Identifying International Fisheries Management Initiatives and fisheries law enforcement barriers in Sri Lanka –Fishers' prospects

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Abstract

Though there are rules and regulations and mechanism to implement them, illegal fishing practices are recorded in inland wide. These issues are badly affected not only for the sustainability of the marine resources but also for the socio-economic status of the fishers. Therefore the study tries to identify some barriers and propose sustainable options for effective implementation of fisheries law in the country. UN binding and non-binding fisheries management initiatives, acts and regulations imposed by the ministry of fisheries of Sri Lanka and other regional fisheries information are used as secondary information for the study. Randomly selected 84 fishers who use three major types of boats in three fishery districts were subjected to the structured interview from May-August 2016. Collected Likert's scale data were analyzed using Wilcoxon sign rank test by SPSS software. It is found that, if the majority of fishers have understood the important of the rules and regulations, poor awareness and low participation of the fishers for the management process led to barriers for compliance. Therefore, proper awareness programs, meaningful fishers' participation for fishery management process, community based appoches, unbias law enforcement, application of input and output control systems, improve government commitment and coordination, better data collection and monitoring system are proposed to minimize the barriers of fishery law enforcement of the country.

Keyword: Fisheries management initiatives, fisheries law, Sri Lankan fishery, fishes' prospects, and Illegal fishery.

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List of Acronyms

APFIC	Asia-Pacific Fishery Commission
BOBLME	Bay of Bengal Large Marine Ecosystem Project
BOBP-IGO	Bay of Bengal Programme Inter-Governmental Organization
CBD	Convention on Biological Diversity
CCRF	Code of Conduct for Responsible Fisheries
CFC	Ceylon Fisheries Corporation
CHFC	The Ceylon Fishery Harbors Corporation
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CMS /Bonn Convention	Conservation of Migratory Species of Wild Animals
COFI	Committee of Fisheries
DCG	Department of Coast Guard
EBSAs	Ecologically or Biologically Significant Marine Areas
EEZ	Exclusive Economic Zone
FADs	Fish Aggregating Devices
FAO	Food and Agriculture Organization of the United Nations
GDP	Gross Domestic Product
GNP	Gross National Product
GPS	Global Positioning System
HDI	Human Development Index
ICJ	International Courts of Justice
ILO	International Labour Organization
IMBL	International Maritime boundary Line
IMF	International Monetary Fund
IMUL	Inboard Multi-day Boats
IPOAs	The international plans of action
IPOA-Capacity	International Plan of Action for the Management of Fishing Capacity
IPOA- Seabirds	International Plan of Action for reducing incidental catch of seabirds in longline fisheries

IPOA-shark	International Plan of Action for Conservation and Management of Sharks
IOTC	Indian Ocean Tuna Commission
ITLOS	International Tribunal for the Law of the Sea
MEPA	Marine Environment Protection Authority
MPA	Marine Protected Area
NAQDA	National Aquaculture Development Authority
NARA	National Aquatic Resources Research and Development Agency
NGO	Non-Governmental Organization
NPOA-IUU	National Plan of Action –Illegal Unreported and Unregulated
NTRB	Non-motorized Traditional Boats
OECD	Organization for Economic Cooperation and Development
OFRP	Out-board engine Fiberglass Reinforced Plastic Boats
PSMA	Port State Measures to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing
RFBs	Regional Fishery Bodies
RFMOs	Regional Fisheries Management Organizations
SAARC	South Asian Association for Regional Cooperation
SDGs	Sustainable Development Goals
SWOT	Strengthen, Weakness, Opportunities and Threats
UNCLOS	United Nations Convention on the Law of the Sea
UNCTAD	United Nations Conference on Trade and Development
UNCED	United Nations Conference on Environment and Development
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFSA	United Nation Fish Stock Agreement
UNGA	United Nation General Assembly
VMS	Vessel Monitoring System
WTO	World Trade Organization

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1. Introduction

Sri Lanka is a small tropical island which is located in the Indian Ocean between 5° 55' and 9° 50' north latitude and 79° 42' & 81° 53' east longitude. It covers 64,630 square kilometers (sq.km) of land and 980 sq.km of waters. It is the 123rd largest nation in the world with a total area of 65,610sq.km[1]. According to the last census in 2012[2], 20,359,439 of population live in the country. Out of the total population, 28.7% live in the western province and 12.6%, 12.5%, and 11.7 % population live in the Central, South and Wayamba provinces respectively. The other 34.5% populations live in rest of the five provinces. The World Bank has revealed that the per capita income of the country was USD 3,912 in 2015[3] and therefore Sri Lanka has been included in the lower middle-income group category. In 2012/13, World Bank information has shown that nearly 15% of the population lived on less than $ 3.10 per day. Although the country is in the lower middle-income group according to of economic indicators, Sri Lanka is in the High Human Development Category recording 0.757 (2014) value according to the Human Development Index (HDI)[4].

Sri Lanka's Gross Domestic Product (GDP) at current market prices was Rs. 11,183.2 billion (US dollars billion 82.3) in 2015[5] and the contributions of the major economic activities to the GDP were 7.9% (Agriculture, Forestry, and Fishing), 26.2 % (Industries) and 56.6 % (Services). Compared to the above major economic groups, 28.7% of the labor force of the country was represented by the Agriculture sector and Service and Industry sectors were represented by 45.6% and 25.8% respectively in 2015[6]. Forestry and fisheries are also represented in the Agriculture sector in the country.

Fishery sector is really important for Sri Lankan food security and export income, and many other sectors. It contributes 17.44% to the per capita protein supply, is the second largest

[1] World Atlas, "Where Is Sri Lanka?", Available from HTTP:// worldatlas.com/as/lk/where-is-sri-lanka.html.
[2] Sri Lanka, Department of Census and Statics, Census of Population and Housing of Sri Lanka, 2012 ,Available from http://www.statistics.gov.lk/PopHouSat/CPH2011/Pages/ Activities/ Reports/FinalReport/Population/Table%20A4.pdf.
[3] World Bank, "country/Sri Lanka", Apr 30, 2016, Available from http://www.worldbank.org /en/ country/Sri Lanka/overview.
[4] United nations development programme, Human Development Index and its component,UNDP data Available from http://hdr.undp.org/en/composite/HDI
[5] Sri Lanka, Central Bank, National Output, Expenditure and Income, Available from http://www.cbsl.gov.lk/pics_n_docs/10_pub/_docs/efr/annual_report/AR2015/English/6_Chapter_02.pdf.
[6] Sri Lanka, Department of Census and Statics, Sri Lanka labor survey – annual bulletin 2015, Available from http://www.statistics.gov.lk/samplesurvey/LFS_Annual% 20Bulletin _2015-f.pdf.

component of the protein supply source of the country[7]. Compared to the Sri Lankan primary source of animal protein, it contributes about 65% to the total animal protein supply[7].

The fishery sector consists of three main subsectors[8], namely coastal, offshore and deep sea, together with inland and aquaculture. Around 272,140 active fishermen were engaged in both marine and inland fisheries and about 560,000 direct and indirect employment opportunities have been created in the country. Fishery sector helped to create livelihoods for 2.6 million people[9].

The country comprises 21500 sq.km of historical waters, 30000 sq.km of the continental shelf and 517000 sq.km of EEZ. According to the Article 76 of UNCLOS, Sri Lanka applied to claim sea space comprising over 1,500,000 sq.km or about 18 times[10] the land area of Sri Lanka. Therefore, it is clear that Sri Lanka has a significant amount of ocean resources which can be used for fisheries as well as other economic activities for the development of the country.

There are several institutes established by the government to formulate policies, strategies and to provide facilities for sustainable utilization of the fisheries resources of Sri Lanka. The fisheries and aquatic resources act (2) 1996 and several other regulations were imposed to regulate sustainable utilization of aquatic resources. Though there is a well-established hierarchy for the proper management of the fishery sector, issues related to the IUU fishing, overfishing, unsustainable fishing practices are still being experienced in the country. As a result of poor management of the fisheries, Sri Lanka was listed as an uncooperative fishing country by the EU in February 2015. This critically affected the fisheries trade in the country. (Fortunately, Sri Lanka was delisted from April 2016.[11])

Sri Lankan fisheries law not only addresses the local requirements but also abides by international fisheries management initiatives. Amendments made in 2013, 2015 are mainly based on international requirements. However, it can be seen illegal and poor fisheries

[7] Sri Lanka, Department of Census and Statics, Summary of Food Balance Sheet - 2013/14, Available from http://statistics.gov.lk/agriculture/FoodBalanceSheet/Food%20Balance% 20Sheet %202013.pdf
[8] Sri Lanka, Ministry of fisheries, fisheries sector development strategy 2010-2013, Available from http://www.fisheries.gov.lk/doc_files/130625062842.pdf.
[9] Sri Lanka, Ministry of fisheries, Performance Report - 2015, Available from http:// www.fisheries.gov.lk/doc_files/131218125433.pdf
[10] Fernando Denis. N, "Future of the Sri Lanka lies of the sea", *The Island*,04 June 2003. Available from http://www.island.lk/2003/06/04/midwee01.html
[11] European Commission, "Fighting illegal fishing: Warnings for Kiribati, Sierra Leone and Trinidad & Tobago, while Sri Lanka is delisted" Brussels, 21 April 2016 Available from http://europa.eu/rapid/press-release_IP-16-1457_en.htm

management practices have persisted in Sri Lankan waters. Therefore fishery management has been identified as one of major issues in Sri Lanka fishery by the Ministry of Fisheries[12]. This study will provide insight into identification of barriers and suggest policy measures for effective implementation of fisheries law and international fisheries management initiatives in Sri Lanka

1.1 Significant of the study

Lack of adhereance to the laws and regulations that were imposed on fisheries, and IUU fishing are key issues in marine resource sustainability[13]. Ministry of Fisheries of Sri Lanka has clearly identified IUU fishery as a policy issue[14]. Since Sri Lanka perceives IUU fishing and poor fishery management as a serious threat to the sustainability of fisheries in both national jurisdictions and the high seas, it has adopted a number of measures in conformity with national and international law and is in the process of taking further action.

The major legal framework for the fishery is "Fisheries and Aquatic Resources act, no. 2 of 1996 as amended subsequently by acts no. 4 of 2000, 4 of 2004 and 22 of 2006" which help to progress the fishery sector towards sustainable utilization. The amendments no. 35 of 2013, No 1 of 2014, and no 2 of 2015 are mainly based on international fisheries management initiatives. These rules and regulations are directly helping to sustain natural resources and maintain livelihoods in the fisheries. Therefore proper implementation of these rules and regulations and properly practice of the international fisheries management initiatives are really important for the country.

Some of fishery resources of the country have been overexploited[15]. Small pelagic and demersal species productions were declining in the late 1980s[16]. Destructive fishing practices and poor fishing techniques have been the main courses of declining fisheries resources.

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[12] Sri Lanka, Ministry of fisheries, *Midterm policy framework 2013-2016*, Available from www.fisheries.gov.lk/doc_files/130510003839.docx

[13] Henrik Osterblom, orjan Bodin, U. Rashid Sumaila, and Anthony J. Press, "Reducing Illegal Fishing in the Southern Ocean: A Global Effort", *Solutions*, Vol 4 (Jan 2015) pp72-79 Available from http://www.thesolutionsjournal.org/node/237225

[14] Sri Lanka, Ministry of fisheries, *Ten year development policy framework of the fisheries and aquatic resources sector 2007-2016*, (March 2007). Available from http://www.cepa.lk/content_images/publications/documents/121-S-Min.of%20Fisheries-Ten%20year%20development%20policy.pdf

[15] Samarayanke, R.A.D.B, "Assessment, management and future directions for coastal fisheries in Asian countries" *WorldFish Center conference proceedings*; (2003))pp. 987-1012, Available from https://core.ac.uk/download/files/153/6396647.pdf

Reef on the Sri Lankan coast are degraded as a result of coral mining, sedimentation, destructive fishing practices (such as blast fishing / bottom set nets / uncontrolled harvesting of ornamental fish), pollution from land-based sources, and crown-of-thorns starfish[17]. Corals located in the Kandakuliya, Thalawila, Chilaw, Hikkaduwa, Batticaloa, Trincomalee and Tangalle have been highly or partially degraded, and destructive fishing practices are one of the major causes[18].

Mangroves create productive and fragile ecosystem mainly in the lagoons. Most of the mangrove forests in Sri Lanka are being eliminated as a result of human settlement, firewood gathering, and clearing of coastal areas for intensive shrimp culture[19]. Further, the marshes have declined as a result of saltpans and conversion for shrimp culture ponds. To give one instance, 50 % of the marshland in Puttalam lagoon was lost in a ten-year period[19].

Therefore, it is clear that significant environmental and socio-economic issues have been created by poor fishery management and IUU fishing practices. Therefore, it is important for proper implementing of the rules and regulations and fisheries management initiatives to the sustainability of the resources. This research will lead to making policy suggestions for effective implementation of laws related to ocean recourses. Ultimately, it will help to sustain existing natural resources in the ocean.

1.2 Research question

To maintain fishery resources at a sustainable level, many steps have been taken by the Ministry of Fisheries in the country. To adjust to intentional standard many amendments have also been passed recently. In addition to the legal approach, allied institutions which are attached the ministry have been established to address the different issues in the fishery and ocean resources. However, destructive and IUU fishing practices are continue in the country.

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[16] Food and Agriculture Organization, *An overview of the impact of the tsunami on selected coastal fisheries resources in Sri Lanka and Indonesia"* ,p 10(Bangkok, 2007) Available from http://www.fao.org/3/a-ai000e.pdf

[17] Arjan rajasuriya, hussein zahir, e.v. muley, b.r. subramanian, k. Venkataraman, m.v.m. wafar, s.m. munjurul hannan khan and emma Whittingham, "*Status of coral reefs in south asia: bangladesh, india, maldives and sri lanka",* Status of coral reefs of the world: 2000, Australian Institute of Marine Science (Western Australia 2000) Available from file:///E:/Writing/Arranged/6396647.pdf

[18] FAO, "Regional Workshop on the Conservation and Sustainable Management of Coral Reefs", *Workshop Proceedings*, Bhattarams, Chennai, 15-17, December 1997, Available from http://www.fao.org/3/a-x5627e/index.html

[19] Samarayanke, R. A. D. B. "Review of national fisheries situation in Sri Lanka." In *Assessment, Management and Future Direction of Coastal Fisheries in Asian Countries. Penang, Malaysia: WorldFish Center Conference Proceedings*, vol. 67, pp. 987-1012. (2003), Available from https://core.ac.uk/download/files/153/6396647.pdf

These activities have critically affected to the ocean resources in the country. Several protests against the IUU fishing practices occurred last year and at the beginning of this year. The Hon. State Minister of Fisheries and Aquatic Resources, Dilip Wedaarachchi, therefore, emphasized that the IUU fishing cannot be minimized only through implementing of law. He further suggested that proper awareness programmes are required to increase awareness of the fishers of the harmful effects of banned fishing methods[20]. Therefore it is really important to have a proper understanding of loopholes and difficulties of implementation of the fisheries law in the country

Hence the leading question for research is "What are the barriers to proper implementation of the fishery law and management initiatives of the country" Therefore; there should be the considerable sustainable options for the proper implementation of the fishery law in the country.

1.3 Objective of the study

Although only a few fishers are engaged in IUU fishery, the negative consequences are not limited to any specific area. It affects the whole ecosystem and the livelihoods of all the fishers in the industry. Hence, the enforcement and monitoring of fishery rules and regulations is important for domestic, regional and global perspectives. It is important to identify barriers to the implementation of rules and regulations of the fisheries. Hence, the major objective of the study is "to identify the barriers and sustainable options to implement fisheries management initiatives, rules and regulation the country". The objective of the fisheries rules and regulation is not to restrict fishery activities in the country but to encourage the sustainable existence of the fisheries in the country.

The rules helps to protect around one million livelihoods related to the fisheries, secure a major animal protein source, and increase foreign income from fishery. Therefore it is really important to find out the prevailing barriers of fisheries law and propose possible options to implement fisheries law in a productive manner.

In addition to the above major objective, the following specific objectives are also considered.

1. To find out the fishers' perception and their suggestions on fishery law in the country.

[20] Dilip Wedaarachchi, State Minister of Fisheries and Aquatic Resources, "Law alone is incapable of doing things that should be done by raising awareness. Proper awareness will deviate fishers from illegal activities", Available from http://www.fisheries.gov.lk/news_ more.php?nw=389

2. To identify the international fisheries management initiatives which are practiced at the present and the experience of developed and developing countries.
3. To examine the consequences of poor implementation of fisheries management initiatives

1.4 Organization of the thesis

The research considers mainly fisheries management initiatives and the difficulties in their implementation. Therefore the research has two parts. While the first part describes the fisheries management initiatives, the second part identifies the barriers and sustainable options for implementation.

There are four sections in the first part of the research. Literature review and methodology of the research will be discussed in the first section. The binding and non-binding instruments of the fisheries and United Nation General Assembly (UNGA) resolutions of the fisheries will be explained in the second section. The regional fisheries management initiatives and the developed and developing countries' application of sustainable fisheries techniques will also be discussed in this section. Development of fishery law in the country from the colonial period, present fisheries rules and regulations, application of the international fisheries management instrument will be discussed in the section three of the first part. Indian ocean fisheries management Initiatives and the organizations will also be discussed in the part one. In addition to that latest amendments to the Sri Lankan fisheries act will be discussed. .

As for Part One, Part Two comprises four sections. An overview of the Sri Lankan fishery such as fish production, fishing crafts, fishing gear and fish trade information will be offered in the first chapter of the second part. In addition to that Fisheries administration, Fisheries Ministry and allied institutes and fisheries issues of Sri Lanka will be explain in chapter one of the second part. The trend of the actions offences the fisheries acts and the regulations and the actions taken to minimize the harmful fishing practices will be explained in section Two of Part Two. The third section of the Part Two will comprise the fishers' ideas which have been collected through structured questioners by the fishers. Then the barriers for implementing fishery laws and regulations and the possible ways and means to proper implement fisheries law will be discussed in section four.

1.5 Limitation of the study

This research is based on the identification of the barriers to implementation of the fishery law of the country. Therefore it is important to study every part of the fishery law implementation process in the country. However, with a limited time period, this study only takes account of the fishers' ideas regarding the fisheries law of the country. Further, the sample size of the research is small as a result of the time limitation of the study and lack of financial. All actions against fishery acts and the regulations are not the result of complain by the fishers or other stockholders. Therefore, lack of data is another limitation of the study. Further, it is hard to find a study of how to identify barriers to implementing fisheries laws in the developing countries and the regional practices to implement fisheries laws and management initiative. However, it is expected to provide description of barriers and opportunities to properly implement fisheries law in the country using prevailing data and using regional experiences.

2. Part 1: The International and Sri Lankan Fisheries management Initiatives

Chapter 1: International binding and non-binding fisheries management Initiatives

Section A: Literature Review

It is hard to find local literature based on the research question of "what are the barriers to proper implementation of the fishery law and management initiatives of the country?". However, a few local studies have discussed the barriers to some specific fisheries management initiatives in the country. In addition, policy papers and the development plans of the Ministry of Fisheries discuss matters relating to the research question and provide some solutions to overcome much research can be found relating to the specific fisheries management components such as MPAs, and ecosystem-based fishery.

