming status. In this respect credit schemes will be launched with low interest rate without burden to the government.

To fulfill the requirement of larger fishing vessels with modern fishing equipments, action has already been taken to commence a larger type boat manufacturing industry with the foreign investment.

Apart from the deep sea resource exploitation, action will be taken to exploit the coastal fisheries resources from the northern and the eastern coastal provinces ensuring sustainable yields. To facilitate this process, the MFARD will launch necessary interventions to enhance the one day fleet in those provinces. To increase the fish production, inactive beach scene operation in the north and the eastern region will be commenced and required assistance will be provided.

To increase the efficiency in the deep sea fishing and to minimize the operation cost, Mother vessels will be introduced under the proposed fisheries sector development strategy.

In considering the reported incidents of illegal unregulated and unreported (IUU) fishing a Vessel Monitoring System (VMS) has been proposed under the sector development strategy. In addition to the other services, VMS will disseminate the information on fishing grounds, which could be derived from the satellite information interpretation.

Table 3.1 Expected Marine Fish Production (Mt) – 2010-2013

Year	**2009**	**2010**	**2011**	**2012**	**2013**
Coastal Sector	180,410	197,412	216,016	236,373	258,649
Relative increase from the coastal sector	-	17,002	18,604	20,357	22,276
Deep sea sector	112,760	151,903	200,195	259,546	332,241
Relative increase from the deep sea sector	-	39,143	48,292	59,350	72,695

Table 3.2 Changes to the composition of the existing fleet during the planned period 2009-2013

Type of Boat	2009	2010	2011	2012	2013
Traditional Non-mechanized	18,243	267*	-	-	-
Traditional mechanized	2,126	183*	760*	-	779*
One day with Out Board Motor	17,193	50*	290*	1227*	1000*
One Day with In-Board Engine	958	-	100*	100*	100*
Multi day boats	2,934	80*	100*	180*	156*
Beach scene	340	150	190	-	-

*New recruitment

By year 2011 the Deep sea fish production will exceed the coastal fishery production

- With compare to the 2009 production levels, the coastal fishery production will increase by 43% by year 2013

- With compare to the 2009 production level, the deep sea fish production will increase by 194%

3.2.2 Inland Fisheries and Aquaculture

The total contribution expected from the inland and aquaculture subsector during the planned period is 94,800 Mt. Out of this amount, it is expected to produce 79 468 Mt form the Perennial water bodies, 8104 Mt and 7228 Mt from Seasonal tanks and shrimp production respectively. Accordingly the inland and aquaculture subsector production will be increased by 100 percent during the planned period.

To achieve the above targets, a number of interventions have been proposed. Among these proposed interventions, establishment of new hatcheries and breeding centers, enhancement of capacity of existing hatcheries to expand the fingerling production, enhancement of capacities in the community led mini hatcheries, augmentation of re-stocking and commencement of new stocking in the unutilized water bodies. In addition, it is envisaged to expand the inland fisheries into the estate sector by introducing pond culture. Besides the above, technological improvements will be carried out by introducing high breed varieties of fresh water fish.

Table: 3.3 Expected Inland Fish Production (Mt)- 2010-2013

	2009	**2010**	**2011**	**2012**	**2013**
Total production	**46,560**	**55,617**	**66,437**	**79,361**	**94,800**
Perennial water body	39,030	46,623	55,692	66,526	79,468
Seasonal water body	3,980	4,754	5,679	6,784	8,104
Shrimp/Aquaculture	3,550	4,241	5,066	6,051	7,228

In compliance with the projected production estimates, stocking program will be conducted as indicated in the table 3.4.

Table 3.4 - Estimated fingerling/post larvae stocking program

YEAR	2010		2011		2013		2013	
	Estimated production (Mt)	Estimated stocking (Mn)	Estimated production (Mt)	Estimated stocking (Mn)	Estimated production (Mt)	Estimated stocking (Mn)	Estimated production (Mt)	Estimated stocking (Mn)
Inland aquaculture	4754	9.51	5679	12.78	6784	16.26	8104	18.23
Coastal aquaculture	4241	314	5066	375	6051	448	7228	535
Culture-based fishery	18649	24.87	22276	29.70	26610	35.48	31787	42.38

3.2.3 Other Actions to Increase Fish Production

Apart from inland fisheries, attention will be placed on development of non-traditional fishery products such as Sea weed farming, Sea bass farming, Sea cucumber farming Oyster/mussels culture, and Ornamental fish. To facilitate non-traditional fisheries development, sea bass hatchery will be established to produce required fingerlings.

