

Regional workshop on Implications of Climate Change on Fisheries and Aquaculture: Challenges for Adaptation and Mitigation in the Asia- Pacific Region 24-26 May 2011, Kathmandu, Nepal

Country Profile – Sri Lanka

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1. Introduction
2. Country Profile
3. Coastal Bio-Physical Features and Resources
4. Current status of aquatic resources – an Over view
 - 4.1. Coastal and Offshore Resources
 - 4.2. Inland resources and Aquaculture
5. Impacts of climate change
6. Quantification of Changes on Climatic Variables in Respect Sri Lanka
 - 6.1 Sea level rise
 - 6.2 Sea surface temperature
 - 6.3 Meteorology
7. Strategies and Actions for adaptation and Mitigation
 - 7.1 Measures to ensure sustainable development of the fishery
 - 7.2. Policies and Plans
 - 7.3 Laws related to the coast zones

1. Introduction

Sri Lanka is southernmost Island of the north Indian Ocean. The tropical island positioned at the centre of monsoonal regime is unkindly prone ocean disasters and climate change. The past geological evidences serves as the key to the prediction of future climate changes, however non linear behaviors in the climate system is witty enough to spring diverse, abrupt and unexpected oscillation in climate

Sea level rise and warming of the sea are identified as the two crucial factors, which may impart decisive impacts on coastal fisheries and agriculture, which may further aggravate poverty of the coastal communities. The air temperature increase in the rate of $0.01^{\circ}\text{C} - 0.036^{\circ}\text{C y}^{-1}$, while rainfall decrease by 10 to 35 mm across Sri Lanka, except on the northwest coast. Sea level has been increasing at the rate of 1.5-3 mm/yr over the past 100 years. The coastal stability studies indicate that except for the northern most coast almost the entire coast is under different degree (moderate to high) of erosion. The forecasted sea level rise for 2050 is expected to cause a general shoreline retreat of 10 m along all sand sandy coasts. Over the 50 years period this will cause correspond to 0.2 m of shoreline retreat per year. The cumulative implications of climate changes possess the potential of inducing adverse effect on the coastal fishery, aquaculture and agriculture.

The coastal nation may not able to evade the implications of climate changes but could adequately address the mitigation/preparedness strategies for the impending effect on the vulnerable coastal zone/community to the changing climate. Sri Lanka identified culture of seaweed, oyster farming, crab fattening, artificial production of marine ornamental fish, value addition to the agriculture and fisheries products, induction of fish aggregating devices as the possible alternative activities to overcome the impending impacts on the fisheries and agriculture. Also identified the potential sites for the respective practices and methodologies for seaweed farming and mud crab fattening and development of human resources and facilities to be responsible for the culture fisheries development, technology transfer, production strategies and research for the implementation of alternative activities.

2. Country Profile

Described by Marco Polo as the finest island in the world, Sri Lanka hangs like a tear drop off the southern tip of India in between 6-10 °N and 80-82 °E. The island, as shown in Fig 1.1, is a part of the Indian subcontinent. It is 225 km wide at most, and 435 km long with a total area of 65,600 km², 2900 km² of which are inland waters. These are mainly irrigation dams, coastal lagoons or estuaries. Natural lakes are scarce. The island itself is not large, but including the oceanic, so called Exclusive Economic Zone, the territory is more than seven times larger.

More than five million people, or one third of the population, live along the coast (Coast Conservation Department, 1998). The coastline, which is about 1760 km long, ranks as the third longest in South Asia (Wijewardane 2000), exhibits considerable geographic diversity. It is characterised by bays, long sandy beaches, lagoons and dunes. Larger, bar built lagoons are most common in the north-eastern and north-western parts of the country, whereas smaller lagoons are scattered around the island. In all, we find more than forty shallow coastal water bodies with a total area of about 1200 km².

The fisheries of Sri Lanka is dominated by coastal fishing from small boats, 5-6 m long, equipped with outboard engines of 15-25 hp. Somewhat larger boats, 8-15 m are used for offshore fishing in 1980's. In terms of total catch, fisheries increased slightly during the nineties but the increase was due to inland aquaculture and offshore gillnets fishing. The mean catch during the preceding decade amounted to approx. 250,000 mt y⁻¹.

Maximum coastal fishery was 184,000 mt, which occurred in 1983. In 1990's, the offshore fisheries features a stable catch of about 60,000 mt y⁻¹. Gillnet fishing dominates the branch. According to surveys carried out by *RV Fridtjof Nansen* during 1978-80, the total biomass on the shelf and the adjacent oceanic area of Sri Lanka was estimated at about 750,000 mt. More recent estimates of the maximum sustainable yield of pelagic fish points at 170,000 mt, including another 80,000 mt of demersal species (FAO, 1998).