Paragraph 1: Local and Other Studies

a. Local Studies

Issues regarding weak law enforcement and compliance have been identified by Wijerathne (2001)[21] in Sri Lankan coastal fisheries. Requirements for the improvement of the fisheries management framework by amending and updating the fisheries laws and regulations have been acknowledged under the ten year development policy framework of the Ministry of Fisheries (2007)[22]. Nadanasabesan (2015)[23] state that the fishery resources in the northern area have been over-exploited as a result of poor fishery management. Hon state Minister of Fisheries of Sri Lanka stated (2016)[24] that "illegal fishing cannot be merely achieved through the implementation of law. It needs proper awareness programmes that will raise the knowledge of fishers about the harmful effects of banned fishing methods to the industry of fisheries." The poor enforcement of the management practices is not the only issue in the fisheries; it can be seen in the coastal zone management of the country (2012)[25]

[21/9] Wijayaratne, B. "Coastal Fisheries in Sri Lanka: Some Recommendations for Future Management." (2001).

[22] Sri Lanka, Ministry of Fisheries, *Ten year development policy Framework Of the fisheries and aquatic resources sector 2007 - 2016*

[23/8] Nimalan, Nadanasabesan. "The need for sustainable development of the small-scale fisheries-A case study from the Northern Province, Sri Lanka." (2015).

[24] Dilip Wedaarachchi, Hon State Minister of Fisheries "Law alone is incapable of doing things that should be done by raising awareness. Proper awareness will deviate fishers from illegal activities ", April 2016. Available from http://www.fisheries.gov.lk/news_more.php?nw=389

[25] Sri Lanka, Ministry Environment and Renewable energy, *Technology need assessment and technology action plan for climate change adaptation*, 2012, Available from, unfccc.int/ttclear/misc_/StaticFiles/.../ce76243f1e68483c83ce6d9f41d35089.pdf

State and Fishermen cooperatives have responsibility to implement fisheries management plan. It is difficult to achieve sustainable objectives without proper cooperation and coordination. R.Wickramasinghe and M. Bavinck (2015)[26] claim that, although the fishers' institutions and the state are parallel, the community institutions have important social and economic functions whereas state institutions are mainly concerned the environmental goals. Therefore it is necessary to view state and community regulations conjunction for proper fishery management. E.K Galappaththi and F. Berkes (2014)[27] have noted that a combination of the fish farmers' knowledge with government technical knowledge helps to maintain economic sustainability of the fishery culture. They further mentioned that small-scale community-based aquaculture operations are more important than the large-scale aquaculture operations for sustainable aquaculture. Fishers' knowledge should be incorporated into state fishery management plans for sustainable fishing practices (Nadanasabesan -2015)[28]. Nadanasabesan added that proper fishery management tools should be used by government and the Fisheries Act no 2 of 1996 should be updated to minimize poor fishing practices in the Northern Province of the country. Wijayaratne (2001)[29] argues that interactive learning processes need to be given to the fishery stakeholders and they should be invited to the decision-making and management process. In addition to that greater responsibilities need to be given to the fishers and they should qualify as fisheries managers to ensure the sustainable food security and the livelihood of the fishers.

b. Other studies

A number of factors including biological, ecological, environmental, technological, social and cultural, and economical considerations should be considered under the fisheries management initiatives.[30] It is really important that compliance with the fisheries management initiatives and the fishery law for sustainable fishery resources should be enforced. However the majority of the developing countries are unable to comply with the fisheries management initiatives. If the enforcement authority is weak in implementing

[26] Wickramasinghe, WA Ranjith, and Maarten Bavinck. "Institutional landscapes affecting small-scale fishing in Southern Sri Lanka-legal pluralism and its socio-economic effects." *Maritime Studies* 14, no. 1 (2015): 1
[27] Galappaththi, Eranga K., and Fikret Berkes. "Institutions for managing common-pool resources: the case of community-based shrimp aquaculture in north western Sri Lanka." *Maritime Studies* 13, no. 1 (2014): 1-16.
[28] Nimalan, Nadanasabesan. "The need for sustainable development of the small-scale fisheries-A case study from the Northern Province, Sri Lanka." (2015)
[29] Wijayaratne, B. "Coastal Fisheries in Sri Lanka: Some Recommendations for Future Management." (2001).
[30]Kevern L. Cochrane,*A Fishery Manager's Guidebook Management Measures and Their Application*,(FAO, 2002), Available from, http://www.fao.org/docrep/005/y3427e/y3427e03.htm

fisheries regulations, it results in fishermen having a low compliance with regulations (Natheer Alabsi and Teruhisa Komatsu 2014)[31]

Lack of success in management can be attributed to lack of surveillance, weak institutions, unclear legal management instruments, and limited involvement of fishers in the management process (Salas Silva and Others 2007)[32]. Tony J. Pitcher and others (2009)[33] found that, there are no outstanding "good" performance ratings for WWF Ecosystem-based management (EBM) principles, and only six countries (USA, Norway, New Zealand, South Africa, Australia and Canada) have recorded confidence limits of 'good' 70%, and three countries (Iceland, Japan and Malaysia) have recorded 'acceptable' scores over 60%. However, almost half (14) of the 33 countries (subjected to the study) have recorded 'fail grades'. (Chile, China, UK, Argentina, Brazil, Pakistan, Indonesia, Morocco, Taiwan, Turkey, Viet Nam, Thailand, Russia and Myanmar).

Inefficient inter-sectoral and inter-governmental integration, weak commitments to financial and human resources, weak leadership and law enforcement capability and limited participation have been identified (S. Satumanatpan, P. Senawongse, W. Thansuporn, H. Kirkman -2014)[34] as important issues for the effectiveness of the Environmental Protected Areas (EAPs). A.Cinti, W.Shaw. J.Torre (2010)[35] have noted that local fishers haven't formal rights to resources, weak organization, limited power, limited access to information, and insufficient institutional support as weaknesses for potential implementation of the fishing regulations. For example, they found that 100% of the respondents were unaware of the recent changes in fisheries policy and most of the respondent (Subjected to the interview) were not aware that there is a Fisheries Act. Therefore, fishers' participation in policy making and implementation, provide exclusive use or property rights to the fishers, strengthen their

[31] Alabsi, Natheer, and Teruhisa Komatsu. "Characterization of fisheries management in Yemen: A case study of a developing country′ s management regime." *Marine Policy* 50 (2014): 89-95

[32] Salas, Silvia, Ratana Chuenpagdee, Juan Carlos Seijo, and Anthony Charles. "Challenges in the assessment and management of small-scale fisheries in Latin America and the Caribbean." *Fisheries Research* 87, no. 1 (2007): 5-16

[33] Pitcher, Tony J., Daniela Kalikoski, Katherine Short, Divya Varkey, and Ganapathiraju Pramod. "An evaluation of progress in implementing ecosystem-based management of fisheries in 33 countries." *Marine Policy*33, no. 2 (2009): 223-232

[34] Satumanatpan, Suvaluck, Pisase Senawongse, Weranit Thansuporn, and Hugh Kirkman. "Enhancing management effectiveness of environmental protected areas, Thailand." *Ocean & Coastal Management* 89 (2014): 1-10.

[35] Cinti, A., W. Shaw, and J. Torre. "Insights from the users to improve fisheries performance: fishers' knowledge and attitudes on fisheries policies in Bahía de Kino, Gulf of California, Mexico." *Marine Policy* 34, no. 6 (2010): 1322-1334.

access of information and provide incentives for compliance. These have been identified as major approaches for proper implementation for the fishery law.

Weak knowledge of resources attribute for the law performance of the regulations (NatheerAlabsi n, TeruhisaKomatsu -2014)[36]. Therefore, awareness of the marine environment" is most important (Suvaluck Satumanatpan -2014)[37] to get the support of all stakeholders. (Ika Kusumawati, Hsiang-WenHuang -2015)[38].Further, Ika and Hsiang argue that a better understanding of benefits derive from the MPAs as a major influential factor for greater involvement of stakeholders and its help to increase the trust on government.

Weak commitments to finance and human resources, weak leadership and capabilities for law enforcement are barriers to the management of the environmentally protected areas. Therefore it is important to increase funds to the implement fisheries management initiatives and rules and regulations. Susan Singh-Renton and Ian McIvor (FAO – 2015)[39] have shown that the regional and local-level fisheries management activities of Central and Northeast Insular Sub-region countries are dependent on government funding support (88% of eight countries, and 80% of five countries and 67% of six countries). Further, according to the findings of the survey, it should be mentioned that 81% of countries (16 countries) felt that funding was insufficient to support the enforcement of all regulations.

L.S. Evans, K. Brown, and E. H. Allison (2011)[40] have identified the strengthening of the process of knowledge sharing help for the effective adaptive governance process overall. South Africa has applied international recognized key elements such as community oriented, more participation of the stakeholders, in responding to local context for their new policy draft in October 2010. [41]

[36] Alabsi, Natheer, and Teruhisa Komatsu. "Characterization of fisheries management in Yemen: A case study of a developing country′ s management regime." *Marine Policy* 50 (2014): 89-95

[37/19] Satumanatpan, Suvaluck, Pisase Senawongse, Weranit Thansuporn, and Hugh Kirkman. "Enhancing management effectiveness of environmental protected areas, Thailand." *Ocean & Coastal Management* 89 (2014): 1-10

[38] Kusumawati, Ika, and Hsiang-Wen Huang. "Key factors for successful management of marine protected areas: A comparison of stakeholders′ perception of two MPAs in Weh island, Sabang, Aceh, Indonesia." *Marine Policy* 51 (2015): 465-475.

[39] Susan Singh-Renton and Ian McIvor " Review of current fisheries management performance and conservation measures in the WECAFC area", FAO, (Rome, 2015), Available from, http://www.fao.org/3/a-i4255e.pdf.

[40] Evans, Louisa S., Katrina Brown, and Edward H. Allison. "Factors influencing adaptive marine governance in a developing country context: a case study of southern Kenya." Ecology and Society 16, no. 2 (2011): 21.

[41] Sowman, M. "New perspectives in small-scale fisheries management: challenges and prospects for implementation in South Africa." *African Journal of Marine Science* 33, no. 2 (2011): 297-311

The major methodologies applied to identify and evaluate the barriers to implementation of the fisheries legislation and the management initiatives can be summarized as follows.

Table 1 Empirical literatures related to the fisheries management initiatives and legislations

Title of the research /Thesis/ report, Year and Auther/s	**Methodology applied**
Institutional landscapes affecting small-scale fishing in Southern Sri Lanka - legal pluralism and its socio-economic effects (2015) W.A. Ranjith Wickramasinghe and Maarten Bavinck	Data have been collected from small-scale, motorized and non-motorized boat fisheries of Hambantota District in southern Sri Lanka The research sample was 85 fishers (Skippers) and information has been collected from Fishers' institutions. Qualitative data analysis (descriptive statistics) techniques has been done.
Coastal fisheries in Sri Lanka: some recommendations for future Management (2001) B. Wijayaratne	Data have been collected from the Ministry of Fisheries and Aquatic Resources Development and its affiliated agencies. In addition to that Ordinances, Acts and Regulations have also been examined to collect necessary information The Gordon-Schaefer model (Anderson 1997) has been used to estimate the level of resource Strengths, Weaknesses, Opportunities and Threats (SWOT).
Institutions for managing common-pool resources: the case of community-based shrimp aquaculture in northwestern Sri Lanka (2014) **Eranga K Galappaththi and Fikret Berkes**	This is a qualitative research study based on the case studies. Data have been collected using participant observation, semi-directive interviews with shrimp farmers and the leaders of shrimp farming community associations, Focus group discussions and key informant interviews with influential people involved in shrimp farming have been done. Thirty-eight (38) shrimp farmers and community associations have been interviewed. Mind maps and diagrams of concepts and management processes, have been developed using descriptive statistics.
The need for sustainable development of the small-scale fisheries (2015) A case study from the Northern Province, Sri Lanka. N. Nadanasabesan	39 fishers from five communities have been subjected to interview SWOT analysis and descriptive data analysis techniques have been used for data analysis.
lnsights from the users to improve	Fisheries regulation and attitudes concerning

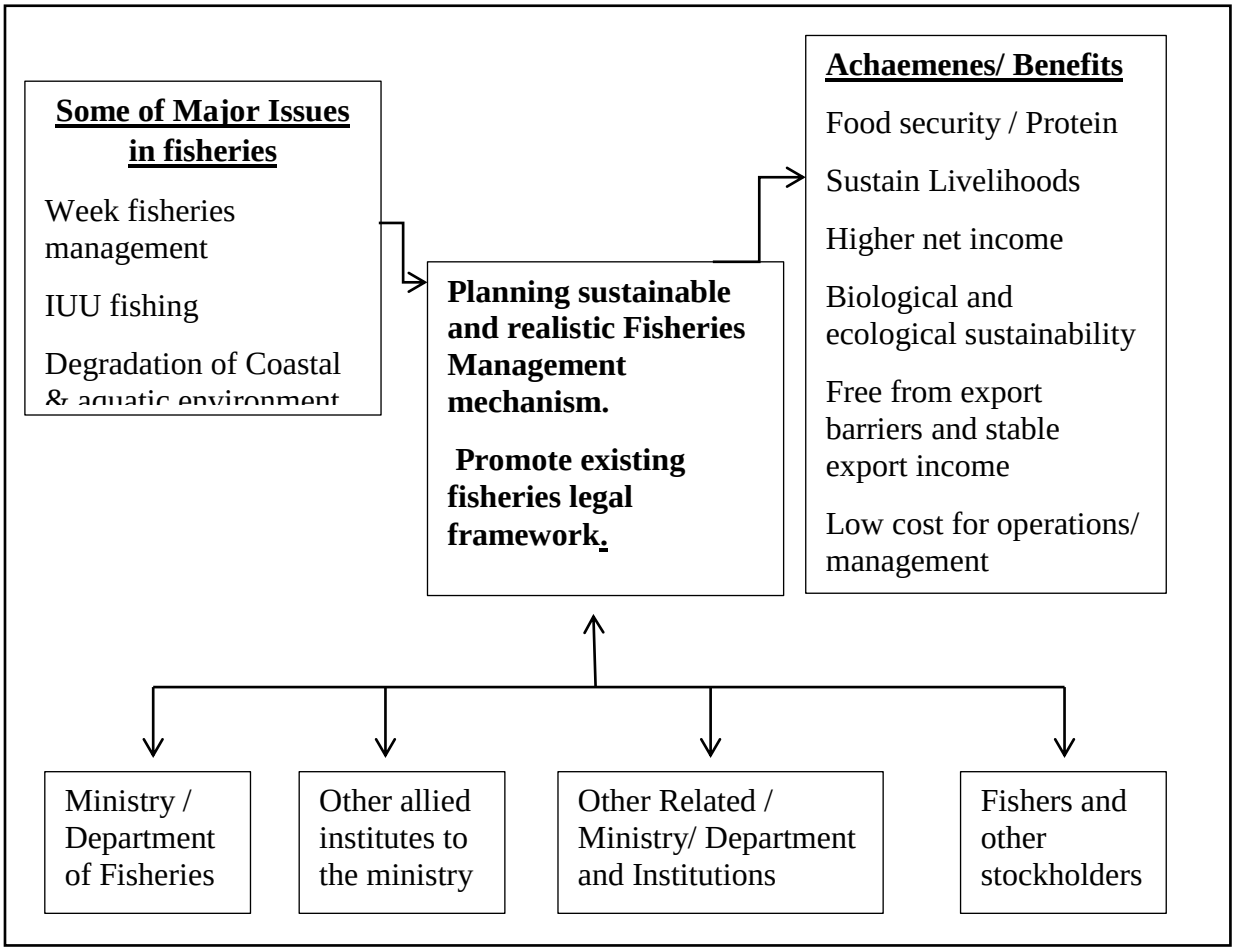
fisheries performance :Fishers' knowledge and attitudes on fisheries policies in Bahı´a de Kino, Gulf of California,Mexico (2010) A. Cinti, W.Shaw, J.Torre	different aspects of fisheries regulation were investigated using a combination of open-ended questions 45 interviews were conducted. Non-parametric Statistics (Mann–Whitney U-test) has been used for data analysis.
Characterization of fisheries management in Yemen: A case study of a developing country's management regime (2014) NatheerAlabsi n, TeruhisaKomatsu	The existing legislative, policy and regulatory frameworks, the compliance and enforcement mechanisms, and the impacts of these arrangements have been critically reviewed.
Individual and village-level effects on community support for Marine Protected Areas(MPAs)in the Philippines (2015) Tomas Chaigneau, TimM.Daw	166 of questionnaires have been collected from three different villages within the Visayas region of the Philippines to determine individuals' support for adjacent MPAs Attitude index and binary logistic regression were used for data analysis.
Key factors for successful management of marine protected areas: A comparison of stakeholders' perception of two MPAs in Weh island, Sabang, Aceh ,Indonesia (2015) Ika Kusumawati , Hsiang-WenHuang	185 questionnaires were completed by government offices, non-governmental organizations, fishermen, and marine tourism operators Chi-square Goodness-of-Fit Test were used to analyze data to show differences among the population

c. Conceptual framework

Fisheries governance is a collection of the legal, social, economic and political arrangements use to manage fisheries[42]. Through the proper management of the fisheries, several objectives such as biological, environmental, technological, and socio-economics are expected to be fulfill. Achievement of the maximum net income for the community is one of major objective of the proper fisheries management.[43] Therefore effective fisheries governance helps to sustain resources, food supply and livelihoods of the community. The following conceptual framework describes the outcomes expected to be achieved by the study with proper implementation of the fisheries management.

[42] Sri Lanka, Ministry of Fisheries, " Institute", Available from, http://www.fisheries.gov.lk/content.php?cnid=intn

[43] Australian Fisheries Management Authority, " Objectives Function and Powers" , Available from, http://www.afma.gov.au/about/objectives-functions-powers/



The study therefore focuses mainly to find a proper mechanism to implement current fisheries legislation, regulations and management procedures. Fishers' ideas and their perceptions of fisheries acts, regulations and management initiatives will be considered for the betterment of the process.

Paragraph 2: Methodology of the study

This study has considered both population and sample data, and there are different techniques are used to collect and analysis data. Sources of primary and secondary data collection, sampling locations and techniques, data analysis techniques and related hypothesis can be describe as follows.

a. Data collection

The research comprises mainly two parts which mainly consider international fisheries management initiatives and then implementation barriers of the fisheries law in Sri Lanka. UN binding and non-binging instruments relates to the fisheries, International Plan of Action

for the management of fisheries of FAO and related fishery management initiatives introduced by FAO, international Convention on Biological Diversity (CBD), Sustainable Development Goals (SDGs), Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), RFMOs and fisheries management initiatives have been considered for the study. Information provided from relevant websites of the above mentioned organisations, annual publications, research papers and other publications referred for the first part of the study.

Sri Lankan past and present legal instruments relate to the fisheries have been considered for the second part of the study. Annual publications and published information of the ministry of fisheries were referred for the study. In addition to that, books, research papers and news articles were also referred. Data collected from Sri Lanka NAVY and legal department of department of fisheries have also been used to describe the issues of fisheries in the country. Further, information provided by the district fishery offices help to understand the difficulties of implementation of fisheries law in the country.