In view of the fragmented and weak nature of the existing fisheries Cooperative Societies, it was decided to strengthening of fisher folk through well established National Fisheries Federation. While strengthening the existing cooperatives, actions have been initiated to establish the National Fisheries Federation with the following objectives;

- To uplift the socio-economic status of the fisher folk by means of providing housing and basic amenities
- Providing and enhancing alternative livelihood opportunities to minimize dependency on coastal fisheries
- To reduce social and economic vulnerability through introduction of effective fisheries pension scheme
- Enhancement of access to credit by introducing soft loan scheme

3.3 Fishery inputs

3.3.1 Fleet Development Plan

Table 3.5-Fleet composition in marine sector in 2009

Boat type	Number
Inboard multi-day	2,934
Inboard one-day	958
Out board FRP	17,193
Non-motorized traditional	18,243
Motorized traditional	2,126
Total	**41,454**

Source: Fisheries statistic, MFAR

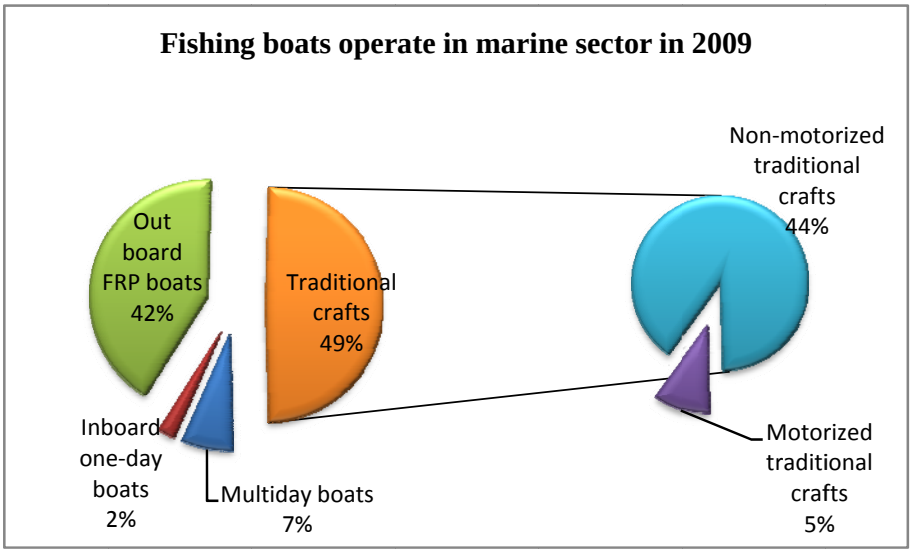

Figure 3.1 - Fleet composition operate in marine sector in 2009

91 percent of the total marine fleets comprised of traditional crafts and out board FRP operated in shallow waters.

3.3.2. Recommendations to increase fleet size

In order to increase fish production unlimited increasing of fleet size is not recommended. When the fleet size increased unlimited catch per unit effort will reduce and result in resource depletion. There will also be social unrest due to conflicts among resource users. So it is recommended to increase fleet size to achieve the maximum sustainable use of the resources. In order to increase fish production in coastal waters polices for better fisheries management and strategies to minimize post harvest losses can be recommended. However there is potential exploitation of offshore/deep sea resources. Hence strategies should be made to exploit offshore/deep sea resources by developing fleets with modern technologies.

Fishing craft requirement for inland capture fisheries is mainly for perennial reservoirs. Most of the fisheries in perennial reservoirs are managed by the fisheries cooperative societies (FCSs) in respective areas therefore increase of inland fishing craft should be done in consultation with the respective FSC. However it is recommended to increase inland fishing crafts in north and east part of the country.