However, FAO recommends a stop for further increase in gillnet fisheries, as it is presumed to have reached a maximum (Gulbrandsen 1998), but also highlights the possibility of expanding long-line tuna fisheries.

In 1990's, fish and fisheries related products accounts for 3% of the GDP and provide about 70% of the animal protein in the diet of an average Sri Lankan (Rupamoorthy 1999). Fish industry employed 2% of the labour and conceded livelihood for about 700,000 individuals. Out of a total consumption of 352,000 mt, more than one third, 132,000 mt is imported (FAO, 1998). In 1998, the total value of the fishery export amounted to 6732 million SLR (90 SLR=1USD). Prawns, mainly from prawn farming (80%) accounted for 40 % of the export value (Edirisinghe 2000).

Mangroves cover the near-shore areas of many coastal water bodies. They are widely harvested for subsistence but also for commercial purposes. Resins from mangrove barks are used for tanning fishing nets. In Puttalam Lagoon, about 60% of the mangroves were eliminated between 1981 and 1992 (Dayaratne et al. 1997).

Coral and sandstone reefs are common along the coast of Sri Lanka. These are generally located 2-8 km from shore. Sandstone reef habitats generally occur at depths greater than 10 m. More than 120 species of stony corals divided among 50 genera have been identified (Rajasuriya et al. 1995a). The bio-diversity on these reefs are high. More than 200 species of fish belonging to 95 different genera have been recorded. However, a great disaster destroyed the major part of the west coast coral reefs in the spring of 1998 due to abnormally warm surface waters (Rajasuriya 1998). Even before, however many of the reefs were overexploited and damaged by destructive fishing techniques and mining (Rajasuriya et al. 1995b).

3. Coastal Bio-Physical Features and Resources

Sri Lanka's coastal region comprises 74 administrative divisions (Divisional Secretary) and contains about:

- 23% of the island's 65,610 km² land area
- 25% of the population, including 65% of the total urban population
- 70% of the tourist hotels
- 62% of the industrial units
- Habitats that are vital for ecological functions, maintaining biodiversity and economic activities, especially the coastal and marine fishery
- A large number of high priority archeological, historical, religious and cultural sites, as well as scenic and recreational sites
- 285 square kilometer lands gazetted as municipal and urban lands

The coastal fishery accounts for about 68% of the coastal and marine fishery which together provide 88% of the total fish production in Sri Lanka

Agricultural lands comprises around 17% of the Coastal Zone, while home gardens comprises about 20%

The coastline is about 1,620 km, including the shoreline of bays and inlets, but excluding lagoons.

Sri Lanka is characterised by low lands and a high plateau of 1000 – 2500 m elevation in the central part of the island. The coastal plains, ranging from the sea level to 90 m are relatively narrow along the southern coast, but wide and flat in the north.