Based on structured questionnaire (attached to the annex 1), randomly selected 84 fishers who use three different types of boats of three fishery districts (Puththalum (Kalpitiya area), Kaluthara and Negambo) were subjected to the interviews. Kalpitiya is located in Puththalum fishery district, North Western province, around 170 Km away from Colombo. Major occupation of people of the area is fishing. While Kalutara and Negambo, are major fishing districts of the country, located close to Colombo. Random sampling techniques were used to select fishers for the study and the data were collected during May to September in 2016. The locations of sample and the different boat types can be shown in the figure 1. Basic information of the sampling lactations has also shown in table 1

Figure 1 **Sample Locations and type of fishing boats selected for the study**

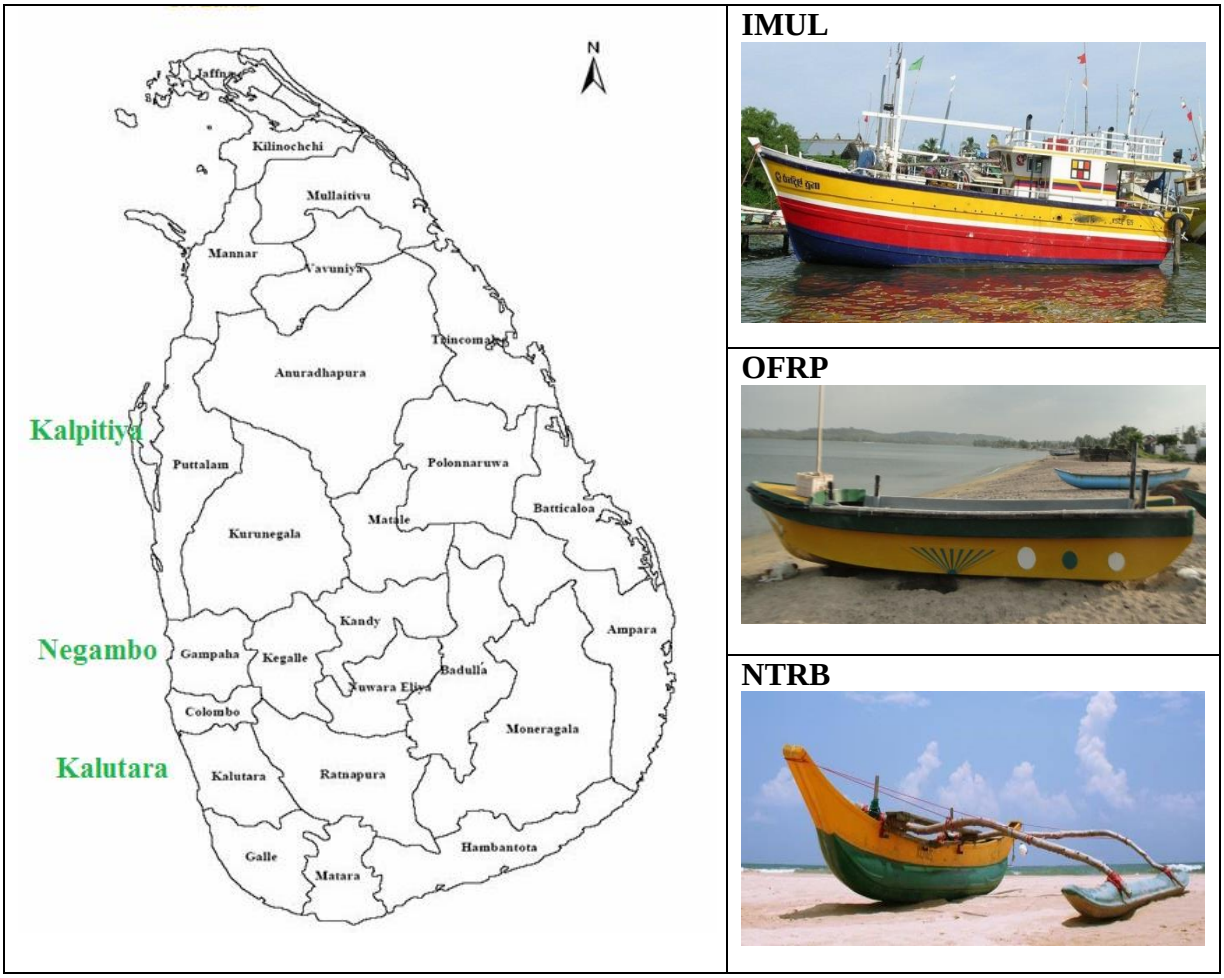


Table 2 **Basic Fisheries Information of the Sample Locations**

Description		Puttalam	Kalutara	Negambo
Active Fishers (Marine Fisheries) (2014)		15,860	6,270	10,020
Fishing Households (Marine Fisheries) (2014)		12,370	6,050	9,380
Fishing Household Population (Marine Fisheries) (2014)		70,980	26,040	50,070
Fisher Community Organizations – 2014 (Coastal)		150	41	56
No of Members of Fisher Community Organizations		9,307	4,116	5,821
Operating Fishing Boats - 2014	IMUL	78	501	646
	OFRP	3,011	487	2,014
	NTRB	1,882	426	1,840
	IDAY	-	12	115
	MTRB	194	85	132
Marine Sector Fish Catch (Mt) - 2014		38,280	40,180	38,030

Source: Ministry of fisheries and aquatic resources annual publication - 2015

Yes / no questions, Likert scale questions and open ended questions have been mainly focused in the questionnaire for the data collection. The collected data are analyzed using SPSS, Minitab and Excel and both inference and descriptive statics are referred for the study. Wilcoxon sign rank test and chi-square test have mainly been used as analytical technique. In

addition to the fishers, data was collected using questioners (Annex: 2) from the District fishery Officers (Additional Directors) of the selected fishing district.

b. Data Analysis

One sample Wilcoxon sign rank test is used to analysis Likert scale data. The one-sample Wilcoxon Signed-Rank test is a non-parametric test determines whether the median of the sample is equal to the some specified value[44]. A one sample median test allows us to test whether the sample median significantly differs from a hypothesized value[45]. The assumption made for the Wilcoxon test is that the variable being tested is symmetrically distributed about the median, which would also be the mean. It is vitally important that the sample has been randomly chosen from the population[46].The assumptions[47] of the Wilcoxon test can be summarized as follows.

1: Dependent variable should be measured at the ordinal or continuous level.

2: Independent variable should consist of two categorical, "related groups" or "matched pairs".

3: The distribution of the differences between the two related groups needs to be symmetrical in shape

Seven Likert scale was selected for the study (Strongly Agree (1), Agree (2), slightly Agree (3), Don't know (neutral) (4), Slightly Disagree (5), Disagree (6), Strongly Disagree(7)) and the scale 4 considered as median value. It is assumed that the people's responses are symmetrically distributed about 'don't know (4). Therefore, the null hypothesis (H_0) of the test is that the fishers neither agree nor disagree of the statements (median, 4). While the alternative hypothesis is fishers either agree or disagree (two tails). The null and alternative hypotheses can be stated as follows.

H_0: the median response is 4 (H_0: $\eta = 4$) or the population median (η) equals the hypothesized median (η_0)

[44] OriginLab, "One-Sample Wilcoxon Signed Rank Test", available from http://www.originlab.com/doc/Origin-Help/NonParaTest-SignRank1

[45] Institute for Digital Research and Education (IDRE), "What statistical analysis should I use? Statistical analyses using SPSS", available from http://www.ats.ucla.edu/stat/spss/whatstat/whatstat.htm

[46] Mathematics in Education and Industry (MEI),"The Wilcoxon signed rank test" available from http://mei.org.uk/files/pdf/wilcoxonrerevised.pdf"

[47] Laerd Statistics, "Wilcoxon Signed-Rank Test using SPSS Statistics" Available from https://statistics.laerd.com/spss-tutorials/wilcoxon-signed-rank-test-using-spss-statistics.php

H_1: the median response is not equal 4 (H1: $\eta \neq 4$) or the population median (η) differs from the hypothesized median (η_0)

Significance level 5% - alpha value (α=.05)

Main points of the one sample Wilcoxon signed rank test can be summarized as follows.

- Find the difference between each value and the median
- Ignore the zeros. Rank the remaining scores. Ignoring the signs, give the lowest rank to the smallest difference. Where two or more differences have the same value find their mean rank, and use this.
- Sum the ranks of the positive differences, W+, and sum the ranks of the negative differences W-. Check that W+ + W- = ½ n (n+1), where n is the number in the sample having ignored the zeros.
- For a two tailed test the test statistic is the smaller of W+ and W-
- Compare the test statistic W, with the critical value in the tables; the null hypothesis is rejected if W is less than or equal to the critical value[48].

Chi-square test is used to find the association of the fishers income with the four other variables (Fishers districts, Fishers boats, Fishers experience, and Fishers education) and association of the same variables considered with fishers' statements.

The chi-square test for independence, also called Pearson's chi-square test or the chi-square test of association, is used to discover the relationship between two categorical variables. Once analyzing the data using a chi-square test for independence, it is needed to make sure that following two assumptions[49].

1: Two variables should be measured at an ordinal or nominal level

2: Two variables should consist of two or more categorical, independent groups.

The Hypotheses of the test is:

H_0: There is not related of (associated with) variables or variables are independent.

H_1: There is related of (associated with) variables or variables are dependent

[48] Mathematics in Education and Industry (MEI),"The Wilcoxon signed rank test" available from http://mei.org.uk/files/pdf/wilcoxonrerevised.pdf"

[49] Laerd Statistics, "Chi-Square Test for Association using SPSS Statistics" Available from https://statistics.laerd.com/spss-tutorials/chi-square-test-for-association-using-spss-statistics.php

This Chi-square test statistic is calculated as follows:

$$\chi_c^2 = \sum \frac{(O_i - E_i)^2}{E_i}$$

It can be found the critical value in a table of probabilities for the chi-square distribution with df=(r-1)*(c-1).

Here $\mathbf{O_i}$ = observed frequency, $\mathbf{E_i}$ =expected frequency in each of the response categories in each group, **r** = the number of rows in the table and **c** = the number of columns in the table. **r** and **c** correspond to the number of comparison groups and the number of response options in the outcome .

In addition to the above major two analyses, boxplot analysis and descriptive statistics are also used for the study. The collected sample data is small compared to the population of the fishers in the country. However, it is expected provide general ideas of the fishers using collected sample data, the statistics of the Ministry of the fishers, Sri Lanka Navy and other related publications.

Section B: International Fisheries Management Initiatives

Fisheries management can be divided into four subsets which are biological, ecological, economic and social[50]. Therefor all the above areas should be covered under international and local legal and management instruments for the sustainable existence of the fisheries. These sustainable fisheries management instruments can be categorized as binding treaties, non-binding instruments and other related sectors such as shipping trade, environmental and labour relations[51].

Paragraph 1: Legally binding instruments

a. The United Nations Convention on the Law of the Sea (UNCLOS)

UNCLOS is a comprehensive regime of law and order in the field of ocean resources. The convention comprises 320 articles and 9 annexes, governing all aspects of ocean space such

[50] Kevern l. Cochrane, "Fisheries management", *A Fishery Manager's Guidebook - Management Measures and Their Application*, Fisheries technical paper 424(Fisheries Department, FAO, Rome, Italy,2002) . Available from http://www.fao.org/docrep/005/y3427e/y3427e00.htm#Contents

[51] Palma, Mary Ann E., Martin Tsamenyi, and William R. Edeson. *Promoting sustainable fisheries: The international legal and policy framework to combat illegal, unreported and unregulated fishing*. Vol. 6. (Brill, 2010).

as delimitation, environmental control, marine scientific research, economic and commercial activities, transfer of technology and the settlement of disputes relating to ocean matters[52]. According to the preamble of UNCLOS, it facilitates the promotion of peaceful uses of the seas and oceans, the equitable and efficient utilization of their resources, the conservation of living resources, and the study, protection and preservation of the marine environment[53]. The Convention was opened for signature on 10 December 1982 and came into force on 16 November 1994, twelve months after the date of deposit of the sixtieth instrument of ratification or accession.

Under the convention coastal states have sovereign rights over marine living resources within the Exclusive Economic Zone (EEZ).[54] However, there are some limitations on full sovereign right over the fishery resources (Art: 51(1), Art: 47(6))[55] . The convention and the management of fisheries resources in the EEZ are described in part V of the UNCLOS.[56] The obligation regarding highly migratory species[57], marine mammals[58], anadromous species[59], catadromous species[60], sedentary species[61] and overlapping stocks[62] are described in part V of the UNCLOS. The Coastal State shall determine the allowable catch of the living resources in its exclusive economic zone based on the best scientific evidence available.[63] The Coastal State shall promote the objective of optimum utilization of the living resources in the exclusive economic zone. However, if coastal state does not have the capacity to harvest the entire allowable catch, it shall through agreements or other arrangements and pursuant to the terms, conditions, laws and regulations referred to in

[52] Final act of the third united nations conference on the law of the sea (united nation publication, Sales NoE.97.V.10), Available from http://www.un.org/Depts/los/convention_agreements/convention_overview_convention.htm
[53] Final act of the third united nations conference on the law of the sea (united nation publication, Sales NoE.97.V.10), Available from http://www.un.org/Depts/los/convention_agreements/texts/unclos/closindx.htm
[54] Part 5: Article 56 of UNCLOS
[55] Article 51 (1) of UNCLOS: an archipelagic State shall respect existing agreements with other States and shall recognize traditional fishing rights and other legitimate activities of the immediately adjacent neighboring States in certain areas falling within archipelagic waters.
Art 47 (6) of UNCLOS: If a part of the archipelagic waters of an archipelagic State lies between two parts of an immediately adjacent neighboring State, existing rights and all other legitimate interests which the latter State has traditionally exercised in such waters and all rights stipulated by agreement between those States shall continue and be respected
[56] Winter, Gerd. *Towards sustainable fisheries law: A comparative analysis*.(No. 74. IUCN, 2009). Available from http://www.peacepalacelibrary.nl/ebooks/files/IUCN_EPLP-074.pdf
[57] Article 64 of UNCLOS
[58] Article 65 of UNCLOS
[59]Article 66 of UNCLOS
[60]Article 67 of UNCLOS
[61]Article 68 of UNCLOS
[62]Article 63 of UNCLOS
[63] Article 61 (1/2) of UNCLOS

paragraph 4, give other states access to the surplus of the allowable catch, having particular regard to the provisions of articles 69 and 70, especially in relation to the developing states mentioned therein[64]. Although the states consider the conservation and utilization obligation in their EEZ[65] (sovereign right area) and high seas[66] under UNCLOS, none of the provisions can be seen to relate to the conservation and management of fisheries in the maritime zone under sovereignty.[67]

b. United Nation Fish Stock Agreement (UNFSA)

UNFSA aims to ensure the long-term conservation and sustainable use of straddling fish stocks and highly migratory fish stocks[68] through effective implementation of the relevant provisions of UNCLOS.[69] The Agreement was adopted on 4 August 1995[70] by the United Nations conference and opened for signature on 4 December 1995. The Agreement came into force on 11 December 2001[71], thirty days after the date of deposit of the thirtieth instrument of ratification or accession[72]. It comprises 50 articles and 2 annexes. The objectives of UNFSA are to conserve and manage straddling fish stocks and highly migratory fish stocks, coastal states and states fishing on the high seas shall adopt measures to ensure long-term sustainability and such measures are based on the best scientific evidence available, apply the precautionary approach, assess the impacts (fishing, other human activities, environmental factors) on target stocks and species, adopt necessary conservation and management measures, protect biodiversity, promote and conduct scientific research, and promote and implement and enforce conservation and management measures through effective monitoring, control and surveillance.[73]

The importance of the establishment of sub-regional or regional fisheries management organizations entering into sub-regional or regional fisheries management arrangements has

[64] Article 62 of UNCLOS
[65] Article 56,61 and 62 of UNCLOS
[66] Article 118 of UNCLOS
[67] Tsamenyi, Martin, and Quentin Hanich. "Fisheries jurisdiction under the Law of the Sea Convention: rights and obligations in maritime zones under the sovereignty of Coastal States." *The International Journal of Marine and Coastal Law* 27, no. 4 (2012): 783-793.(Koninklijke Brill NV, Leiden, 2012). Available from http://ro.uow.edu.au/cgi/viewcontent.cgi?article=1637&context=lawpapers
[68] Highly migratory fish stocks, such as tuna, swordfish and oceanic sharks, regularly travel long distances through both high seas areas and areas under national jurisdiction. Straddling stocks, such as cod, halibut, pollock, jack mackerel and squid, occur both within a country's exclusive economic zone and in the adjacent high sea area.
[69] Article 2 of UNFSA
[70] Resolution 47/192
[71] http://www.un.org/Depts/los/convention_agreements/convention_overview_fish_stocks.htm
[72] Article 40(1) of UNFSA
[73] Article 5 of UNFSA

been explained by UNFSA.[74] Further it explains the duties, compliance and enforcement of flag states over fishing vessels flying their flag on the high seas[75]. The agreement states that states have an obligation to settle their disputes by negotiation, inquiry, mediation, conciliation, arbitration, judicial settlement, resort to regional agencies or arrangements, or other peaceful means of their own choice.[76] The agreement has mentioned especially the importance of data collection that relates to the fisheries. Currently eighty-three parties have become members of the UNFSA and conduct informal consultation meetings every year from 2002. To review the UNFSA and to discuss further requirements, three review conferences 2006, 2010 and 2016 have been held up to now.

c. The FAO Compliance Agreement (1993)

The compliance agreement helps promote compliance with international conservation and management measures by fishing vessels on the high seas for submission to governments for acceptance. The compliance agreement came into force on 24 April 2003, the date of receipt bythe Director-General of the twenty-fifth instrument of acceptance. The agreement was registered with the Secretariat of the United Nations on 1 August 2003[77].