3.3.3 Strengthening of Cey-Nor foundation to supply of fishing vessels and gear at reasonable cost

In compliance with the production targets set-out in the fisheries sector strategy for 2010-2013, it is important to enhance the capacity of the Cey-Nor Foundation to fulfill the requirement of the fishing vessels and the gear. Thus, strategies have been formulated to enhance the capacity neither of Cey-Nor by strengthening boat building capacity through new joint ventures for the purpose of construction of larger vessels and refurbishment of existing boat yards and net manufacturing industries located in Weerawila and Lunuvila. In addition to the manufacturing of fishing vessels, attention has been placed on producing leisure boats, floating restaurants and boat houses for the domestic and foreign markets.

3.4 Research, development and capacity building

The principal fisheries and aquatic research arm of the fisheries sector, the National Aquatic Research and Development Agency (NARA), conducts research on all living and non-living aquatic resources in Sri Lanka with special emphasis on applied research and also responsible for development, management and conservation of aquatic resources. NARA's research work covering the areas of oceanography, fishing technology, the aquatic environment, inland aquatic resources, marine biological resources, post-harvest technology, socio-economic and marketing etc., fishery resources forecasting.

Although it has been in operation for nearly three decades since its establishment in 1982, its capacity to meet its present challenges in the context of the ambitious targets set out for fish production by the Government is restricted. However urgent attention on the needs to comply with the global issues in fisheries, research and developments requires support with state-of–the–art technologies. Hence the strategies of the Government manifesto has made to enhance the capacity of NARA for effective execution of its mandate.

3.5 Fishery infrastructure development

3.5.1 Fish landing facilities

The development of fisheries infrastructure facilities including fish landing sites is a prime requirement. As a result of civil war prevailed in the north and the eastern province and destruction caused by 2004 Asian tsunami, most of the fisheries infrastructure was destroyed. Thus arrangements have been made to reconstruct and develop fish landing centers and anchorages under the FAO funded project on Restoration and Improvement of Fish Landing Centers with Stakeholder Participation in Management and IFAD funded Post Tsunami Coastal Resources Rehabilitation project. In addition arrangements have been made to facilitate the desired fish production targets, by constructing large scale fisheries harbours to accommodate multi day vessels in Selavatra, Gurunagar, Point Pedro and Mullativu in the Northern Province, Kalametiya, Gandara in the southern province, Dickowita in the Western province and Cod Bay and Valachanai in the Eastern Province. The proposed harbours will be constructed with modern facilities to cater the fisheries sector.

3.5.2 Vessel Monitoring System (VMS)

Under the fisheries sector development strategy, a modern and technically improved Vessel Monitoring System (VMS) will be established in order to curtail IUU fishing, disseminate warnings; communicate during distress situation and to provide information on fishing grounds to the fisher folk.

3.6 Fish marketing

A major part of the fish marketing sector in Sri Lanka is being operated by private sector. The policy of the government is not to interfere and control the activities of the private traders but to encourage more persons and organizations to enter this trade and there by strengthen the price competitiveness. The Government intervention for fish marketing thorough Ceylon Fisheries Corporation (CFC) is minimal and the volume of fish handled by CFC is quite insignificant. However, CFC is unable to compete with the private sector on equal terms by giving credit and adjusting prices. The poor liquidity position of the CFC, breakdown of fish colleting networks, deterioration of outstation based infrastructure, and insufficient motivation of its marketing personals etc. created negative impacts on marketing.

Table 3.6- Target daily sales volume per day

Year	2009	2010	2011	2012	2013
Estimated fish supply per year (Mt)	321,531	383,240	456,793	544,463	648,958
Estimated daily sales (kg)	8,809	20,999	37,544	74,583	177,796
Market contribution (%)	1.00	2	3	5	10.00

The main strategy of the CFC is to promotion of price competiveness by means of promoting marketing. CFC will attempt to achieve set targets by purchasing and selling larger volume of

fish. Doing so CFC envisaged providing fish for consumers at an affordable price and producer a completive price. Reviewing the current purchasing and selling networks CFC will intended to promote fish purchases directly from producers at the fish landings. Further it has been made arrangements with cooperative societies and other fisher organizations to supply to them fish on continuing basis at a fair price. CFC is to distribute the collected fish in district within the same district in order to minimize reduce the cost of holding fish in cold rooms over a period of time and to minimize fish transport cost.