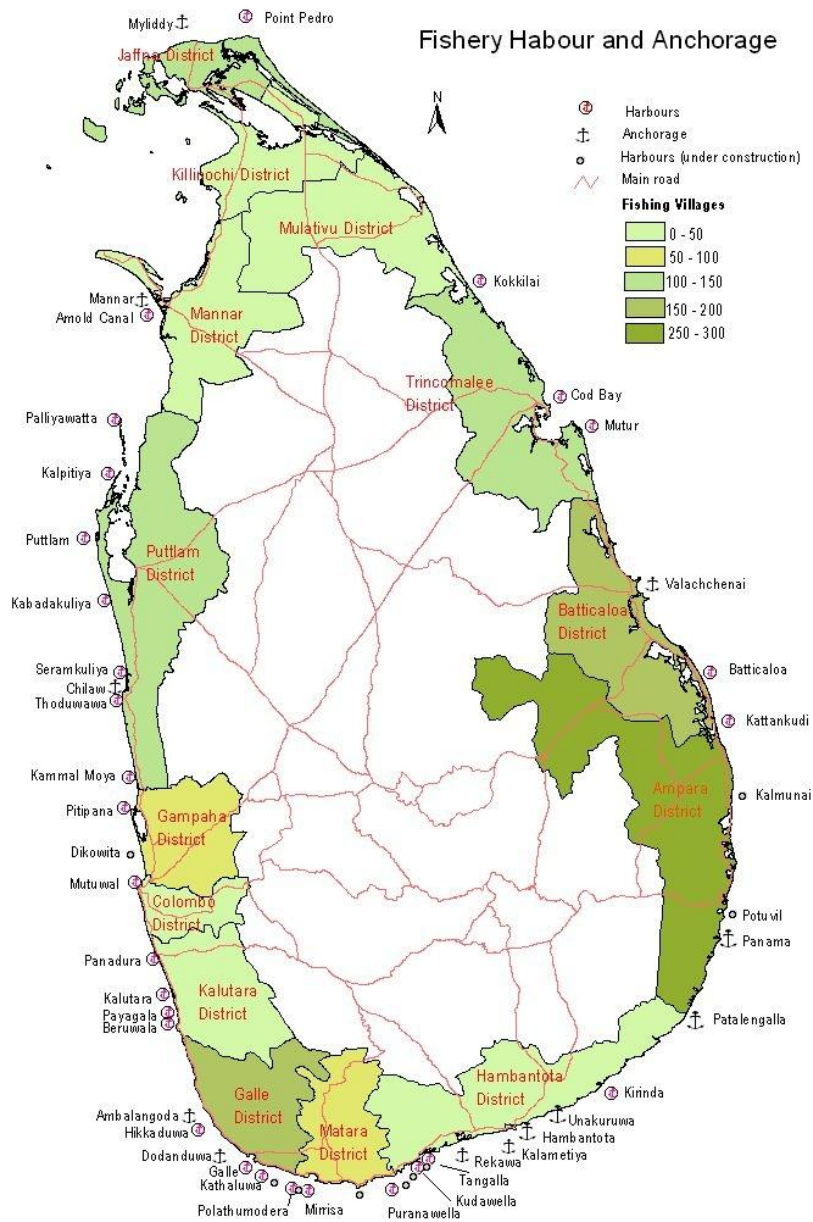


Fig.1. Fishery harbours, anchorages and Population distribution of coastal districts

The coastal zone is heavily used for fish landings. There are about 700 minor fish landing sites scattered along the coast. They are the beach-landing sites where traditional craft, and craft powered by outboard motors land. Larger boats tied up at anchorages and used

small boats to land their catch. The multi-day boats and some of the day-boats used the 12 fishery harbours, most of which were established in the 1970s. There are 15 fishery harbours 19 anchorages in the country. Anchorages are defined as water areas providing a safe haven for anchoring of boats.

The total fishing family population amounts to 610,000 and it is estimated that more than a million people from the coastal community self-employed traders depend on fisheries for their livelihood. The fisheries sector contributes more than SLR 10,000 million foreign exchange through export of marine and aquaculture products. The daily income of for coastal fishermen is between SLR 200- 500, but higher in the south and southwest.

4. Current status of aquatic resources – an Over view

The annual total fish production in Sri Lanka for 2009 and 2010 are respectively 339,730t, 349,300t with the coastal and marine fishery contributing over 86%. Fishery products also contributed 2.6% to all export earnings in 2009. The food fishery is also one of the most dynamic export sectors in the economy through the export of various aquatic products such as prawns, lobsters, crabs, chank shells, beach de mer, molluscs, fish and fish maws and shark fins. Rising foreign exchange earnings through the export of marine and aquaculture products and the contribution of 2.6% towards Sri Lanka's total value of all export earnings in 2009. The direct involvement of marine and inland fishery are 164,870 males and 10,353 females and 32,758 males and 750 females in the inland fishery respectively. Fattening of crabs for export' is also now gaining importance among fishers. Overall the fishery industry provides direct or indirect employment to 475,000 persons, while fishing and related activities (including those working in boat building, fish processing and equipment manufacturing) sustain about 2.5 million people.

In the post-war scenario in Sri Lanka, it has also been recognized that development of the fishery industry offers excellent potential for providing livelihoods to those affected by the war. As such, there is a move to encourage non-traditional farming of sea

cucumbers, oyster, sea bass, and seaweed in the sea off the North and the East coasts for which good water quality is a critical requisite.

4.1. Coastal and Offshore Resources

Overall the coastal region covers only 24% of the country's land area and accommodates about 25% of the total population. Despite the drop in contribution from the fishery sector to the national GDP after the tsunami to 1.03%, it had climbed to 1.2% of the GDP in 2009. The growth in the marine fishery sector in 2009 was primarily driven by coastal fishing which expanded due mainly to post-war relaxation of restrictions on fishing off the Northern and Eastern provinces. Further, the entire contribution to the post-tsunami national GDP of 2005 and 2006 from the coastal region, where fishery forms the foremost economic activity, is estimated to be 43% and 44%. The coastal and deep sea marine fishery contributed respectively 180,410 MT and 112,760 MT of fish amounting to a collective 86.3% of the total fish production in the island in 2009. Accordingly the coastal and marine fishery forms an important national economic activity.