This Agreement applies to all fishing vessels (except those less 24 meters) used, or intended for fishing on the high seas[78]. Article III of the agreement is the heart of the compliance agreement and it states the obligations on the parties engaged in high sea fishing vessels.[79] Each party should maintain a record of fishing vessels entitled to fly its flag[80] and exchange information, including evidentiary material, relating to activities of fishing vessels[81]. The agreement promotes the use of mutually satisfactory solution for dispute settlement. However if such arbitrations does not succeed, parties can bring the dispute to international courts of justice (ICJ), International Tribunal for the Law of the Sea (ITLOS).[82] The agreement began

[74] Article 9 -13 of UNFSA
[75] Article18 and 19 of UNFSA
[76] Part VIII of UNFSA
[77] FAO, "Agreement to promote compliance with international conservation and management measures by fishing vessels on the high seas", 14 october 2014. Available from http://www.fao.org/fileadmin/user_upload/legal/docs/012s-e.pdf
[78] Article II of compliance agreement
[79] Kllen Hey, development of international fisheries law.
[80] Article lV of compliance agreement
[81] Article V and Vl of compliance agreement
[82] Article lX of compliance agreement

as an effort to solve the "reflagging" problem, and over past decades fishing nations have created numerous organizations to regulate the fisheries.[83]

d. Port State Measures to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing (PSMA)

Illegal, Unreported and Unregulated (IUU) fishing in the world is estimated be worth between $10 billion and $23 at present[84] and its detrimental effect upon fish stocks, marine ecosystems and the livelihoods of legitimate fishers is understood ,together with the increasing need for food security on a global basis.[85] PSMA is the first ever binding international treaty that focuses specifically on illicit fishing. The agreement was finalized on 28 August 2009 and came in to force in June 2016, thirty days after the date of deposit of the twenty-fifth instrument[86]. Since all flag states are not capable or willing to discharge their flag state duties to prevent IUU fishing, port state agreement helps to prevent IUU fishing up to certain extent[87]. PSMA provides a powerful and cost-effective means of preventing, deterring and eliminating IUU fishing and increasing coordination at the regional and interregional levels to combat IUU fishing [88]. Provisions relating to the, electronic exchange of information, role of the flag state[89], developing state requirements[90], dispute settlement[91], are listed under the PSMA. Information to be provided in advance by vessels requesting port entry[92], port state inspection procedures[93], and report of the results of the inspection[94] have been provided to standardize the process of PSMA.

Paragraph 2: Non- binding instruments and related conventions

UN, FAO, RFMOs and international non-governmental organizations have provided guidelines and best practices for the sustainable fisheries. Non-binding instruments are often

[83] Ellen Hey, *Developments in international fisheries law*, (The Hague, The Netherland, 1999)
[84] FAO, *Report of the Expert Workshop to Estimate the Magnitude of Illegal, Unreported and Unregulated Fishing Globally*, Report No 1106 (Rome, 2–4 February 2015).Available from http://www.fao.org/3/a-i5028e.pdf

[85] Preamble of Port State Measure.
[86] Article 29(1) of Port State Measures
[87] Palma, Mary Ann E., Martin Tsamenyi, and William R. Edeson, *Promoting sustainable fisheries: The international legal and policy framework to combat illegal, unreported and unregulated fishing*. Vol. 6. (Brill,2010)
[88] Preamble of Port state measure
[89] Article 20 of Port state measure
[90] Article 21 of Port state measure
[91] Article 22 of Port state measure
[92] Annex A of Port state measure
[93] Annex B of Port state measure
[94] Annex C of Port state measure

refer to as soft law; they provide policy guidance for states and RFMOs to support international and national efforts to combat IUU fishing[95] and sustainable fisheries. Non-binding instruments often play a precursory role and shape future customary law of general principles, and provide a model for future treaty making. Further they contribute to the coordination and cooperation between national institutions at the international level[96].

The Code of Conduct for Responsible Fisheries (CCRF) consists of a collection of principles, goals and elements for action of fisheries and aquaculture issues. Representatives from members of FAO, inter-governmental organizations, and non-governmental organizations were involved for the arrangement of the Code[97]. It was initiated in 1991 by the FAO Committee on fisheries and more than 17O Members of the FAO adopted the Code of Conduct for Responsible Fisheries on October 31st 1995 in the twenty-eighth session of the FAO conference.

The code comprises twelve Articles and two Annexes. The first two articles explain the nature, scope and objectives of the code. The Code conforms with UNCLOS, fish stock agreement 1992 declaration of Cancun, the Rio Declaration on Environment and Development, and Agenda 21(in particular Chapter 17) adopted by the United Nations Conference on Environment and Development (UNCED), and other relevant declarations and international instruments[98]. Effective conservation and management of the living aquatic resources, prevention of overfishing, undertaking research and data collection, relying on the best scientific evidence available, maintain the nutritional value, quality and safety of the products, and promote awareness of responsible fisheries through education and training are some of important principles, mentioned under the general principle of the code[99]. Components of fisheries management[100], fishing operation[101], aquaculture development[102], coastal area management[103], post-harvest and trade[104] and fisheries research[105] are also

[95] B.S. Chimni, Miyoshi Masahiro, Javaid Rehman ,*Asian Yearbook of International Law:* Volume 15 (2009)
[96] Friedrich, Jorgen. *International Environmental "soft law": The Functions and Limits of Nonbinding Instruments in International Environmental Governance and Law*. Vol. 247. (Springer Science & Business Media, 2013)
[97] FAO, *what is the code of conduct for responsible fisheries*, (Rome, 2001) Available from ftp://ftp.fao.org/docrep/fao/003/x9066e/x9066e00.pdf
[98] Article 3 of CCRF
[99] Article 6 of CCRF
[100] Article 7 of CCRF
[101] Article 8 of CCRF
[102] Article 9 of CCRF
[103] Article 10 of CCRF
[104] Article 11 of CCRF
[105] Article 12 of CCRF

describe under the code. The code does not exactly explain how fishers, industry and governments should take the necessary practical steps to implement the code. The purpose of these guidelines is to give practical and technical advice to fishers, industry and fishery managers in order to take steps to implement the code.

The international plans of action (IPOAs) are voluntary instruments elaborated within the framework of the CCRF. Four IPOAs have been developed and they were adopted by the twenty-third session of the FAO committee on fisheries in February 1999 and endorsed in November 2000[106].

The CCRF mention that "states should prevent overfishing and excess fishing capacity and should implement management measures to ensure that fishing effort is commensurate with the productive capacity of the fishery resources and their sustainable utilization"[107]. This issue was discussed in 1997 by the FAO committee on fisheries and the final outcome was the International Plan of Action for the Management of Fishing Capacity (IPOA-Capacity).

The objective of the IPOA-Capacity is for states and regional fisheries organizations to achieve efficient equitable and transparent management of fishing capacity at a sustainable level. To achieve this objective four "urgent actions" were introduced and the strategies may be implementing through awareness building and education, technical co-operation at the international level, and coordination. IPOA-Capacity explains that the management of fishing capacity should be based on major principles such as participation, a holistic approach, conservation, new technologies, priority, mobility and transparency.

Seabirds especially albatrosses and petrels are being incidentally caught by longline fisheries throughout the world. To reduce the incidental catch of seabirds from longline fishery, the International Plan of Action for reducing incidental catch of seabirds in longline fisheries (IPOA- Seabirds) proposal was made in March 1997 the at FAO committee of fisheries[108]. It applies to the state waters where longlines are used by their own or foreign vessels, on the high seas and in the EEZ of other States. IPOA-Seabirds has been developed within the framework of the CCRF as envisaged by Article 2 (d) and Article 3[109].States should carry out a set of activities to implement IPOA- Seabirds and should start the implementation of the National Plan of Action (NPOA- Seabirds) before COFI Session in

[106] FAO, "International Plans of Action", Available from http://www.fao.org/fishery/code/ipoa/en
[107] Article 6(3) of CCRF
[108] FAO,"International plan of action for reducing incidental catch of seabirds in longline fisheries",(Roam, 1999) Available from ftp://ftp.fao.org/docrep/fao/006/x3170e/X3170E00.pdf
[109] Nature and Scope IPOA-Seabirds

2001[110]. Elements such as prescription of mitigation measures, research and development, education, training and publicity, data collection may be included to the NPOA- Seabirds. Ten technical measures and five operational measures have been introduced under the IPOA Seabirds to minimize the incidental catch of seabird.[111]

As a result of unsustainable shark catches in past decades, some shark species in several areas have become threatened. Especially Sharks need long recovery times in response to over-fishing and lack of available catch, effort, landings and trade data, as well as limited information on the biological parameters of many shark species, the issue has become serious[112]. Therefore, the International Plan of Action for Conservation and Management of Sharks (IPOA-shark) has been developed through the meeting of the technical working Group on the Conservation and management of sharks in Tokyo in April 1998 and adopted at twenty-third session of FAO in 1999. The IPOA-Shark has been elaborated within the framework of the CCRF as envisaged by Article 2 (d) and Article 3 and the term "shark" includes all species of sharks, skates, rays and chimaeras (Class Chondrichthyes), and the term "shark catch" is taken to include directed, bycatch, commercial, recreational and other forms of taking sharks. Participation, nutritional and socio-economic considerations, to sustain stocks is the general principle of the guideline. Each state is responsible for developing, implementing and monitoring their shark-plan If their vessels conduct directed fisheries for sharks or if their vessels regularly catch sharks in non-directed fisheries, they are responsible. States were to strive to have a shark-plan by the COFI session in 2001[113]. The Shark-plan should aim to ensure sustainable shark catch, assess threats to shark populations, with special attention for vulnerable or threatened shark stocks research, management, data collection and educational initiatives within and between states to minimize waste and discards from catches in accordance with CCRF article 7.2.2. States which implement a Shark-plan should be assessed (every four years) for increasing its effectiveness. Suggested contents of a shark plan[114] and content of shark assessment report[115] are explained in the IPOA shark plan.

[110] Implementation IPOA-Seabirds
[111] Technical and operational IPOA-Seabirds
[112] FAO, "International plan of action for the conservation and management of sharks", Available from ftp://ftp.fao.org/docrep/fao/006/x3170e/X3170E00.pdf
[113] Implementation IPOA shark
[114] Annex A IPOA shark
[115] Annex B IPOA shark

IUU fishing has created a series of issues which undermine the effort to conserve and manage fish stocks, fail to achieve management goals, loss of both short and long-term social and economic opportunities, negative effects on food security and environmental protection. The Twenty-third session of the FAO committee on fisheries in February 1999 discussed on prevent, deter and eliminate IUU fishing and the Twenty-fourth session committee of fisheries approved the International Plan of Action (IPOA IUU), by consensus, on 2 March 2001[116]. IPOA-IUU is a comprehensive "toolbox" to prevent, deter and eliminate IUU fishing and many of these tools have already been used by at least one state. Articles 1 and 3 of the CCRF describe the relationship between IPOA IUU and other relevant international instruments. Element of the IUU fishing describe major legal bindings of the fisheries. All states are required to develop and adopt NPOA-IUU not later than three years after the adoption of the IPOA IUU. Developing countries are to be funded for capacity building and technical support for the development and implementation of the NPOA.

a. Other Important convention related to the sustainable fishery

United Nations Environment Programme (UNEP) convened the ad-hoc working group of experts on biological diversity in November 1988 to explore the need for an international Convention on Biological Diversity (CBD).[117] After discussions of the exports in ad-hoc working groups and intergovernmental negotiating committees, the convention was ready for signature on 5 June 1992 at the United Nations Conference on Environment and Development (Rio "Earth Summit"). The convention expects to achieve sustainable use of its components and the fair and equitable sharing of benefits.[118] The CBD defines biodiversity as the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems[119]. According to the UN principle, states have sovereign rights over their resources pursuant to their own environmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other states or of areas beyond the limits of national jurisdiction.[120] Countries should develop national strategies, plans or

[116] FAO, "International plan of action to prevent, deter and eliminate illegal, unreported and unregulated fishing", (Rome, 2001) available from ftp://ftp.fao.org/docrep/fao/012/y1224e/y1224e00.pdf
[117] Convention on Biological Diversity, "History of the Convention" Available from https://www.cbd.int/history
[118] Article 1 of CBD
[119] Article 2 of CBD
[120] Article 3 of CBD

programmes for the conservation and sustainable use of biological diversity.[121] Therefore it is clear that the CBD has focused on sustainable fisheries and it is further embodied in the strategic plan for biodiversity 2011-2020. The CBD works on such issues as ocean acidification, coral reefs and ecologically or biologically significant marine areas (EBSAs).

Aichi Biodiversity targets closely relate to sustainable fisheries. Target 6 ensure that "by 2020 all fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem based approaches, so that overfishing is avoided, recovery plans and measures are in place for all depleted species, fisheries have no significant adverse impacts on threatened species and vulnerable ecosystems and the impacts of fisheries on stocks, species and ecosystems are within safe ecological limits"[122]. Improvement of current efforts to protect important inland, coastal and marine areas,[123], identification and prioritization of invasive alien species and pathways[124] and minimization of multiple anthropogenic pressures on coral reefs and other vulnerable ecosystem[125] are other targets which are planned to be achieved by 2020. These targets are closely related to the fisheries.

The Convention on the Conservation of Migratory Species of Wild Animals (CMS /Bonn Convention) was adopted in Bonn, Germany, in 1979 and came into force in 1985. One major outcome of the conference was the decision to establish the United Nations Environment Programme (UNEP) and the conference also recognized the migratory species which faced special threats[126].There are several CMS-related agreements and memoranda which have identified bycatch is a major issue for fisheries. Parties have endorsed resolutions and recommendations at past conferences[127] calling for immediate action to reduce the unnecessary deaths in by catches[128].

Sustainable Development Goals (SDGs) were adopted by world leaders at the United Nations Sustainable Development Summit on 25th September 2015. The goals will be universally applied over the next fifteen years. SDGs comprise 17 goals and 169 targets and it is

[121] Article 6 of CBD
[122] Convention on Biological Diversity, "Aichi Biodiversity Targets" " Available from https://www.cbd.int/sp/targets/
[123] Aichi Biodiversity Targets 11
[124] Aichi Biodiversity Targets 9
[125] Aichi Biodiversity Target 10
[126] CMS,"CMS History and Structure", August 2015. Available from http://www.cms.int/sites/default/files/publication/History%20%26%20Structure_2.pdf
[127] Cape Town 1999, Bonn 2002, Nairobi 2005 and Rome, 2008
[128] CMS," Bycatch". Available from http://www.cms.int/en/page/bycatch

recognized that poverty is the greatest challenge for sustainable development. It is expected to double agricultural productivity and income of small scale food producers, in particular women, indigenous peoples, family farmers and fishers[129]. SDG 14, named as "conserve and sustainably use of the oceans, seas and marine resources for sustainable development" is important for the sustainable usage of the ocean resources. Seven important targets have been mentioned under the SDG 14, such as reduction of marine pollution[130], minimization of impacts of ocean acidification[131], effective regulation of IUU and destructive fishing practices[132], increasing economic benefits to developing countries[133] and enhancing conservation and sustainable use of oceans and their resources by implementing international laws[134].

The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) aims to ensure that international trade in specimens of wild animals and plants does not threaten their survival[135]. The convention came in to force on 1st July 1975 and currently there are 182 parties. Approximately 5,600 species of animals and 30,000 species of plants are protected (listed in the three CITES Appendices) by CITES against over-exploitation through international trade[136]. Appendix I comprises the species which are normally banned from trade and only under exceptional circumstances (ex: research) allowed to be imported. Appendix II includes species called "look-alikes" that are not threatened, but can be threatened if trade is not closely controlled. Appendix III includes species that are protected in at least one country and asks other CITES parties for assistance in controlling the trade. Under Appendixes I and II there are 16 and 87 fish species have been identified gradually, while there are no fish species mentioned under Appendix III. FAO and CITIES work closely to address technical difficulties which help to fulfil the requirements of CITIES. For instance, FAO has been working on legal and implementation issues related to fisheries and promotes capacity building of member countries on issues related to the commercially- aquatic species listed in the CITIES appendix.

[129] SDG Targets 2.3
[130] SDG Targets 14.1
[131] SDG Targets 14.3
[132] SDG Targets 14.4
[133] SDG Targets 14.7
[134] SDG Targets 14.7 c
[135] CITES, "What is CITES?", Available from https://cites.org/eng/disc/what.php
[136] CITES, "The CITES species", Available from https://cites.org/eng/disc/species.php

Chapter 2: Regional and Sri Lankan fisheries management

Section A: Indian Ocean Fisheries management and Fisheries Ordinance of Sri Lanka

The Indian Ocean area is 73,556,000 square kilometers (28,350,000 sq. mi) and the ocean's volume is estimated to be 292,131,000 cubic kilometers[137]. The Indian Ocean is the third largest ocean in the world and it has been divided into two fishing areas named as Western Indian Ocean (Area 51) and Eastern Indian Ocean (Area 57) by the FAO[138]. Marine capture production of the Indian Ocean is 12.7 million tonnes which comprises 4.7 million tonnes from the Western Indian Ocean and 8 million tonnes from the Eastern Indian Ocean[139].It has about 16% fish production compared to the total marine capture fisheries in the world. Marine waters of the western side which begins on the southeast coast at 77°00'E of Indian Ocean comprises the Western Indian Ocean (Area 51)[140]. Area 51 has been further divided in-to eight subareas named as Red Sea (Sub-area 51.1), Red Sea (Sub-area 51.1), Western Arabian Sea (Sub-area 51.3), Eastern Arabian Sea, Laccadives (Sub-area 51.4), Somalia, Kenya and Tanzania (Sub-area 51.5), Madagascar and Mozambique Channel (Sub-area 51.6), Oceanic (Sub-area 51.7), Mozambique (Sub-area 51.8). Marine waters of the eastern side start from the southeast coast of India at 77°00'E of the Indian Ocean named as the Eastern Indian Ocean (Area 57)[141] which has been further divided to six subareas[142].