Improvement of marketing network aims at supplying higher volume of fish for local consumption. Poor handling and improper post harvest practices may cause deteriorate fish quality. Food and Agricultural Organization in association with the Ministry has implemented a project on minimum standards for fish handling and reduced post harvest losses in selected areas. The strategy for this will be supporting the implementation of a Government program to establish minimum standards of fish quality, including regulations, guidelines, training, pilot schemes and dissemination and to enable the private sector (fisher folk, fish processors and traders) to apply better fish handling techniques and practices. There is a ice shortage in Sri Lanka, the existing ice supply is inadequate to fulfill the current demand. Therefore, capacity of CFC on provision of ice and cold storage facilities would be enhanced during the proposed period. The initiatives have been made by CFC to expand this capacity with special emphasis on North and East provinces.

Table 3.7 Target sales network

Marketing Network	2010	2011	2012	2013
Sales				
New dedicated unit	74	150	200	250
Lak Sathosa branches	200	225	225	225
Fish sale to national hospitals	34	34	34	34
Coop city outlet	19	150	224	224
Mobile outlets	15	35	25	45
Economic centers	03	05	05	05
Wholesale centers	-	02	02	02
Purchase				
Fish landings (landing site, anchorage etc)	11	17	17	17
Cooperative society				
Commissioning of representatives				
New purchasing centers	-	10	11	20
Foreign vessels	191	200	300	400
Infrastructure				
Ice plant	11	11	11	11
Cold room	02	02	02	02

Table 3.8 Annual ice requirement (Mt)

Year	Daily requirement	Daily shortage
2010	1,450	150
2011	1,700	250
2012	2,000	300
2013	2,350	350

Table 3.9 Existing ice plants and their capacities

District	No. of ice plant	Capacity (Mt/day)
Jaffa	7	10
Mullaitivu	-	
Killinochchi	-	
Mannar	5	40
Trincomalee	3	120
Batticaloa	2	25
Ampara	2	20
Hambantota	8	246
Matara	7	250
Galle	6	88
Kalutara	7	255
Colombo	3	22
Gampaha	13	555
Chilaw	6	131
Puttalam	5	310
Anuradhapura	1	10

3.7 Trade and investment

Export of food fish and fishery products include fish, beach de-mer, lobster, prawns, ornamental fish, aquatic plants and shark fins. The current earnings from the fish and fishery products export is approximately 21 billion rupees. Under the fisheries sector development strategy for 2010-2013, it is envisage increasing the export of non- traditional fishery product while reducing the import of canned fish and dry fish for domestic consumption. To facilitate the enhancement of non-traditional fishery product exports, it is intended to expand the sea farming and aquaculture especially in the eastern and the Northern Province.

3.8 Resources Conservation

3.8.1 Established advisory council

As per the provisions of the Fisheries and Aquatic Resources Development Act No.2 of 1996, Fisheries Advisory Council was established in 2010. The main functions of the Advisory Council are as follows.

3.8.2 Identification of fisheries management areas

To ensure the biological sustainability of the fisheries resources in the country, fisheries management areas will be declared where appropriate and necessary. By declaring fisheries management areas, it is intended to promote co-management to ensure the sustainability of the resources while maintain equity. The prevailing status of overexploitation and degradation of habitats will be minimized through co-management to be promoted in the declared fisheries management areas. The Regional Fisheries Livelihood Project funded by FAO and the CENARA project being funded by CIDA has already initiated co-management process at selected coastal sites. In addition, NAQDA has already initiated co-management process at 37 selected inland water bodies with a view to ensure sustainable fisheries management.

3.8.3 Regional cooperation for resources conservation

To enhance the regional cooperation and conservation efforts, Bay of Bengal Large Marine Ecosystem project was commenced with the participation of eight countries including Sri Lanka, Bangladesh, India, Myanmar, Malaysia, Indonesia, Thailand and Maldives. Under this project the issues such as over exploitation of living resources including decline in overall availability of fish resources, changes in species composition and catches, high proportion of juvenile in the catch and changes in marine bio-diversity and degradation of coastal habitats and pollution being addressed.

3.8.4 Prohibition of destructive fishing methods

In view of the necessity to ensure long term biological sustainability of the fisheries resources, use of all types of destructive fishing gears such as monofilament nets, light course, surukku and lila nets and dynamiting were prohibited. To strengthen the policy objective on this, the importation of monofilament nets was banned.