Due to over-exploitation of the coastal waters in the past, efforts are being made to maintain stability of the coastal fishery at the present level, while management efforts will be concentrated for growth of the offshore and deep sea fishery and aquaculture. This can be directly linked to adaptation measures for the fishery sector in view of climate change that may cause significant changes in the coastal environment. In terms of commercial groups in the deep sea and coastal fishery, pelagic marine fish contribute the most to fish production, but the brackish water (estuary and lagoon) fishery—which includes shrimps, lobster and crab fishery—also constitutes an important component of the country's export earnings

There are about 146 species of marine bony food fishes that are of high or medium value in Sri Lanka among the 1,800 species of marine pelagic fish found in Sri Lankan waters. Sri Lanka also has many types of coastal wetlands including marshes, mangroves, sea

grass beds and mud flats that are important to maintain the coastal fishery. Any damage to estuaries and lagoons, coral reefs or coastal wetlands would lead to reduced feeding, breeding and nursery habitats for commercially important coastal and marine finfish and shellfish used in the food fishery. Species in estuaries and lagoons that contribute significantly towards the food fishery include clupeids, mullet, milkfish, rabbit fish, and many species of shrimps and mud-crabs. Many species of shrimp, crabs and lobsters are currently fished in lagoons and estuaries and the sea, and there are several edible species among the 28 species of sea cucumbers found in Sri Lankan waters, and several species of edible oceanic squid.

4.2. Inland resources and Aquaculture

About 11.5% of total food fish production is from the inland capture fishery. Throughout history, the inland fishery has been a secondary use of waters in many man-made tanks built for irrigated paddy cultivation. In more recent times the larger multi-purpose reservoirs are also used for development of the inland fishery. The inland fishery provides cheap protein, incomes and employment for many rural people. Generally the large (> 800 ha) and medium (200-800 ha) reservoirs are used for capture fisheries; the small (1-200 ha) irrigation reservoirs and seasonal tanks which hold water for 6 - 8 months a year are used for culture-based fisheries.

Inland food fishery shows trend for growing production since 2005. Among the species contributing to the inland fishery are the cultivated tilapia, rohu, catla, common carp, big head carp, silver carp, *mirigal*, *hiri kanaya*, *lula*, cultured shrimps, fresh water prawns and some wild fish. Tilapia, which is an introduced species, is the most important food fish in the inland fishery, comprising 56.5% of the inland fish catch in 2009 (

Sri Lanka has one of the highest densities of inland surface freshwater bodies in the world. In addition to the island's abundant natural surface water; ancient tanks dot the Dry Zone, while the more recently built large multi-purpose reservoirs are located in the wet uplands. In addition, the network of bunds, small streams, or irrigation canals and sump

ponds that are associated with rice paddies are home to many freshwater food and ornamental fish species. This offers high potential for the island's inland food fishery which is mainly dependant on about 260,000 ha of freshwater bodies, 155,000 ha of perennial water bodies and 100,000 ha of seasonal village tanks that hold water for 6-8 months of the year. Currently fingerling stocking has been carried out in 38, 65 and 250 major, medium and minor water bodies respectively; 250 minor perennial tanks; 375 seasonal tanks and 300 aquaculture ponds.

Overall brackish water aquaculture in Sri Lanka covers approximately 6,000 ha in extent. At present, this fishery consists mainly of shrimp culture, which has expanded considerably since the late 1970s when commercial shrimp farming commenced in the country. A large number of shrimp farms are currently located in the Western and Northwestern coastal belt. Shrimp farming on the East coast has now re-commenced and the possibilities of expanding brackish water aquaculture to other provinces are being explored. A declining trend in the productivity of shrimp farms of the Northwestern Province has been discerned due to diseases (e.g. white spot) and other environmental factors. The need for zoning coastal areas to sites suited for aquaculture and other development is recognized in the Coastal Zone Management Plan (CZMP); zoning plans for aquaculture has been carried out for Eastern Province, and is ongoing for other coastal areas.

5. Impacts of climate change

The coastal zone between land and ocean serves as the end point of impact and effect of all natural and anthropogenic changes in climate and utility. The transition zone, where the physical properties of water vary in high gradient serve as the clogging point of material, thus sink of pollutants and sediments. Furthermore the coastal plain, a low land, is prone to land based flooding and may get inundated by the sea water due to the rising sea level. The sea level rise has intensified the coastal erosion, siltation of estuaries, saltwater intrusion into the rivers and salination of coastal plain. The increased siltation and reduced fresh water discharge into the coastal zone resulted in enhanced

sedimentation on the coastal zone. Thus, lakes are converted into marshy land while the extensive siltation at the mouth of the estuary resulted in permanent closure of the lagoons converting them into freshwater lakes. The partial or permanent closure of the estuaries and lakes reduce the water exchange, thus reduced the water quality and productivity of these sensitive ecosystems.