Paragraph 1: RFMOs in Indian Ocean

Regional fisheries organizations have been established to provide advice and coordinate the regional countries to promote long-term sustainable fisheries. There are two regional organizations, the Regional Fishery Bodies (RFBs) and the Regional Fisheries Management Organizations (RFMOs), functioning for different purposes. RFMOs mainly involve fisheries conservation and management issues while RFBs generally provide consultative or advisory measures for regional or member countries.[143] There are three categories of

[137] World atlas, "Indian Ocean – Map & Details" Available from http://www.worldatlas.com/aatlas/infopage/oceans/indianocean.htm
[138] FAO, "FAO Major Fishing Areas" Available from http://www.fao.org/fishery/area/search/en
[139] FAO, State of World Fisheries and Aquaculture 2016, Available from http://www.fao.org/3/a-i5555e.pdf
[140] FAO, "FAO Major Fishing Areas Indian ocean, western (Major Fishing Area 51)", Available from http://www.fao.org/fishery/area/Area51/en
[141] FAO, "FAO Major Fishing Areas Indian ocean, EASTERN (Major Fishing Area 57)", Available from http://www.fao.org/fishery/area/Area57/en
[142] Bay of Bengal (Subarea 57.1), Northern (Subarea 57.2), Central (Subarea 57.3), Oceanic (Subarea 57.4), Western Australia (Subarea 57.5), Southern Australia (Subarea 57.6)
[143] New Zealand Fisheries information, "Regional Fisheries Management Organizations", June 2009. Available from http://fs.fish.govt.nz/Page.aspx?pk=103&tk=322

RFBs which are established under the FAO constitution[144], established outside the FAO framework but with FAO depository functions[145] and established outside the FAO framework[146/147]. RFBs established under Article VI[148] have advisory rather than regulatory powers while RFBs established under Article XIV[149] have regulatory power and can adopt conservation and management measures that are binding on their members. RFBs of this type (established under article XIV) are referred as RFMOs[150]. There are about ten regional fisheries organizations[151] functioning in the Indian Ocean and the majority of them have been established under FAO regulation and with a few beyond the out of FAO legal framework.

a. Asia-Pacific Fishery Commission (APFIC)

APFIC was established on 26 February 1948 under Article XIV of the FAO constitution. It carries out its functions and responsibilities in the Asia-Pacific Area and covers both marine and inland aquatic resources of the Asia-Pacific area[152]. 21 countries have been members of the APICS up to the present and Sri Lanka is one of the members. The objective of the APFIC is to promote the full and proper utilization of living aquatic resources by the development and management of fishing and culture operations and by the development of related processing and marketing activities in conformity with the objectives of its members[153].At present, the APFIC supports three major initiatives for responsible fishing such as the development of the Bay of Bengal Large Marine Ecosystem Project (BOBLME) and establishment of an ASEAN–SEAFDEC regional management mechanism and the establishment of an ASEAN roadmap for integration of the fisheries sector[154]. APFIC currently undertakes several activities including the projects for the integration of fisheries and effective aquaculture, raising awareness on climate change, strengthening

[144] two types, which are established under Article VI of the FAO Constitution (CECAF, CIFAA, COPESCAALC, EIFAAC, SWIOFC, and WECAFC) established based under Article XIV (APFIC, GFCM, IOTC, RECOFI and CACFish
[145]Ex: ICCAT, NACA, COMHAFAT, LVFO, SEAFO and SIOFA
[146] Ex: CCAMLR, CCSBT, NAFO, NEAFC, WCPFC and IATTC
[147] Fisheries and Aquaculture Department, "FAO and Regional Fishery Bodies", Available from http://www.fao.org/fishery/topic/16918/en
[148] COPESCAALC,CIFAA, EIFAAC,CECAF,SWIOFC,WECAFC.
[149] APFIC, CACFish, GFCM, IOTC,RECOFI
[150] FAO,"Regional fishery bodies established within the fao framework", cofi/2014/inf.11 (Rome, 9-13 June 2014). Available from http://www.fao.org/3/a-mk346e.pdf
[151] BOBP-IGO,RECOFI,PERSGA,SWIOFC,IOTC,SIOFA,SWIOFC,CCAMLR,APFIC.
[152] FAO, "Asia-Pacific Fishery Commission- about the Asia-Pacific Fishery Commission", Available from http://www.fao.org/apfic/background/about-asia-pacific-fishery-commission/en/
[153] FAO, "Asia-Pacific Fishery Commission- The function of APFIC (APFIC Agreement, Article IV)", Available from http://www.fao.org/apfic/background/about-asia-pacific-fishery-commission/function-apfic/en/
[154] Gail Lugten, *The role of international fishery organizations and other Bodies in the conservation and management of living Aquatic resources*, (FAO Rome, 2010)Available from http://www.fao.org/docrep/012/i1493e/i1493e.pdf

implementation of ecosystem approaches, promoting certification contributing to combating IUU fishing, promote reduction of fishing over-capacity, improving livelihoods of fishing and aquaculture communities, and culture-based fisheries in inland waters to blue growth and so on[155]

b. Indian Ocean Tuna Commission (IOTC)

IOTC was established in 1993 under Article XIV of the FAO constitution and came into force on 27 March 1996. The purpose of the IOTC is to conserve and manage stocks that migrate into or out of the Indian Ocean[156]. Important functions of the commission are to gather, analyses and disseminate scientific information, catch and effort statistics, coordinate research and development activities, transfer technology, training, adopt Conservation and Management Measures (CMM), and review economic and social aspects of the fisheries[157]. To achieve conservation and management measures, the following important resolutions have been adopted among others by the commission[158]. (a) Implementation of a limitation of fishing capacity[159], (b) prohibiting of the use of large-scale driftnets on the high seas in the IOTC area[160], (c) fish aggregating devices (FADs) management plan[161], (d) recording of catch and effort data by fishing vessels in the IOTC area[162],(d) mandatory statistical reporting requirements[163], (e) vessel monitoring system (VMS) programme[164]

c. The Bay of Bengal Programme Inter-Governmental Organization (BOBP-IGO)

This Agreement was signed on 26 April 2003 in Chennai, India[165] and the members of the BOBP-IGO are Bangladesh, India, the Maldives, and Sri Lanka. Further discussion is going on with countries such as Myanmar, Thailand, and Indonesia to join the BOBP-IGO. The objectives of the organization are to increase awareness and knowledge of coastal fisheries management, enhance skills through training and education, transfer appropriate technologies and techniques for development of small-scale fisheries, promote women's participation in

[155] FAO, "Regional fishery bodies established within the FAO framework", Thirty-second Session, COFI/2016/Inf.16, (Rome, 11-15 July 2016)
[156] Gail Lugten, FAO, The role of international fishery organizations and other Bodies in the conservation and management of living Aquatic resources, Rome, 2010, FAO
[157] IOTC,"The commission", Available from http://www.iotc.org/about-iotc
[158] Nineteenth Session of IOTC was held from 27 April to 1 May 2015
[159] Resolution 12/11 of IOTC
[160] Resolution 12/12 of IOTC
[161] Resolution 13/08 of IOTC
[162] Resolution 15/01 of IOTC
[163] Resolution 15/02 of IOTC
[164] Resolution 15/03 of IOTC
[165] Bay of Bengal Programme,"about BOBP", Available from http://bobpigo.org/html_site/aboutbobp.htm

coastal fisheries development and establish a regional information networking. BOBP-IGO has developed a plan to strengthen monitoring, control and surveillance of fishery resources in the Bay of Bengal among the member states. It has helped to develop their national plans of action for monitoring, control and surveillance.[166]

In addition to the above regional fisheries organizations there are few RFMOs /RFBs function in the Indian Ocean and the final target of most of them is to maintain the sustainable fisheries in the region. Different approaches such as ecosystem approaches, precautionary approaches, training and development and data collection have been applied by the regional organizations. Therefore active function of the RFBs/RFMOs is important for the proper management of the fisheries in the region. However several challenges have been faced by the RFBs and may undermine the objectives of the RFBs

Funding is the most significant issue faced by many RFBs and may adversely affect the programmes agreed under their work plan. Insufficient human resources and delays to fulfil vacancies have badly affected to the function of the RFBs. Low attendance at meetings and overlapping with the mandate of the RFBs are other issues faced[167]. Therefore these issues adversely impact the function of the RFBs.

FAO area 57 is the most productive area of the Indian Ocean and it is still showing an increasing trend in fish landings. Landings from the Bay of Bengal and Andaman Sea regions have increased steadily, with no sign of levelling off[168].However, based on the stock assessment which has been done in 2010 (based on best available data and information by Southwest Indian Ocean Fisheries Commission), it is revealed that overall 68% of fish stocks are fully fished or under fished, and 32% fish stock at unsustainable levels in the area 51[169]. In Asia, coastal fisheries biomass is down to 8% to 12% of per fishing levels and 80% of the coral reefs in South East Asia at risk particularly overfishing, coral mining and global warming[170]. Further lack of reliable information on the status of stock position, migration of

[166] International waters governance, "Bay of Bengal", Available from http://www.internationalwatersgovernance.com/bay-of-bengal.html
[167] FAO, "Regional fishery bodies established within the FAO framework", Thirty first session of COFI, COFI/2016/Inf.16 (Rome 2014) Available from http://www.fao.org/3/a-mq842e.pdf
[168] FAO, State of World Fisheries and Aquaculture 2016, Available from http://www.fao.org/3/a-i5555e.pdf
[169] FAO, State of World Fisheries and Aquaculture 2016, Available from http://www.fao.org/3/a-i5555e.pdf
[170] Dennis Rumley, Sanjay Chaturvedi, Vijay Sakhuja, *Fisheries Exploitation in the Indian Ocean: Threats and Opportunities*, (Institute of Southeast Asian Studies, 2009)

tunas, IUU activities, bycatch lack of real catch data are the threats of Indian Ocean[171]. Research Gaps on stock status of marine mammals, impact of climate change, by-catch research including the fishing gears, genetic studies are also issues of the Indian Ocean[172]. Therefor it is really important to strengthen the regional fisheries organizations and the active implementation rules and regulations in coastal states for sustainable utilization of the fishery resources.

Paragraph 2: Fisheries legal instrument before 1940

Although there is no long history of commercial fisheries in the country, there is some evidence[173] about local fishing practices which were use in the country for many years. A Perimiyankulama rock inscription by King Vasabha (65 – 109 bc) revels that fishing was an important economic activity in the canals and reservoirs of the country. Channels and reservoirs were owned by the king and levies and tax were sometimes collected and used for the benefit of the temples[174]. *An Historical Relation of the Island of Ceylon in the East Indies, Jataka Atuwa Gatapadaya*, explained that fishing and the fishing practices such as hook (bail), net (jala), and the long basket (kumaina) were used in the ancient history of the country. Historically Sri Lanka had rich pearling grounds and used pearls for trade and gifts to other countries[175]. Therefore at the time, Sri Lanka was named as a "pearl of the Indian ocean". During the colonial period fisheries rules and regulations were passed under different ordinances.

a. The Village community Ordinance law no 24 of 1889.

A total of 29 regulations were made under this ordinance for the fisheries sector and of these 29, 27 were of regulations applied to inland fishing, while the remaining two covered the marine fishery[176]. Regulations related to the fisheries management were imposed under this

[171] Pillai, N. G. K., and P. Satheeshkumar. "Conservation and Management of Tuna Fisheries in the Indian Ocean and Indian EEZ." International Journal of Marine Science 3, no. 24: 187-192. (Kochi- Kerala, India 2013)

[172] Renison Ruwa, and Jake Rice," Indian Ocean, Group of Experts: Chapter 36E" (UN 2016) Available from http://webcache.googleusercontent.com/search?q=cache:http://www.un.org/depts/los/global_reporting/WOA_RPROC/Chapter_36E.pdf&gws_rd=cr&ei=QNToV57uCsXl0gT51r2YBA

[173] Siriweera, W. I. *The Inland fisheries in Sri Lanka: a historical perspective*, Agrarian Research and Training Institute,(Colombo 7, 1986). Available from http://harti.nsf.ac.lk/bitstream/handle/1/2461/22925.pdf?sequence=26.

[174] Hettiarachchi, A. "An overview of the inland fisheries of Sri Lanka." (Colombo 10, 2008). Available from http://repository.kln.ac.lk/handle/123456789/7428

[175] Silva de D. G. B, "Role of pearl trade in Lankan history ", The Island, 17 Jan 2004. Available from http://www.island.lk/2004/01/17/satmag01.html

[176][176] Ariyadasa, M. A. W, *Compendium of fisheries legislation in Sri Lanka*, UNDP/FAO/SRL/01/022 (Colombo, State printing cooperation, 1998).

ordinance[177]. For an instance banning some fishing techniques (poison and dynamite, some restriction for the fishing gears (Kraals, *barudel*), registration of fishing nets, and demarcation of the limits for the fishermen were some of the management measures introduced to the fishery.

b. The Local Boards Ordinance Law No. 13 0f 1887

Regulations relating to the prohibition of fishing gear (*ran-dela, kulu-dela and ara-del*a) , time limitation for some fishing gear (Kraals was prohibited during April, May and June in the Panadura river) and time allocation for Beach Seine in Matara Bay were gazetted under the ordinance.

c. The Game Protection Ordinance 1909

The main purpose of the ordinance was to protect game, wild animal, birds, reptiles and fish. Four species of fish which were not indigenous to Sri Lanka waters are protected under the ordinance. Fishing without a licence in selected water bodies, use of dynamite and poison within the island or at sea are punishable and, regulation for registration of *baru* nets, beach seine and *yoth* fishing are important under this ordinance[178].

d. The Small Towns Sanitary Ordinance Law no 18 of 1892.

Prohibition of some fishing techniques (rod, line, beach seine, *kodel, kundeliyadel*) of the river, lake and streams has been introduced under this ordinance. The ordinance did not mean significant involvement for the fisheries management and only concerned some regulation on fishing method in the Galle and Matara Districts[179].

e. Local Government Ordinance Law No 11 of 1920

Three inland fisheries regulations were introduced under this ordinance. It was mainly based on licences for kraal fishing and banning of discharge from firearms for the purpose of killing or disabling fish.

f. The Chank Fishery Ordinance no 18 of 1842

This was a separate ordinance from the artisanal fisheries introduced as result of chank fishery and was not conducted by the local fisherman. Beach-de-mer, coral and shell collection were also covered by the ordinance, which was relatively poor as a guideline

[177] Sivasubramaniam.K, *One hundred years of fisheries management in Sri Lanka*, (Colombo, State printing cooperation, 1997).
[178] Ariyadasa, M. A. W, *Compendium of fisheries legislation in Sri Lanka*, UNDP/FAO/SRL/01/022 (Colombo, State printing cooperation, 1998)
[179] Sivasubramaniam.K, *One hundred years of fisheries management in Sri Lanka*, (Colombo, State printing cooperation, 1997)

provided for fishery management other than the chank. Further there was no reference to the species of chank, beach-de-mer, coral and shells which may or may not be harvested[180].

g. The Peal Fisher Ordinance no 2 of 1890.

This was also a separate ordinance for similar reasons of the chank ordinance. Licences for boats and divers and penalties for unauthorized pearl fishery were introduced under this ordinance[181].

h. Walling Ordinance no 2 of 1928.

This ordinance provided regulation on the number of no persons allowed to kill, hunt or attempt to kill any animals such as whales, dolphins, porpoises and all marine mammals in Ceylon waters without licence[182].

i. Fisheries Ordinance no 24 of 1940

Fisheries Ordinance was the basic law for fisheries until it was suspended in 1996. This ordinance repealed the provisions of many ordinances except the game protection ordinance, chank ordinance, pearl and whale ordinance[183]. The ordinance was amended seven times[184]. Appointment of the Director for Fisheries[185], establishment of the Fisheries Advisory Board[186], registration of fishing boats[187], protection of fish[188], fishing dispute settlement[189], power of officers, offence, and registration of mortgage were introduced under this ordinance. Section 33, stated that "the minister may make regulations for the fishing industry, for the protection of fish in Ceylon waters". Spiny lobster and prawn regulation (1979), Live fish export regulation (1994), Inland water fishing regulations (1978), Regulation of foreign fishing boats (1979) regulations for registration of fishing boats (1980), beach seine regulations (1984), purse seine net fishing regulation 1986, fishing boats regulation were

[180] Sivasubramaniam.K, *One hundred years of fisheries management in Sri Lanka*, (Colombo, State printing cooperation, 1997
[181] Sivasubramaniam.K, *One hundred years of fisheries management in Sri Lanka*, (Colombo, State printing cooperation, 1997
[182] Sivasubramaniam.K, *One hundred years of fisheries management in Sri Lanka*, (Colombo, State printing cooperation, 1997
[183] Sivasubramaniam.K, *One hundred years of fisheries management in Sri Lanka*, (Colombo, State printing cooperation, 1997
[184] No 17 of 1950, No 25 of 1952, No 30 of 1956, No 20 of 1973, No 46 of 1973, No 07 of 1976, 1994
[185]FAO, Legal Office, Legislation Branch and International Centre for Ocean Development, *Regional compendium of fisheries legislation- Indian Ocean Region*. Vol. 1. - Article 2 of fisheries ordinance Sri Lanka (FAO, 1986).
[186] Sri Lanka, Fisheries ordinance no 24 of 1940, Article 3
[187] Sri Lanka, Fisheries ordinance no 24 of 1940, Article 9
[188] Sri Lanka, Fisheries ordinance no 24 of 1940, Article 12-19
[189] Sri Lanka, Fisheries ordinance no 24 of 1940, Article 20

important regulation introduced under Section 33. In addition to that, about 17 regulations related to inland fisheries were introduced under the same section.

Section B: Fisheries legal instrument in the present
Paragraph 1: Fisheries and Aquatic Resources Act No. 2 of 1996 and Regulation

This is more comprehensive act which is practiced in the present. The act has been amended seven times[190] and the latest amendments are based mainly on international requirements. The act repealed the Fisheries Ordinance of 1940 and its amendments[191.] Further the Chank Fisheries Act, the Pearl Fisheries Ordinance and the Whaling Ordinance were also repealed by the act[192].

Part One of the act describe the administration which concerns the appointment of the Director General (amended in 2000), the advisory council (amended in 2013), the function of the council and fisheries management development plan. Licensing of fishing operations in Sri Lankan waters, fishing operation in the high seas and registration of local fishing boats (amended in 2013), are explained in Part Two and Three respectively of the act. Requirements for licensing, cancelation of licences transfer of licences, and procedures for appeal under the cancellation included in to the part two. Protection of the fish and other aquatic resources is explained in Part Four. Prohibition of poisoning in the fishery (amended 2004), fisheries management areas (amended 2004), and fisheries management coordinating committee of fisheries management areas are included to this part. Methods of declaring the area for conservation are set out in Part Five of the act. Part Six explains the legal background on aquaculture which was amended in 2006. The process of dispute settlement is explained in Part Seven (amended in 2006). Part Eight illustrate the method of dispute settlement and this part was amended in 2006. Offences and penalties against violation of the Fisheries Act are set out in Part Nine which was amended in 2013, 2015 and 2016. The amount of the fine has been increased in these amendments. General legal frameworks such as interpretation, inconsistency and application of the Act are described in Part Ten.

a. Fisheries Regulation of Sri Lanka

The Minister of Fisheries may make regulations[193] in respect of all or any of matters such as reservation areas, condition of fishing boats, status of fishing nets, management and

[190] 2000,2003,2004,2006,2013,2015,2016.
[191] Sri Lanka, Fisheries and Aquatic Resources Act no 2 of 1996,Section 64 (a),
[192] Sri Lanka, Fisheries and Aquatic Resources Act no 2 of 1996,Section 63
[193] Sri Lanka, Fisheries and Aquatic Resources Act no 2 of 1996,Section 61

conservation and other related matters. Therefore, there are many significant regulations which have been passed by the Ministry of Fisheries to sustain fishery resources in the country. The important regulation passed in the current year can be summarized as follows.

Table 3 **Summary of the fisheries regulation of Sri Lanka**

Year	Regulation	Scope
1996	Fishing Operation Regulations	Prohibited to catch, land, transport, sells, buy, receive or possess any marine mammals or turtle. Prohibited fishing operations (Push net fishing, Harpoons for marine mammals, Moxi nets fishing operation, Gill nets or Trammel net fishing operation on coral reefs or rocks)[194] Licences required fishing operations were explained under part 1
	Aquaculture Management Regulations	Prohibited to set up or operate an aquaculture enterprise except licence issued by the Director of Fisheries and Aquatic Resources or a licensing officer[195]
	Inland Fisheries Management Regulations	Prohibited to operate any type of fishing gear (except rod and line) for fishing in the inland waters except licence issued by the Director of Fisheries and Aquatic Resources or a licensing officer[196]
1998	Fish Processing Establishments Regulation	Prohibited to operate a fish processing establishment, excepting under authority of a licence of the Director of Fisheries and Aquatic Resources.[197]
	Fish Products (Export) Regulations	Explains condition of the hygiene of export fisheries products (for fish processors, fishing boats, requirements after landing, health control and monitoring, storage and transportation were explained)[198]
	Export and Import of Live Fish Regulations	Explains live fish species which prohibited to export and prohibition of export and re-export live fish without licence of the Director of Fisheries and Aquatic Resources[199]
1999	Lobster fishing operation Regulation	Prohibition periods for lobster fishing operation (during the months of February, September and October)
2010	Fishing (Import and Export) Regulations	Prohibited to take, collect, harvest remove fish, fish products or aquatic resources for import and export without obtaining a valid fishing operation license. Prohibited to engage in any dredging of the sea bed or undertake trawling operations within Sri Lanka waters using licence issued for fishing operation[200].
2011	Fisheries (Cancellation	Cancellation of the fee for the registration for fishing boats

[194] Sri Lanka, Fishing Operations Regulations of 1996, Available from http://faolex.fao.org/docs/pdf/srl7962.pdf
[195] Sri Lanka, Aquaculture Management Regulations of 1996
[196] Sri Lanka, Inland Fisheries Management Regulations of 1996
[197] Sri Lanka, Fish Processing Establishments Regulations 1998. Available from http://faolex.fao.org/docs/pdf/srl19674.pdf
[198] Sri Lanka, Fish Products (Export) Regulations 1998, Available from http://faolex.fao.org/docs/pdf/srl19671.pdf
[199] Sri Lanka, Export and Import of Live Fish Regulations 1998. Available from http://faolex.fao.org/docs/pdf/srl19672.pdf
[200] Sri Lanka, Fishing (Import and Export) Regulations 2010. Available from http://faolex.fao.org/docs/pdf/srl134190.pdf

	of Fees) Regulation	mortgage, fishing boat registration, fishing operations from 1 January 2011[201].
	Inland Fishing Operations Regulations	Introduces the requirements for inland fishing. They shoud be determined by the respective Fisheries Society of the areas, gillnet mesh size and length (more than 4 inches and maximum length < 1,500 meshes), time allowed for gillnets fishing (3pm. to 7pm, 5am. to 9am). Applicable areas has been scheduled under the Gazette[202]
	Regulations amending Landing of Fish Regulations (amended 2007,2009)	Fish caught within Sri Lanka waters shall not be transferred, reloaded or transhipped to any local or foreign fishing boat. (This shall not apply to a transfer, reloading or transhipment of fish from local or foreign fishing boats by mother vessels, authorized by Director General) 10% from (5% fresh + 5% frozen) the total weight of the tuna fish landed in Sri Lanka should be sold to the CFC at an agreed price.[203]
2012	Fisheries Management (Collection of dead shells) Regulations	Explanation of license requirements to take, remove, collect, harvest or transport dead shells from Sri Lanka waters for commercial purposes Prohibited engage in mechanized dredging for taking, removing, collecting or harvesting of dead shells. Required licence has been shown in schedule I and II[204].
	Prohibition of Catching Thresher Shark Regulations	Prohibition of catching Thresher Shark species of the family Alopiidae when engaged in any fishing operation, recreational or sport fishing of any fishing boats operated in Sri Lanka waters, or high seas and anchored in a Sri Lankan Port[205].
	Fishing Operations Regulations (live Ornamental Fish, Lobster) Matara and Galle District	Introduction of requirements for separate licences to engage in fishing operations to catch both live ornamental fish and lobster. Requirements to maintain records of log books provided by the ministry. Introducing maximum number of bottom set gill nets per boat (20-NTRB, 25 MTRB & OFRP) and fishing hours (6.00 a. m. to 6.00 p. m)[206]
	Fishing Operations Regulations of catching Chank or Lobster in the	Introducing requirements for separate fishing operation licences for each category (Chank, Lobster) and maintaining records in log books provided by ministry. Introducing maximum number of bottom set gill nets per boat (20-NTRB,

[201] Sri Lanka, Fisheries (Cancellation of Fees) Regulation, 2011. Available from http://faolex.fao.org/docs/pdf/srl134198.pdf
[202] Sri Lanka, Inland Fishing Operations Regulations, 2011. Available from http://faolex.fao.org/docs/pdf/srl134199.pdf
[203] Sri Lanka, Landing of Fish Regulations 1997. Available from http://faolex.fao.org/docs/pdf/srl134262.pdf
[204] Sri Lanka, Fisheries Management (Collection of dead shells) Regulations, 2012. Available from http://faolex.fao.org/docs/pdf/srl133801.pdf
[205] Sri Lanka, Prohibition of Catching Thresher Shark Regulations 2012. Available from http://faolex.fao.org/docs/pdf/srl133800.pdf
[206] Sri Lanka, Fishing Operations Regulations of catching Live Ornamental Fish or Lobster in the South Coast (Matara and Galle District) Fisheries Management Area, 2012. Available from http://faolex.fao.org/docs/pdf/srl132403.pdf

	Hambantota District	25 MTRB & OFRP) and fishing hours (6.00 a. m. to 6.00 p. m)[207]
2014	Fish catch data regulation	Every fisher using mechanized boats shall carry a log book issued by the Department of Fisheries. (it should be checked by authorised officers in every three month) Fishers who sell fish for export to submit a detailed catch certificate. Fish imports for export purposes shall furnish catch certificate and health certificate.
	High sea fishing operation regulation	Provides requirements of licence for high sea fishing operation and compling with the conditions of UNCLOS, IOTC, fish stock agreement and port state measures. Maximum length of the gill nets that can be used on the high sea shall be less than 2.5 km. No fishers fish less than 1km where data buoys are installed. No fishers shall engaging fishing operations in 0^0-10^0 north and 40^0-60^0 east in Indian Ocean or any other protected area using long line (February) and purse seine(September)
2015	Fishing gear marking regulation	Fishing gear shall be marked by tag or flag and shall be displayed prominently. Flags should not be less than 25cm height and 35cm width) Abandoned or lost fishing gear shall be reported to the DG fishery.
	Implementation of satellite based fishing boats operating in high sea.	Prohibited to deploy vessels having an overall length of 34 feet or more for high seas fishing operation without a vessel monitory system.
	Implement of port state measure to prevent deter and eliminate IUU fishing	NO person shall accept under authority a licence issued by the DG to land, tranship, pack or process fish taken outside Sri Lankan waters by foreign fishing boats or obtain services such as resupplying, maintaining and dry docking for such boat at any port of Sri Lanka authorized by DG. DG should take steps to prevent such activities.

Paragraph 2: Other Ordinance / Acts related to the Fisheries

a. Fauna and flora protection ordinance 1937.

The ordinance was introduced in 1937 and has been amended ten times up to 2009[208]. The ordinance provides the legal background for protection and conservation of the fauna and flora of Sri Lanka. Section 6(a) of the ordinance describes the requirements of permits for fishing in national reserves and sanctuaries[209] and should limit the number of permits issued in respect of fishing taking into consideration any adverse impact on the habitats of fauna

[207] Sri Lanka, Fishing Operations Regulations of catching Chank or Lobster in the South Coast (Hambantota District) Fisheries Management Area, 2012. Available from http://faolex.fao.org/docs/pdf/srl133798.pdf

[208] Law of Sri Lanka, "fauna and flora protection ordinance". Available From http://www.srilankalaw.lk/Volume-III/fauna-and-flora-protection-ordinance.html

[209] Sri Lanka, Fauna and flora protection ordinance (Amendment) 44 of 1964, section 6

and flora[210]. It is prohibited to import mammals, birds, reptiles, fish and invertebrates without a permit[211] and prohibited to export mammals, birds, reptiles, amphibians, fishes, corals, and invertebrates without a permit[212]. Schedules I, II, III, IV, IVA and V which describe the protected, non-protected, strictly protected species, of the principal enactment were repealed in 2009. Schedule II of the amendment lists mammals[213] and reptiles that are strictly protected and Schedule IV lists of fish that are protected[214]. Sea Mammals (Observation, Regulation and Control)[215] regulation has been introduced to regulate and control the vessels that are used the observation of sea mammals.

b. Marine Pollution Prevention Act no 35 of 2008

This act repealed the Marine Pollution Prevention Act no 59 of 1981 and established the Marine Environment Protection Authority (MEPA). The main objective of the authority is prevention, reduction, control and management of pollution in the territorial waters of Sri Lanka or any other maritime zones. The Secretary of the Ministry of Fisheries is a member of the board of Directors of the MEPA[216]. Fisheries activities and conservation of living marine resources and wild life have also been included in Part nine of the act that provides information on prevention of pollution and civil liability.

c. Department of Coast Guard Act, no. 41 of 2009

The Department of Coast Guard (DCG) was established under this act. The preamble to the act states that "It is expedient to provide for the establishment of a multi-mission service to be called the coast guard service for the purpose of ensuring the security of the coastal areas, the maritime zones, the territorial waters of Sri Lanka". Preventing illegal fishing in the coastal areas of Sri Lanka and the protection of fishermen including rendering assistance at sea are functions of the DCG[217]. The Department of Coast Guard has the power to examine and seize or dispose of items related to any offence which has been committed or it has reasonable grounds to believe that such offence has been committed[218]. Fishing is one of the items among others under this clause.

[210] Sri Lanka, Fauna and flora protection ordinance (Amendment) 22 of 2009
[211] Sri Lanka, Fauna and flora protection ordinance (Amendment) no 49 of 1993, Section 37
[212] Sri Lanka, Fauna and flora protection ordinance (Amendment) no 49 of 1993 Section 40
[213] Include whales, dolphin, dugong, turtle etc.
[214] Include Lion fish, Dusky angel fish, clown cross dotted butterfly fish, batfish etc.
[215] Sri Lanka, Fauna and flora protection ordinance (Amendment) no. 1 of 2012.
[216] Sri Lanka, Marine pollution prevention act no 35 of 2008 Part 1 Section 3 (1)/(b)/ (III)
[217] Sri Lanka, Department of coast guard act, no. 41 of 2009 Part II Section 4 (a)
[218] Sri Lanka, Department of coast guard act, no. 41 of 2009 Sec 5 (e)

d. Central Environmental Authority Act no. 47 of 1980.

The Central Environmental Authority was established under this act and the act was amended in 1988. Senior officers of the Ministry of Fisheries represent the "Environment Council" which was established under the act. The Authority shall recommend to the Minister a system of rational exploitation of fisheries and aquatic resources within the territorial waters, within its exclusive economic zone, or within its inland waters and shall encourage citizen participation to maintain and enhance the optimum and continuous productivity of such waters [219].Section 23(H) of the amendment act no. 56 of 1988 prohibit the pollution of inland waters that can be harmful to the human, animal, birds, fish and plants.

e. Coast conservation act, No. 57 of 1981

The act provides provision for a survey and preparation of a coastal zone management plan within the coastal zone in the country to regulate and control development activities. The act was amended in 1988. Director or other responsible person of the NARA represents the "Coast Conservation Advisory Council" which established under this act. An inventory includes fisheries and shellfish within the coastal zone in the country and produced under the coastal zone survey. Regulating and controlling development activities within the coastal zone is one of objectives of the act. However fishery has not been included to the definition of the development activities[220]. The act mentions that the regulations be made by the Ministry of Fisheries under Section 32 read with the sections 13, 14, 16 and 18 of the costal conservation act, no. 57 of 1981[221].

f. Maritime Zones Law no 22 of 1976.

The act provides the legal basis of the marine zones and the judicial power belonging to them. Section 3 of the act describes the territorial sea and innocent passage, while Sections 4 and 5 clarify the areas of contiguous zone and the EEZ respectively. Maritime boundaries between Sri Lanka and India at Palk Strait, Gulf of Mannar and Bay of Bengal are clearly mentioned under the act[222]. Sovereignty of the Sri Lanka over the territorial waters and historical waters and sovereign right over EEZ has been accepted under this act.

[219] Sri Lanka, Central environmental authority act no 47 of 1980 Section 18
[220] Sri Lanka, Coast conservation act no. 57 of 1981 Section 42
[221] Sri Lanka, Government notification no 260/22 , 02 September,1983
[222] Sri Lanka, Maritime Zones law no 22 of 1976 Section 8 (a),(b),(c)

3 Part 2: Sri Lankan Fishery Industry and Fishers prospects
Chapter 1: Overview of Sri Lankan Fishery Industry

Section A: Fisheries Administration and current situation

The Director-General shall be responsible for the administration and giving effect to the provisions of the act[223]. The Fisheries and Aquatic resources advisory council that was established under the act, is responsible for advice to the Minister on all matters relating to the management, regulation, conservation and development of fisheries and aquatic resources in Sri Lankan waters. Similarly the Council shall be responsible to advise the Director General and Secretary of the Ministry on administration, management, conservation of the fishery in the country.

The Department of Fisheries is responsible for periodic updates to its legal provisions and applying regional and international management practices, conventions and regulations. To bring the fisheries rules and regulation and management practices for the grass roots levels, the department uses its 148 fisheries inspectors who are attached to the 15 districts fisheries offices. In addition awareness programmes on fisheries rules and management practices are conducting ministry, department of fisheries and related institution. According to the act director general shall, subject to the availability of resources, conduct long-term educational programmes to educate the fishers on the regulations made under the act.[224]

Paragraph 1: Fisheries Ministry and allied Institutions

a. The Ministry of Fisheries & Aquatic Resources Development

The ministry is vested in responsibilities for the development and conservation of the fisheries sector in Sri Lanka. Key functions of the ministry are formulation and implementation of policies and programmes, expansion and development of the fisheries infrastructure, implementation of programmes to improve quality of fish and fisheries products to suit international demand, improvement of local fish market and socio- economic status of the fishing community[225]. Before the establishment of the Ministry of Fisheries in 1970, areas covered under the fisheries were handled by various ministries such as local administration, commerce trade and fisheries, Industry and Fisheries, Industry industrial

[223] Sri Lanka, Fisheries and Aquatic Resources Act no 2 of 1996 Part 1 Section 2(2)
[224] Sri Lanka, Fisheries and Aquatic Resources Act no 2 of 1996 part 2 Section 14N
[225] The Ministry of Fisheries & Aquatic Resources Development, "About ministry". Available from http://www.fisheries.gov.lk/content.php?cnid=abt_mnstry

research and fisheries, agricultural land irrigation and power[226]. The Vision of the ministry is to be the leader of conservation and sustainable utilization of fisheries and aquatic resources in the South Asian Region. The Minister of Fisheries has a regulatory power the matters related to Fisheries. An Advisory Council has been established under the Fisheries Act[227] to advise the minister on matters relating to the management, regulation, conservation and development of fisheries and aquatic resources of Sri Lanka. Six main institutions function under the purview of the Ministry of Fisheries and Aquatic Resources Development[228].

b. Department of Fisheries & Aquatic Resources

Department of Fisheries was established as a result of the Fisheries Ordinance of 1940. Development of the fisheries industry, raising the socio-economic status of the fishers and helping the entrepreneurs to increase their production for local and export markets are the main objectives of the department. The department contributes to upgrading the legal provisions and imposes regulation to fulfil the local requirements as well as regional and international convention and regulations. There are fifteen districts Assistance Directors' Offices (covering 148 fisheries inspectors' divisions) under the department and they cover all fishers' villages in the country. In addition, 21 radio communication centres were established to assist multiday fishers[229].

c. The National Aquatic Resources Research and Development Agency (NARA)

The NARA was established under Act no. 54 of 1981. If Promotes and conducts research activities to identify, assess, manage, conserve and develop aquatic resources as major objectives. Further, it provide advisory and consultancy services, collects and disseminates data/information for management, conservation and development of aquatic resources[230]. NARA provide consultancy services in the fields of inland and aquaculture, marine biology, hydrographic, socio-economic and marketing, fishing technology, environmental, post-harvest, oceanography and marine science that help in conservation, management and development of aquatic resources in the country

[226] Indika gunawardene, Minister of Fisheries and Aquatic Resources Development, "Towards efficient and participatory management in Fisheries",25 yeas ministry of fisheries
[227] Sri Lanka, Fisheries and Aquatic Resources Act no 2 of 1996 Part 1(3)
[228] The Ministry of Fisheries & Aquatic Resources Development, "Institutions". Available from http://www.fisheries.gov.lk/content.php?cnid=intn
[229] Department of Fisheries and Aquatic resources, "Organizational structure" Available from http://fisheriesdept.gov.lk/v3/en_US/organizational-structure/
[230] The National Aquatic Resources Research and Development Agency (NARA),"about us", Available from http://www.nara.ac.lk/NARA/12/about%20us/about%20us.html

d. The National Aquaculture Development Authority (NAQDA)

NAQDA was established by Act no. 53 of 1998 in 1999 and its' objectives are to develop the aquaculture and inland fisheries sector, create employment opportunities in the inland and coastal aquaculture sectors, promote culture high-value fish and aquaculture species and promote investment on aquaculture.

e. The Ceylon Fishery Harbors Corporation (CHFC)

CHFC was established in february 1972 under the State Cooperation Act no 49 of 1957 and is responsible for establishment, construction, maintenance operation and management of fishery harbours, anchorages and shore facilities for fishing operations in the country[231].Under the "*Thotupola Aruna"* programme several steps are to be taken by CFHC to upgrade existing harbours, to build new fishery harbours and to develop new business opportunities. Currently nineteen fishery harbours are managed under CFHC and ten fishery harbours may built, mainly in the northern part of the country[232].

f. Cey-Nor Foundation Limited

Cey-Nor Foundation is a limited liability state-owned business organization, functioning under the Ministry of Fisheries. The Key activity of the Cey-Nor is to turn out high-quality fiberglass vessels at competitive market. Cey-Nor is currently following international production standards and building boats using the latest fiberglass boat-building techniques[233]. In addition to the fishing boats, fishing gear is also manufactured by Cey-Nor. However fishing gear factories at Lunuwila and Weerawila were transferred[234] to North Sea Ltd which is functioning under the Ministry of Prisons Reform, rehabilitation, resettlement and Hindu religion affairs.

g. Ceylon Fisheries Corporation (CFC)

CFC was established in 1964 in order to ensure affordable prices to consumers while giving security to the producers. CFC purchases fish from fishery harbours and landing centres as well as selling fish through their own island wide marketing chain.

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[231] Sivasubramaniam.K, *One hundred years of fisheries management in Sri Lanka*, (Colombo, State printing cooperation, 1997

[232] The Ceylon Fishery Harbors Corporation (CHFC) "Harbours Location", Available from http://www.cfhc.gov.lk/Harbour_Main.php

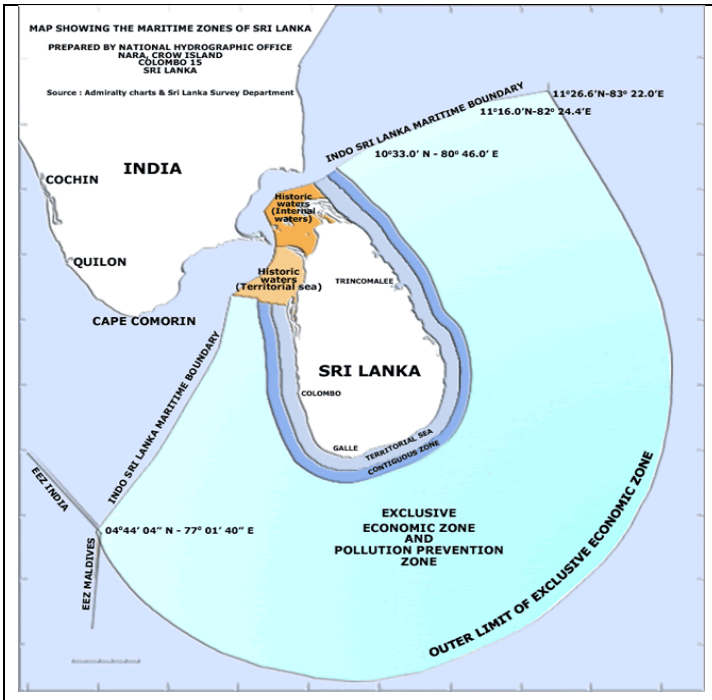
[233] Cey-Nor Foundation Limited, "Overview", Available from http://ceynor.gov.lk/about-ceynor-foundation

[234] Under the cabinet decision dated 02nd November 2010

Paragraph 2: Trend of Sri Lankan production and other infrastructure

Being an Island nation Sri Lanka comprises significant amount of ocean resources. Further, 25% of the population, 70% of the hotels and 70% of the industrial units are located within the coastal zone of the country[235]. Sri Lanka is third dominant capture fish producer that produce about 7.15% in the South Asian region while India (63.16%) and Bangladesh (21.30%) are the first and second major capture fish producer[236] in the region. Per capita fish consumption of the country is about 15. 1Kg /year (2012/2013)[237] which is the second best fish consumption in the south Asian region. Following chart shows the ocean resources of Sri Lanka.