The anthropogenic activities, such as overexploitation of resources, emission of green house gas, deforestation, adhoc irrigational and other development, land use changes, sand mining exerts extensive pressure on the on the coastal zone. The reduction in river discharge, possibly due to the construction of reservoir and expansion of irrigation in the upstream has transformed high productive brackish water ecosystem into unproductive hyper-saline ecosystem, while diversion of water into estuary converted them into less productive freshwater lake. The industrial revolution has generated enormous pressure on the environment by polluting atmosphere, hydrosphere and lithosphere. The slow processes of climatic changes are accelerated by the anthropogenic activities.

6. Quantification of Changes on Climatic Variables in Respect Sri Lanka

The quantification and prediction of the complex climate system requires reasonable monitoring schemes, operated for sufficiently long periods so that they capture the full system dynamics, however our observation systems are so young, time series are short and local, thus limit our prediction capability

6.1 Sea level rise

The forecasts for global sea level rise in this century vary considerably, but the IPCC has provided a central estimate of 0.2 m and 0.5 m rise by the years 2050 and 2100 respectively. The forecasted sea level rise for 2050 is expected to cause a general shoreline retreat of 10 m along all sand sandy coasts. Over the 50 years period this will cause correspond to 0.2 m of shoreline retreat per year. By 2100 a general shore line retreat of 25 m is expected, corresponding to an average retreat of 0.25 m per year.

However, coastal erosion is controlled by winds, waves, surges, geomorphology and geology. In critical areas coastal erosion rate may vary from 1-13 m/year.

6.2 Sea surface temperature

The surface temperature record offers most convincing evidence of warming of sea surface. The global temperature record from 1870 falls into four sections. The first, (1870-1910), when urban development and heating standards were modest, thus shows no definite trend. The second from 1910 to 1945 showed a temperature increase of about 0.5°C, which coincides with the period when measurement stations were mainly urban and population and heating standards were increased. The third, from 1946 to 1975, showed a fall of about 0.15°C. This period coincides with the expansion of the aviation industry, with removal of many weather stations to airports, and an expansion of the system to rural areas. The rapid expansion of human population, motor traffic and economic wealth after 1976 shows a rise of about 0.5°C.

6.3 Meteorology

In general cyclones are generated in the Bay of Bengal during October and November, when inter-tropical convergence zone shifts southwards towards equator and traverse the northern part of the island moving from southeast to northwest, with highest impact on the northeast coast. The mean annual occurrence of cyclones is 0.2, indicating a return frequency of cyclone at every five years. Globally the climate change seems to have increasing frequency and intensity during the last three decades, however, it shows opposite trend in Sri Lanka

It is believed that human induced climate change, rather than naturally occurring ocean cycles, may be responsible for the recent global increases in frequency and strength of hurricanes, long-term trends in tropical warmth and tropical cyclone activity. During the period from 1901 – 1995 about 13 cyclones hit on the Sri Lankan coasts. The cyclone induced storm surges rise the sea level for considerable period of time. The 1978 cyclone hit on the Batticaloa raised the sea level up to 2.73 m, resulting in seawater penetration

wave upsurge up to 800 m into the inland from shore line, thus destroyed much of the vegetation on the sandbar on the north and east coast.

Sri Lanka is situated in the northern part of the Indian Ocean, near the centre of the monsoon regime. In Sri Lanka, the Southwest Monsoon dominates from June to September and the Northeast Monsoon from December to February. The monsoons form an energetic current system with seasonal reversals of the surface layer ocean circulation, particularly in the northern Indian Ocean (north of 10°S) including the Arabian Sea and the Bay of Bengal. The monsoons have a wide influence on precipitation and evaporation patterns, which in turn affect the oceanic variability. The Persian Gulf and the Red Sea discharge hypersaline waters into the Arabian Sea, while the Bay of Bengal receives a large surplus of freshwater in its northern parts. Excess freshwater in the Bay of Bengal and excess evaporation in the Arabian Sea brings about a sea level difference, which is important for the hydrography of the Sri Lankan waters. The seasonal sea level variations in the inner Bay of Bengal may exceed 1 m, with a maximum in later summer. Although the range in Sri Lankan waters is certainly smaller, still exert important seasonal variations in the circulation patterns, where both changing winds and variable freshwater input contribute. Although tides around Sri Lanka are weak (the spring tidal range 0.5-0.6 m) the seasonal sea level variations also influence the lagoon tidal circulation, simply because of its effect on the total depths.