Chart 1 **Sri Lankan sea and inland resources**



Description	Qty
Historic Waters (sq. km)	21,500
Continental Shelf (sq. km)	30,000
EEZ (sq. km)	517,000
Lagoons(2) & Estuaries (Hectares)	158,000
Mangrove Zones, Mud Flats & Salt (Hectares)	71,000
Total Extent of Fresh Water Bodies (Hectares)	260,000
Coastline	1,700km
Fishery sector Contribution to GDP	1.8%
Fishery sector Contribution to Export earnings	2.4%

Source: Ministry of fisheries annual publication 2015 and its web.

a. Trend fish production

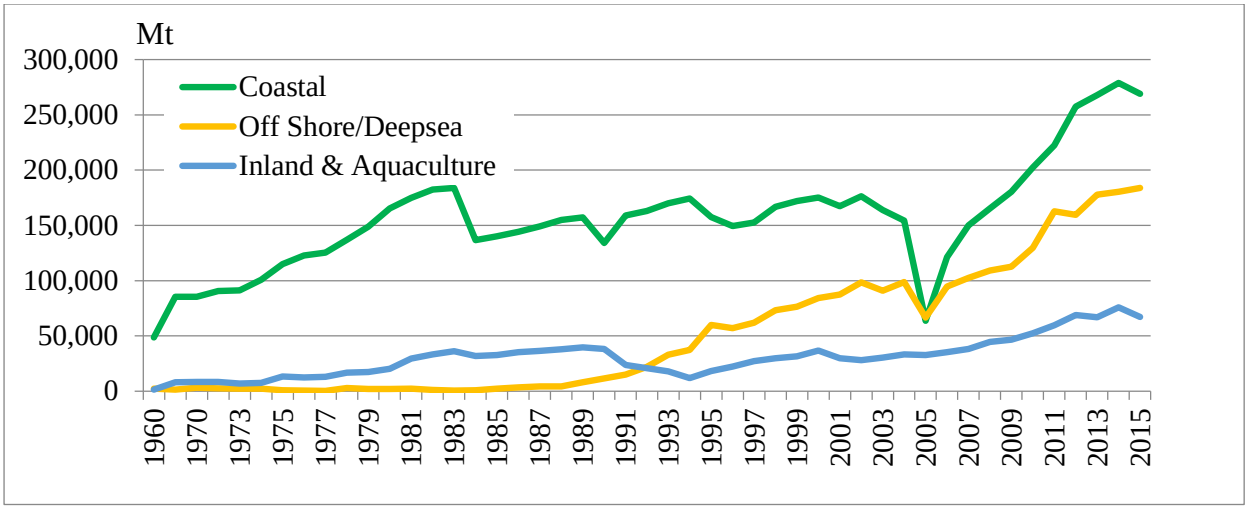
Total fish production of the country has gradually increased in last decade except 2005. As a result of tsunami disaster, both costal and deep sea fish production of the country were drastically decline in 2005. Deep sea fish production is significant in the recent past, as result

[235] Sri Lanka, Ministry of Fisheries and aquatic resources development, *10 year development policy.* Available from ftp://ftp.fao.org/docrep/fao/010/ai532e/ai532e04.pdf
[236] FAO, Fishery and Aquaculture Statistics 2014, Available from http://www.fao.org/3/a-i3720e.pdf

[237] Sri Lanka, Department of Census and Statistics, *Household Income and Expenditure Survey 2012/13*. Available from http://www.statistics.gov.lk/HIES/HIES2012_13FinalReport.pdf

of increasing trend of deep sea fish exploitation commenced at about 1980[238]. However coastal fish production is still major contributor which contribute about 60% (2015) for the marine fish production. While inland fish production contribute about 13% (2015) for the total fish production of the country. Negambo (12.82%), Galle (11.22%), Matara (9.22%), Kalutara (8.75%) and Negambo (8.28%) are the major marine fishery districts (2014) which contribute more than 50% to the total marine fish production of the country. Skipjack tuna (13.44%), Yellowfin tuna (9.84), other tuna like species (12.89%) and Small shore seine verities (23.61%) are the major marine sector fish species (2015) of the country. The following chart shows the trend of the Sri Lankan fish production of the past 50 years.

Chart 2 Trend of the Sri Lankan fish production in last 50 years (tone)



Source: Ministry of fisheries annual publications

b. Fish Trade of Sri Lanka

Fish and fishery products export plays an important role in Sri Lankan export sector and its contribution is about 2.4% to the total export earnings. Sri Lanka is a major fish importer in the South Asian region and its share is about half (49%) compared to the total regional fish import value[239]. There are about 75 of medium and large scale export companies, 32 of which utilize the EU-approved processing plants[240]. EU and East Asian regional countries are the major fish exporting regions and fish, prawns, crabs, mollusks, are the major export items of the country. While dried fish, fish, canned fish and maldives fish are the major imported

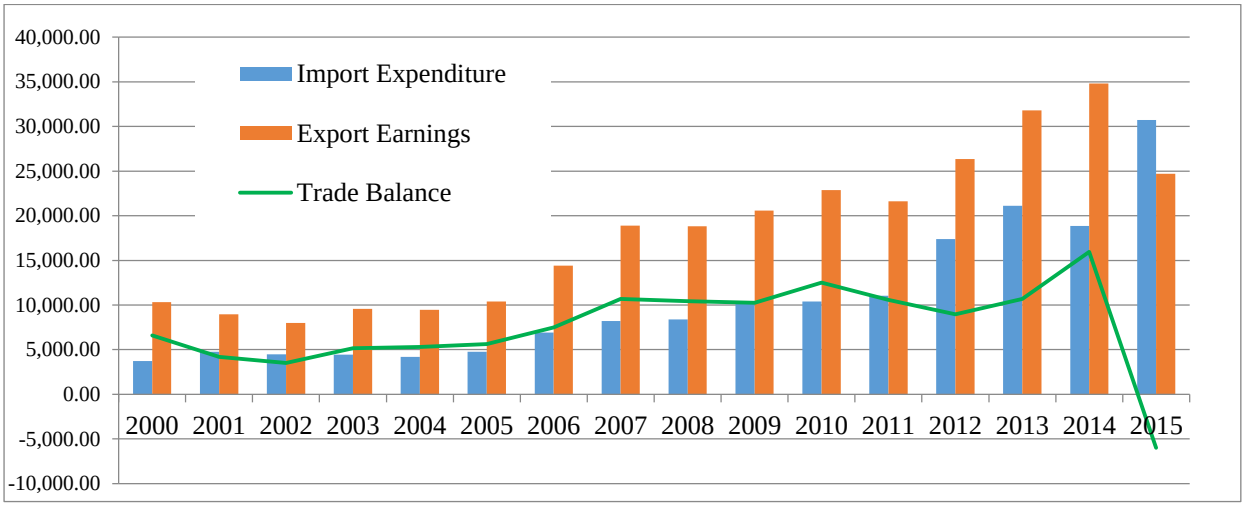
[238] Sri Lanka, Ministry of Fisheries and aquatic resources development , *Midterm policy framework 2013-2016 For fisheries sector development*, Available from www.fisheries.gov.lk/doc_files/130510003839.docx

[239] FAO, Fishery and Aquaculture Statistics 2014, Available from http://www.fao.org/3/a-i3720e.pdf

[240] Sri Lanka Export Development Board, "Seafood" 2016.Available from http://www.srilankabusiness.com/sea-food/

items of the country. Tariff concessions received from the developed countries especially from the EU region, help to enhance the fish export in the country. However suspended of EU GSP plus tariff concession in 2010, issued yellow card in 2012 and received its red card in 2015 (delisted April, 2016)[241] were badly affected for the Sri Lankan fish export industry. Although, Sri Lanka was able to maintain positive trade balance during last decade in the fish trade, negative trade balance could be seen in 2015. Significant increase of the import expenditure in 2015, compared to the 2014 (canned fish 134%, Maldives fish 156% and all others major items more than 50%) and significant decline of the income of export (all major categories except shark fins) have badly been influenced for this result. Following chart shows the trend of fish and fishery products export, import and trade balance of the country in last 15 years.

Chart 3 Trend of the fish and fishery products export, import and trade balance (Rs million)



Source: Ministry of fisheries annual publications

c. Infrastructure facilities of the fishery sector.

Oru (outrigger canoes),vallam and theppam were main fishing crafts in the past, occupied in the coastal fisheries. As a result of experiments in 1930s, 4 main types of mechanized vessels such as mechanized crafts with outboard engines (17-23 feet fibre-glass FRP boat), One-Day Operating Craft (the 3.5 ton day-boat, 28 – 34 ft. in length), Multi-Day Operating Craft (3.5 - 5.5 ton more than 34 ft)Small Trawlers (10 - 11 ton boats) were employed[242] in the fishery

[241] European Commission - Press release, Brussels, 21 April 2016, Available from http://europa.eu/rapid/press-release_IP-16-1457_en.htm

[242] Oscar Amarasinghe, "Economics of fishing by multi - day crafts of Sri Lanka" 20 January 2014. Available from http://freedomtonationsl.blogspot.com.au/2014/01/multiday-boat-study.html

of the country . There are about 54000 of fishing boats (2014)[243] are used for both coastal and offshore fishery in the country. These boats can be categorized into five major parts such as IMUL (4447), IDAY (876), OFRP (23982), MTRB (2720) and NTRB (21963)[244]. Considered to the total fishing fleets, 90% of the fishing crafts are engaged in one day fishing and the rest spend more than one day for fishing at the sea.

Since there are multi fish species in the coastal, multi gears are practiced in the coastal fishery. Beach seine was a famous traditional fishing technique which is practiced in the present. In late 1950, beach seine fishery contributed about 40% to the total landing of the country[245]. Gillnetting fishing began in 1950s, and lately it was a most widespread fishing method for small-scale fishers in the country[246]. During 1980s purse seine fishery was introduced to the fishery and it was efficient technique for small pelagic fisheries[247]. Small and medium mesh size gillnets, trammel nets (especially in the lagoon fishery), bottom long line, trawl line and purse seine are the famous fishing gears in the present among fishers. Large-mesh gillnets (about 6") and long lines are widely used fishing gears in deep sea tuna fishery. Combination of gillnets and long line fishing technique contributes more than 75 % of the total tuna fishing effort in the country[248]. 8 fishing gear producers are manufacturing fishing gears in the country. North Sea Ltd, JB fishing, Malabar ropes are the dominant fishing gears producers among them.

There are 20 major fishing habours function in the country and majority of them are located in south coast. While 11 locations were identified to develop as fishery habours where mainly located in northern coast in the country. In addition to the above fishery habours, 58 anchorages and 890 of minor landing centers are functioning in island wide, while 73 locations were identified to improve as landing sites[249]. 90 ice plants which capable to produce 2788 mt/day are functioning in the present (2014) and majority of them are located in southern coast.

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[243]/ Sri Lanka, Ministry of Fisheries and aquatic resources development, Fisheries Statistics - 2015,Available from http://www.fisheries.gov.lk/content.php?cnid=ststc

[244] IMUL - Inboard Multi-day Boats, IMUL - Inboard Single-day Boats, OFRP - Out-board engine Fiberglass Reinforced Plastic Boats, MTRB - Motorized Traditional Boats, NTRB - Non-motorized Traditional Boats

[245]/Atapattu, A. R., and P. Dayaratne. "Case studies of community-based approaches to resource management in Sri Lanka." (1993)

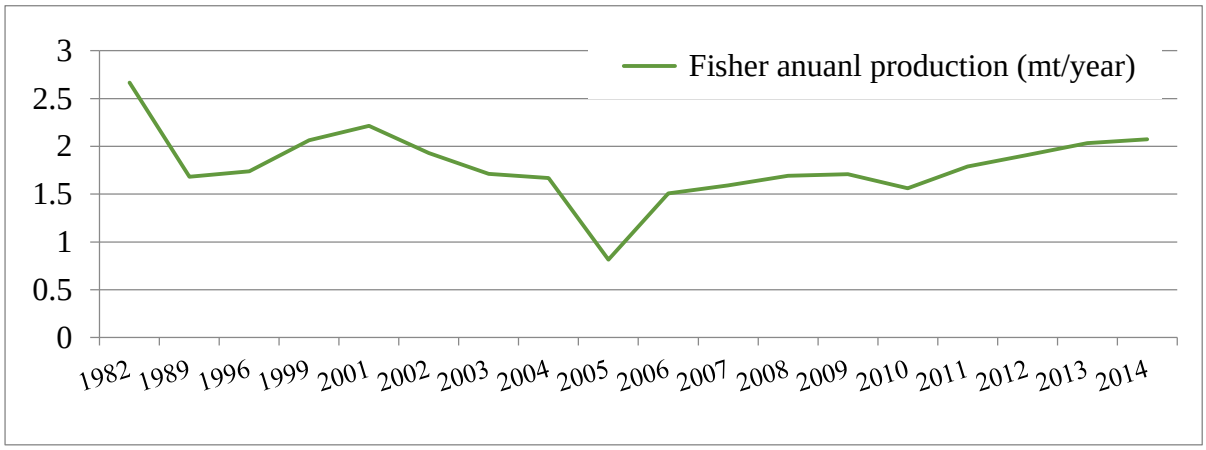
[246] Reconstruction of sri lanka's fisheries catches: 1950-2008

[248] Jayasooriya J.A.D.B, Analysis of Catch Assessment of Tuna Fisheries in Sri Lanka, Ministry of Fisheries and Aquatic Resources Development, Sri Lanka (Colombo 10, 2013). Available from www.iotc.org/sites/default/files/documents/.../IOTC-2013-WPTT15-15_Rev_1.pdf

d. Socio-Economic status of the fisheries.

As a result of the open access of the fishery, there are increasing trend of people enter in to the fishery. Considered to the last decade, around 70000 new fishers have entered into the marine fishery sector of the country. There are about 221350 active marine fishers (male and female) engage in marine fishery which represents 190780 households. Average household size of the fishers' family is about 4-5 persons (2014). Trincomalee, Baticoloa, Kalmunai and Jaffna are the major fishing districts where majority of fishers are located, represent more than 50% of the total fishers of the country. However, Kalutara (6.40 mt), Galle (4.8mt), Negambo (3.7mt), and Colombo (3.6mt) are the major districts that represent highest per fisher annual production, while Trincomalee (0.64), Batticoloa (0.73), Kalmunai (0.82), Jaffna (1.05) and Mannar (1.20) are the law productive districts. The average per fishers' annual production of the marine fishery of the country fluctuated between 1.5 to 2.5 mt/year. Following chart shows the trend of average per fishers' production of the marine fishery in the country.

Chart 4 Trend of the per fishers' productivity – Marine sector tone/Year



Source: Ministry of fisheries annual publications

85323 of marine fishers have organized within 925 fisher's organizations in the country. Therefore about 40% of fishers entered in to some fishers' organization. Annual per capita fish consumption of the country is about 15Kg (2013) that represent 10.9kg of fish, 3.6kg of dried fish and 0.6kg of canned fish.

Section B: Issues of the Sri Lankan Fisheries

The issues of fishery sector have been identified by the ministry of fisheries, FAO and the other stakeholders of the fishery. Identification of the issues helps to overcome or minimize

the negative influence of the issues. Although, issues of the fisheries change time to time, some issues consisting long period and hard to answer. Several steps such as rules and regulations, awareness and strategic plans, have been adopted by ministry of fisheries to solve or minimize the negative impact of the issues. The issues related to the fisheries have been identified by 10 year development plan[250], FAO[251], US Aid[252] and Wijayaratne[253] can be summarized as follows.

a. Indian fishermen poaching
b. Lack of sound data and information
c. Post-harvest losses and poor marketing and transportation
d. Inadequate and poor manage and maintain fishery infrastructure
e. Poor and destructive fishing gear practices
f. Inadequate investment in the fishery sector
g. Poor coordination between Ministry and allied institutes.
h. Poor application of the fisheries development plan
i. Insufficient expertise of the fishery sector
j. High operational cost of fishing

Impacts of the above issues, badly affected for the progress of the Sri Lankan fishery industry. Therefore, actions to be taken to solve or minimized the impact of the above issues, and their impacts can be broadly considered.

Paragraph 1: Domestic Issues of Sri Lankan fishery

a. Lack of sound data and information

Data is essential for ensuring the successful management and sustainability of the fisheries[254], and it is used for commercial, recreational, cultural, and scientific purposes[255]. Biological, ecological, economic and social data should be collected to prepare sustainable fisheries

[250] Sri Lanka, Ministry of Fisheries and aquatic resources development, *10 year development policy.* Available from ftp://ftp.fao.org/docrep/fao/010/ai532e/ai532e04.pdf

[251] Banks, R., Gunawardena, A, Taylor-Moore, N, Fernando, C, Joseph, L, Abeysekera, N, FAO: *Fisheries Sector Institutional Analysis and Capacity Assessment*, (Rome 2007). Available from http://www.fao.org/docrep/010/ai532e/ai532e00.htm

[252] Arunatilake, Nisha, Gunawardena. A, Marawila. D, Samaratunga .P, and Senaratne A. "Analysis of the fisheries sector in Sri Lanka." (USAID 2008).