The SWM brings heavy rains from the Indian Ocean into southern Asia. The NEM, on the other hand, brings dry air from the Asian continent, and the season is dry in most parts of southern Asia. Sri Lanka, however differs from the general rain pattern and parts of the island obtains more rain during the NEM than during the SWM. This is because the island is surrounded by waters on both sides. Furthermore, the island is situated right in the centre of the monsoon regime. In general, the SWM is slightly stronger than the NEM, with a mean wind speed of 4-6 m s⁻¹ at its peak. The Northeast Monsoon features average wind speeds of 2-5 m s⁻¹. The typical mean wind speed from the different climatic zones of Sri Lanka

7. Strategies and Actions for adaptation and Mitigation

Adaptation to climate change would require better preparedness to the natural hazards that are expected to become more pronounced. With the anticipated negative impacts of climate change on production from the coastal fishery, and probably the inland fishery, minimizing other threats to the fishery industry that lowers productivity at present would be in the interests of the industry. This would require conserving fish stocks as well as their feeding and breeding grounds through effective management of the resource, gathering the required data for informed fishery sector management, and making the fishers more aware of the benefits of sustainable fishery. Planning within the sector would also have to take into account provisions required to safeguard those engaged in the fishery industry in the event of increased intensity and frequency of natural hazards resulting from climate change that could drastically affect their livelihoods and settlements. This would need establishing institutional support to cater to those involved in the fishery industry who are affected by disaster events, and to provide alternate employment as required. The government has already identified and addressed some of these needs as prerequisites for sustainability of the fishery. These initiatives support adaptation measures within the fishery sector. Some of the key policies, plans, strategies and actions that could support the formulation of adaptation measures are;

7.1 Measures to ensure sustainable development of the fishery

• *Legislative coverage*

The Fisheries and Aquatic Resources Act No. 2 of 1996 deals comprehensively with conservation of the fishery resource—both marine and inland—and helps ensure sustainable development of the industry. The Fisheries Act empowers enacting regulations when required to strengthen monitoring, controlling and surveillance (MCS) capabilities to facilitate effective fisheries management and to prevent over-use of resources and destructive fishing. This Act represents a shift of focus to the active management of the fishery resource, by taking into account environmental concerns and the need to actively involve the fishing community in fisheries management, rather than being solely control centered.

• ***The National Fisheries and Aquatic Resources Policy of 2006***

The policy is noteworthy in that:

- Responsibility of implementation of the National Fisheries and Aquatic Resources Policy lies with the ministry in charge of the subject of fisheries and aquatic resources.
- A precautionary approach is followed in the management of resources.

This policy promotes: responsible fishery practices, surveys on fisheries and aquatic resources and stock assessments; use of appropriate harvest technology and resource friendly fishing gear; and management of coastal fisheries to conserve the resource. It also seeks to protect the rights of the traditional coastal fishers and to regulate the use of fishing gear that will harm the fishery or other marine species in accordance with international obligations. It enables participation of all stakeholders in developing inland fisheries and seeks to protect the right of inland fishers to fish in irrigation reservoirs.

• ***Caring for the Environment: Path to sustainable development (NEAP of 2008-2012)***

This document provides a sectoral analysis for the marine resources, including issues and problems in the marine resource sector and related policies; and 12 strategies and relevant actions under each for management of the marine sector. Of these, strategies 4, 5, 6 and 7 cover management of the fishery resource. These include actions to conduct surveys for sustainable resource development and management, improving management of the fisheries and aquatic resources, improving quality and safety control measures in fish and aquatic products, promoting sustainable resource use and improving skills of fishermen to this end.

• ***The Coastal Zone Management Plan (CZMP) of 2006***

Chapter 5 of the CZMP deals with ‘Integrating Coastal Fisheries and Aquaculture with Coastal Zone Management’ and the relevant policies, strategies and actions as an integral part of coastal zone management rather than merely for increasing fishery productivity. It

acknowledges that optimizing the outcome of fishing and aquaculture practices is the responsibility of MFAR, DFAR and NAQDA. It, however, recognized that issues related to the sustainable development of the coastal fishery are not only sector related, but encompass other sectors and economic activities as well as coastal ecosystem health, and that fisheries and aquaculture affect other economic activities within the coastal zone.

• *Major initiatives to promote sustainable management of the fishery*

The Coastal Resources Management Project (CRMP) 2002-2005

This project included institutional strengthening for fisheries resource management to achieve sustainable marine and coastal fishery supported by the construction of fisheries harbours, anchorages and ancillary facilities necessary for improvement of fish quality and the reduction of handling losses. It also dealt with addressing the problem of fishery resource depletion, and promoted activities and actions that will reduce pollution in lagoons and estuaries and relieve pressure on coastal resources. This project also set up a basic management information system/framework for better connectivity of agencies under the ministry dealing with fisheries and their outlying offices, including developing a data gathering network which was piloted to gather catch and effort data as a first step towards interpreting and managing the biological state of the fishery.

Enhancing inland fisheries and aquaculture

The ADB funded Aquatic Resources Development and Quality Project (ARDQIP) supported NAQDA in developing freshwater capture fisheries and aquaculture.

• *Capacity enhancement of NARA (CENARA)*

This is being carried out through the *Uthuru Wasanthaya* programme where the cultivation of sea cucumber, sea weed and other non-traditional fishery products will be encouraged and promoted among the people for livelihood development.

7.2. Policies and Plans

Sri Lanka being a non-annex 1 country and being committed to reduce Greenhouse gases to the atmosphere under the UNFCCC, more efforts have been taken for adapting and mitigating to climate change. Country's priority has gently moved towards adapting to climate change than assessing mitigation options and taking measures to mitigate climate change.

Mahinda Chintana; A vision for a new Sri Lanka

The ten year development plan aims for the agriculture sector to grow at a faster rate with a higher contribution coming from non plantation sector through prompting other foods crops, fruits and vegetables, fisheries and livestock. The vision for fisheries is “ Sri Lanka to become a leader in the South Asian Region in sustainable utilization of fisheries and aquatic resources detecting the utilization fisheries and aquatic resources for the benefit for the current and future generation.”

The Action Plan for Haritha (Green) Lanka Programme

Ten missions including meeting the challenges of Climate Change have been identified for action under this. The Plan has recommended a number of measures to be undertaken by 2016 on mitigation and adaptation. The Implementation of the programme will be overseen by the Ministry of Plan Implementation.

National Physical Planning Policy (NPPP) and a National Physical Plan (NPP)

The policy and the plan were expected to provide a broad framework to promote economic growth while maintaining integrated planning of economic, social, physical and environmental aspect of land. Among the environmental concerns that the policy took note were sea level rise, warming temperatures, uncertain effects on forest and agricultural systems and increased variability and volatility in weather patterns. Based on

the principles of sustainable development, a policy was developed to provide a framework for addressing the issues and challenges that will face Sri Lanka towards 2030

National Climate Change Policy in Sri Lanka

This has been drafted with the goals of

- To minimize the climate change risks to Sri Lanka's communities, infrastructure, built environment and ecosystems.
- To integrate climate change concerns into relevant sectoral policies
- To ensure that climate change concerns are considered in decision making at all levels
- To enable Sri Lanka's regions, communities and sectors to capture opportunities in mitigating and adapting to changing climate and make Sri Lanka a green economy.

National Adaptation Strategy for Sri Lanka-2011-2016

A study was completed by a team funded by ADB in association with the Ministry of Environment in formulating a National Climate Change Adaptation Strategy (NCCAS) to increase Sri Lanka's resilience to climate change impacts whilst pursuing sustainable economic development (MoE, 2010). In the development of the NCCAS, first, Sector Vulnerability Profiles (SVP) were prepared for the five key sectors – agriculture and fisheries; water; health; urban development, human settlements and economic infrastructure; and biodiversity and ecosystem services.

The strategy was presented in 5 thrust areas:

- Mainstream climate change adaptation into national planning and development,
- Enable climate resilient and healthy human settlements,
- Minimize climate change impacts on food security,
- Improve climate resilience of key economic drivers, and
- Safeguard natural resources and biodiversity from climate change impacts.

The Initial National Communication of Sri Lanka was prepared and submitted to the UNFCCC secretariat in October 2000. Second National Communication on Climate Change has been drafted to the UNFCCC thereby meets the obligations to the convention and aims to strengthen the technical and institutional capacity of Sri Lanka in mainstreaming climate change concerns into the country's sectoral and national development planning processes.

The project contains the following main components.

- Information on national circumstances
- Greenhouse Gas Inventory
- Programme containing measures to facilitate Adequate Adaptation to climate change
- Programmes Containing Measures to Mitigate Climate Change
- Other Information Considered Relevant to the Achievement of the Objective of the Convention including the following:
 - Development and Transfer of Technologies
 - Research and Systematic Observation
 - Education, Training and Public Awareness and Information and Networking
 - Improved Information Technology
 - Capacity-building
- Constraints and Gaps, and Related Financial, Technical and Capacity Needs

Preparation of SAARC Action Plan on Climate Change from year 2009-2011 and periodically reporting to SAARC Secretariat in the Environmental Ministerial Meetings

Ministers of Environment of all the eight nations of the South Asian Association for Regional Cooperation (SAARC) have adopted a three-year Action Plan on Climate Change at the SAARC Ministerial Meeting on Climate Change, held in Dhaka from 1st to 2nd July 2008. The Action Plan, covering 2009-2011, and focuses on seven thematic areas - from adaptation of Climate Change to regional stance for international negotiations.

Implementation of the activities under the Adaptation Fund

An Adaptation Fund was established under the KP to finance concrete adaptation projects and programmes in developing countries that are particularly vulnerable to the adverse effects of Climate Change.

A country can choose to submit project proposals for funding either through an accredited National Implementing Entity (NTE) or through Multilateral Implementing Entity (MIE). Ministry of Environment has nominated the Ministry as the National Implementing Entity (IE) of the Adaptation fund of UNFCCC. The NTE will bear the full responsibility for the overall management of the projects and programmes financed by the Adaptation Fund, and will bear all financial, monitoring and reporting responsibilities.

Developed Carbon Financed Strategy and The Sri Lanka National Policy on Clean Development Mechanism (NPCDM)

The draft policy intends to establish the institutional, financial, human resources and legislative framework necessary for Sri Lanka to participate in the Clean Development Mechanism under the Kyoto Protocol effectively.

The NPCDM will be implemented in total compliance with and complementary to the National Strategy on Sustainable Development and the National Poverty Reduction Strategy of Sri Lanka. Even though Sri Lanka is a Non Annex I country with a per capita emission of Greenhouse Gases (GHGs) as low as 0.6 ton of CO₂ equivalent per year, it is the objective of the Government of Sri Lanka to encourage private sector investments in climate-friendly development activities, while contributing to the ultimate objective of the United Nations Framework Convention on Climate Change (UNFCCC).

Establishment of Sri Lanka Carbon Fund (pvt) Ltd

Lanka Carbon Fund to promote CDM activities in Sri Lanka. The government has recognized importance of promoting CDM in Sri Lanka for the purpose of bringing revenue as well as clean technologies in support of contributing towards reducing emissions. In addition to developing a National CDM Policy and Strategies the Government established a Sri Lanka as a company. The SLCF was established as a private public partnership company registered under the Companies Act No 7 of 2007.

The nature of the organization is a state owned private company with Government being the majority share holder with 51% of the equity. The balance share capital will be raised from other sources including the private sector. Carbon Fund will assist the project developers in terms of finances and technical know how with a view to proactively more project developers to harness maximum benefit to the country

7.3 Laws related to the coast zones

Main statutes

- Coast Conservation Act No.57 of 1981 (CCA 1981)
- Coast Conservation (Amendment) Act No.64 of 1988 (CCA 1988)

Other key statutes

- Marine Pollution Prevention Act No. 59 of 1981 which provides for prevention, reduction and control pollution in Sri Lankan waters and has provision for penal action for any form of marine pollution or damage to live marine resources and wildlife
- The Fisheries and Aquatic Resources Act No. 2 of 1996 which promotes measures for the integrated management, regulation, conservation and development of fisheries and aquatic resources in Sri Lanka, and enables declaration of fisheries reserves

- National Aquaculture Development Authority of Sri Lanka Act No. 53 of 1998 which set up the National Aquaculture Development Authority (NAQDA) to develop aquaculture and inland fisheries
- National Aquatic resources Research and Development Agency Act No. 54 of 1981 which set up NARA for research and research application work on all living and non-living aquatic resources for the development and management of the fisheries and ocean resources sector
- The fauna and Flora Protection Ordinance No. 2 of 1937, and subsequent amendments including marine sanctuary and a Nature Reserve. The Act also has provision to protect certain categories of animals and plants wherever they are found, including threatened species of corals, fish turtles and all marine mammals
- The National environmental Act No. 47 of 1980 and the amended Act No. 56 of 1988 which empowers project approving agencies to obtain an Environmental impact assessment from any developer for prescribed development projects
- The state Lands Ordinance No. 8 of 1947 and its two amendments
- The Forest Ordinance No. 16 of 1907 and its subsequent amendments
- The Urban Development Authority Law No. 37 of 1978 which provides for the development of environmental standards and schemes for environmental improvement in areas identified as USD areas