[253] Wijayaratne, B. "Coastal Fisheries in Sri Lanka: Some Recommendations for Future Management." (Iceland 2001) Available from http://innri.unuftp.is/proj01/WijayPRF.pdf

[254]Gulf of Maine research Institute, "Understanding the Role of Data in Fisheries Management" 3 Nov 2014.Available from http://gmri.org/news/waypoints/understanding-role-data-fisheries-management

[255] The National Academic Press, "General Issues in the Collection, Management, and Use of Fisheries Data"2000. Available from https://www.nap.edu/read/9969/chapter/5#

strategy[256]. Further fish stock assessments provide important scientific information to make sound policy decisions on conservation and management of fish stocks[257]. However, there are some weak areas of fisheries data collection in Sri Lankan fishery, especially length and/or age composition of landings for major species, discards of major species per fleet per year, total catches of bycatch species, impact of fishing gear, average income per fishing unit per year for all fleets, costs per fishing unit per year, profitability of each fleet, total number of people employed in fishing of different types of crafts by age groups and so on. Although, data are collected periodically in some important fields, it can't be seen continuous data collection in the above mentioned fields as a result of lack of resources availability. Sri Lanka still uses fish stock assessments that have been done during 1978-1983 of RV Dr Fridtjof Nansen research vessels. However, new fish stock survey has to be planned to implement with the collaboration of Ministry fisheries, NARA and the Norwegian Centre for Development Cooperation in Fisheries in 2017[258]. Further logbooks for all boats but mechanized were initiated to fulfill the requirements of MCS and other compliance. Especially collected data need to be properly analyzed in order to extract meaningful and relevant information to make fisheries policies or further requirements. Therefore, it can't only be satisfied through the data collection, without proper analysis and application them for management. Sri Lanka is not in a satisfactory level of analyzing and application of the findings of fisheries data, especially because of lack of expertise in the fishery management areas.

b. Inadequate and poor manage and maintain fisheries infrastructure

Infrastructure is a significant factor of the growth of fishery sector. Therefore, proper infrastructure facilities help to increase the growth and the quality of the production. Fishery habours, anchorage and landing centers are really important infrastructure of the fishery sector. However, it can't be satisfied about landing facilities in the northern cost of the country. Although there are 23% (around 1/4 of marine fishers) of marine fishers live in Jaffna, Mannar, Mulative and Kilinochchi (northern fishery districts) fishing districts, there is no fishery habour in the northern fishery districts. After 30 years civil war, fishers of the above districts are entering into fishery, especially investing for deep sea fishing and related

[256] Cochrane, K. L and Garcia S.M(eds). *A fishery manager's guidebook*. John Wiley & Sons,(2009). Available from http://www.fao.org/docrep/005/y3427e/y3427e00.htm#Contents
[257]NOAA Fisheries, "Fish Stock Assessment" 23 May 2012. Available from http://www.nmfs.noaa.gov/stories/2012/05/05_23_12stock_assessment_101_part1.html
[258] Ministry of Fisheries & Aquatic Resources, "Survey of fish stock assessment due to be commenced in January", Available from http://www.fisheries.gov.lk/news_more.php?nw=461

activities. Before the war, 40% of marine fish production of the country was born from northern fishery districts. Ministry of fisheries has identified the requirements of the northern districts and identified 8 locations to build fishery habours[259]. Cold rooms and ice plants of the country are insufficient compared to the fish production of the country. Especially cold room facility and ice plants should be developed in the northern fishing districts (Jaffna, Mannar, Mulative, Killinochchi) where 17 ice plants have been functioned in the present[260] and the day capacity of these plants are about 6% compared to the total ice plants capacity of the country. Freezing is the growing processing method of fish for human consumption in the world. For an instant, compared to the processed fish for human consumption and total fish production in the world, 54% and 25% gradually represented by frozen fish in 2012[261]. Therefore, it is important to invest in the cold room facilities to get the advantage of the future development of the fishery industry.

Demand for fish and fisheries products in the country is increasing as a result of increasing purchasing power of the consumers. For an instant, per capita GDP at market price from 2000 to 2010 and 2010 to 2015, have been increased by 216% and 43% gradually[262]. However the fish production of the country of the same period (2000-2010 and 2010- 2015) has been increased by 30% and 35% gradually. As a result, fish import of the country has been drastically increased in 2015, resulted negative trade balance of the fish and fishery products sector in the first time of the history. Therefore significant investment should be required to face the future challenges of the fishery sector.

World aquaculture production is booming and the share of the aquaculture for fish production is increasing year by year. Especially aquaculture production of the Asian region is significant compared to the other region of the world. Although Sri Lanka comprises significant amount freshwater bodies, lagoon and estuaries, it was unable to fully utilize the resources to develop aquaculture industry. Especially privet parties, community based organizations should be participated for aquaculture development under the government facilitation. Following table clearly explain the trend of aquaculture production, contribution to the total fish production in world and selected individual south Asian countries.

[259] The Ceylon Fishery Harbors Corporation, "Harbour Locations", Available from http://www.cfhc.gov.lk/Harbour_Main.php
[260] Sri Lanka, Ministry of Fisheries and aquatic resources development, Fisheries Statistics - 2015,Available from http://www.fisheries.gov.lk/content.php?cnid=ststc
[261] FAO, Fishery and Aquaculture Statistics 2014, Available from http://www.fao.org/3/a-i3720e.pdf
[262] Sri Lanka, Central Bank of Sri Lanka (CBSL) "Publications, Economic and Financial Reports", http://www.cbsl.gov.lk/htm/english/10_pub/p_1.html

Table 4 Trend of aquaculture contribution for the total fish production - tone (2005-2014)

World / South Asian Countries	**2005**	**2010**	**2014**
World Capture	92473723	89130056	93445234
World Aquaculture	44297712	58927772	73783725
Total Production world	136771435	148057828	167228959
Aquaculture share from total	**32%**	**40%**	**44%**
India Capture	3691362	4689316	4718821
India Aquaculture	2967378	3785779	4881019
Total Production India	6658740	8475095	9599840
Aquaculture share from total	**45%**	**45%**	**51%**
Bangladesh Capture	1333866	1726586	1591190
Bangladesh Aquaculture	882091	1308515	1956925
Total Production Bangladesh	2215957	3035101	3548115
Aquaculture share from total	**40%**	**43%**	**55%**
Pakistan Capture	434850	453264	475076
Pakistan Aquaculture	80622	140101	148381
Total Production Pakistan	434850	453264	475076
Aquaculture share from total	**19%**	**31%**	**31%**
Sri Lanka Capture	215817	389074	535050
Sri Lanka Aquaculture	4304	8058	34220
Total Production Sri Lanka	220121	397132	569270
Aquaculture share from total	**2%**	**2%**	**6%**

Source: FAO statistics 2014 & FAO Sri Lanka database[263]

c. Poor and destructive fishing gear practices

This issue has been identified by several fisheries development plans and individual studies. Therefore significant efforts have been taken by ministry of fisheries to minimize the issues of destructive fishing practices in the Sri Lankan waters. The illegal and destructive fishing practices such as mono filament nets, dynamite and other illegal fishing gears can be seen in

[263] FAO, Fisheries and Aquaculture Department, FAO database. Available from http://www.fao.org/figis/servlet/SQServlet?ds=Aquaculture&k1=COUNTRY&k1v=1&k1s=38&outtype=html

the coastal waters. Especially small scale fishers of the country are badly affected from them. Since purse seines namely *Laila* and *Surukku* practices were badly affected for the marine environment as well other small scale fishers, they were banded from February 2016 and some conditions such as length of the net (should not be exceed of 225m), mesh size (should be 2½inches) and the height of the net (should not be more than 25m) were introduced to the purse seine fishery[264]. Fishing gears are developed and modified by the fishers, changing length, height and mesh sizes aiming at higher production. This can badly affect for other fishers and it may be affected to increase by catch of the fishing gears. Therefore continuous monitoring on fishing gears and fishing gear standardization are really important for sustainable fishing practices in the coastal waters.

d. Other Issues.

Ministry of fisheries implement Ten year development policy framework (2007 -2016) in 2007 and thus far eight fisheries development plans have been implemented by the ministry[265]. The successive plans suffered from poor and unreliable data, since absence of catch and effort monitoring systems[266]. Therefore, it was hard to maximize the outcomes of the development plans. Further lack of resources availability, weak of coordination[267] and lack of inertia[268]caused to poor achievements of the development plans. As a result, the policy issues were repeated by development plan to development plan. Hence it is important to practice active monitoring and evaluation system with the development plan.

Considerable post-harvest value lost and poor marketing and transport were identified as issues of fishery sector in the country by 10 year development plan[269]. Research of NARA[270] revealed that average estimated post-harvest quality loss is 39% while estimated commercial post-harvest loss as 14%. Prolonged soaking time of gillnets, inadequate icing of fish, higher temperatures in fish holds over-stacking of fish in fish holds, long storing time of fish in

[264] Ministry of Fisheries & Aquatic Resources Development, "Laila and surukku purse seines which had been using for 32 years by Sri Lankan fishers were fully banned from 21st February", Available from http://www.fisheries.gov.lk/services.php?nw=35

[265] Wijayaratne, B. "Coastal Fisheries in Sri Lanka: Some Recommendations for Future Management." (Iceland 2001) Available from http://innri.unuftp.is/proj01/WijayPRF.pdf

[268] FAO, Review of national policy initiatives and Frameworks for fisheries resource Development and management, (2007) Available From ftp://ftp.fao.org/docrep/fao/010/ai532e/ai532e04.pdf

[269] Sri Lanka, Ministry of Fisheries and aquatic resources development, *10 year development policy.* Available from ftp://ftp.fao.org/docrep/fao/010/ai532e/ai532e04.pdf

[270] Ganegamaarachchi, G. J., J. M. P. K. Jayasinghe, M. J. S. Wijeyaratne, M. Jayasooriya, and K. Hettiarachchi. "Handling practices and post-harvest losses of tuna catches from multi-day boats operating from fish landing site Negombo, Sri Lanka." (2000).

boats, use of polluted ice and water and inadequate infrastructure facilities are major reasons for increase post-harvest loss of fisheries in the country.

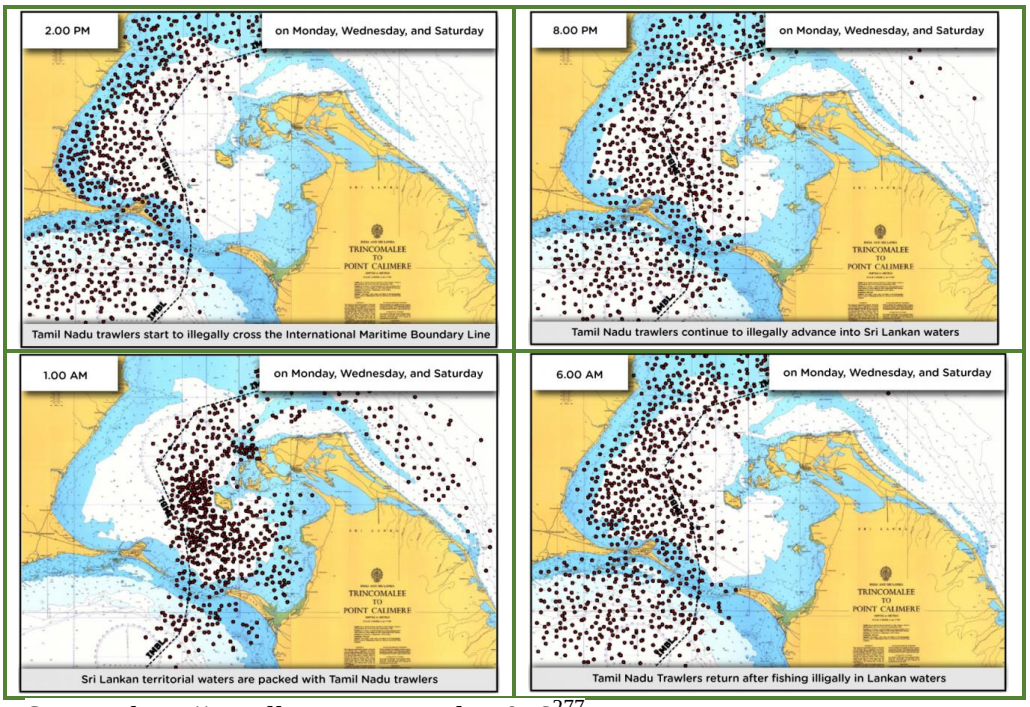
Paragraph 2: Poaching by Indian Fishers

Large number of trawlers entering in to Sri Lankan waters is one of major issue in Sri Lankan fishery sector. It deprives the livelihoods of Sri Lanka fishermen, national fish production, export income of fishing and rich ecosystem of the Sri Lankan waters.

As a result of law productive fishing ground of Indian waters, Indian trawlers of Ngapattinam, Thanjavu, Pudukottai, and Ramnathapuram, enter into Sri Lanka waters[271]. Especially trawler of Rameswaram have to depend on fishing in Sri Lankan waters as a result of depletion of the trawling ground of Indian waters[272]. There are over 5,000 mechanised trawlers in Tamil Nadu and nearly 2,500 of them enter Sri Lankan waters on Mondays, Wednesdays and Saturdays and often coming at 500 m of the Sri Lankan shoreline[273/274/275]. During the peak period of the civil war, government of Sri Lanka banned or limited the fishing activity in northern International Maritime boundary Line (IMBL) as a security purposes. However after civil war, fishermen in the northern districts of the country could engage in fishing activities without security barriers. Therefore the issue turned out to be adverse after the end of the Fourth Eelam War in 2009[276]. Following chart clearly shows the Indian fishermen entering in to Sri Lankan waters.

[271] Sinhalanet, "Indo-Lanka Fishing dispute: Time for Solutions".13 June 2014. Available from http://www.sinhalanet.net/indo-lanka-fishing-dispute-time-for-solutions
[272] V.Vivekanandan, "Crossing maritime borders: The problem and solution in Indo-Sri Lankan context" From available http://eranga123.blogspot.com.au/p/crossing-maritime-bordersthe-problem.html
[273] Daily News, "Shedding IUU fishing for better times", 27 June 2016 Available From http://www.dailynews.lk/?q=2016/06/27/features/85751
[274] Ministry of fisheries and Aquatic Development, "No approval under any circumstances will be given to Indian fishers to fish on Sri Lankan waters",2016, Available From http://www.fisheries.gov.lk/news_more.php?nw=426
[275] Gazala Anver, "Amma's Deceptions: A Sri Lankan perspective on the 'Indo–Lankan Fishery Issue", 11 July 2016, Available From http://roar.lk/reports/ammas-deceptions-sri-lankan-perspective-indo-lankan-fishery-issue/
[276] Gautam Sen, Institute for defence studies and analyses, "Problem of Fishermen in India-Sri Lanka Relations", 20 May 2016, Available From http://www.idsa.in/idsacomments/problem-of-fishermen-in-india-sri-lanka-relations_gsen_200516

Chart 5 Indian poaching in Sri Lankan waters



Source: http://roar.lk - Mon 11 July 2016[277]

Based on the India and Sri Lankan agreements in 1974 and the 1976 IMBL has been clearly demarcated and has given exclusive rights to each nation. Agreement on boundaries in historical waters between two countries and related matters enter into force on 10 July 1974 and demarcated mutually agreed[278] boundary line in the water from Palk Strait to Adam's Bridge[279]. According to the agreement, Indian fishermen and pilgrims can enjoy access to visit Kachchativu Island without travel documents or visas (not provide the right of fishing).[280] Article 6 the agreement mentioned that vessels of Sri Lanka and India will enjoy in each other's waters such rights as they have traditionally enjoyed. However, the provisions in article 5 and 6 taken together do not confer any fishing rights on the Indian fishermen or vessels to engage in fishing in Sri Lankan waters[281]. Maritime boundaries between two countries in the Gulf of Mannar[282] , Bay of Bengal[283] have been declared by the agreement in

[277] Gazala Anver, "Amma's Deceptions: A Sri Lankan perspective on the 'Indo–Lankan Fishery Issue", 11 July 2016, Available From http://roar.lk/reports/ammas-deceptions-sri-lankan-perspective-indo-lankan-fishery-issue/
[278] Article 3, Maritime boundaries: India-Sri Lanka 1974
[279] US department of state-Bureau of intelligence and research "Limits in the sea maritime boundaries: India-Sri Lanka", (1978) the geographer, Available From http://www.state.gov/documents/organization/58833.pdf
[280] Article 5, Maritime boundaries: India-Sri Lanka 1974
[281] Asian Tribune, "Kachchativu always been part of Sri Lanka - Foreign Minister", 12 September 2008.Available From http://www.asiantribune.com/node/13196
[282] Article 1 The Territorial Waters, Continental Shelf, Exclusive Economic Zone and other Maritime Zones Act, 1976
[283] Article 2 The Territorial Waters, Continental Shelf, Exclusive Economic Zone and other Maritime Zones Act, 1976

1976 which came in to force 10 May 1976[284]. The agreement provides the sovereignty over the historic waters and territorial sea, as well as over the islands, falling on its side of the aforesaid boundary for each party[285]. The agreement signed by Sirimavo Bandaranaike and Indra Gandhi in June 1974 and accordingly Kachchativu Island was part of Sri Lanka. However, Sri Lanka's sovereignty over Kachchativu is not only based on the Agreements of 1974 and 1976 but also on historical documentations provide the right over the island to Sri Lanka[286].Therefore it is clear that the enter in to the Sri Lankan historical waters, without permission is illegal.

More than 50000 marine fishers live in the northern fishery districts (Jaffna, Killinochchi, Mannar, Mulative) which is around one fourth of the marine fishers of the country[287]. Before commence the war (1982), around 40% of the fish production of the country came from Nothern fishery districts (except Killinochchi fishery district). However, contribution of the fish production in the northern fishery district drastically dropped to 5% in the peak period of the war (2008) and gradually increased after 2009. However, livelihoods of Sri Lankan fishers' have been drastically affected as a result of the Indian poaching.

Fish, prawns, beach de mar, and many more species in Sri Lankan waters are caught by Indian fishers. According to Dr. Muttukrishna Sarvananthan, director of the Point Pedro Institute for Development Studies, the average annual losses incurred by from Indian pooching is amounts to US$ 41 million or Rs. 6 billion per year[288] which is higher amount than the fish and fishery products export income of the country. Table 2 explains the information on arrested and repatriated Indian fishers by Sri Lankan government from 2010.

Table 5 Arrested and repatriated Indian fishers information (2010-2016)

Year	Arrested		Repatriated	
	Fishermen	Trawlers	Fishermen	Trawlers
2010	50	9	31	7
2011	159	30	76	21

[284] Rumley, Dennis, Sanjay Chaturvedi, and Vijay Sakhuja, eds. *Fisheries exploitation in the Indian Ocean: Threats and opportunities*. Institute of Southeast Asian Studies, 2009).

[285] Article 5 The Territorial Waters, Continental Shelf, Exclusive Economic Zone and other Maritime Zones Act, 1976

[286] Daily Mirror, "Kachchativu was part of Sri Lanka even before the Agreement of 1974", 27 August 2013.Available From http://www.dailymirror.lk/34440/kachchativu-was-part-of-sri-lanka-even-before-the-agreement-of-1974

[287] Sri Lanka, Ministry of Fisheries and aquatic resources development, *Fisheries Statistics - 2015,*Available from http://www.fisheries.gov.lk/content.php?cnid=ststc

[288] Gazala Anver, "Amma's Deceptions: A Sri Lankan perspective on the 'Indo–Lankan Fishery Issue", 11 July 2016, Available From http://roar.lk/reports/ammas-deceptions-sri-lankan-perspective-indo-lankan-fishery-issue/

2012	177	29	96	22
2013	670	125	569	64
2014	807	167	1074	159
2015	450	70	377	69
2016 (up to August)	234	42	230	-

Source: Sri Lanka NAVY

India fishers who enter into the Sri Lankan waters use bottom trawling fishing techniques which remove or damage to sedentary living organisms (including seaweed or coral) in the seabed[289]. Nara has discovered that illegal bottom trawling carried out by Indian fishers on Sri Lankan waters has devastated our sea bed turning it to another dead sea. This trawling method devours all the marine species, sea weeds, corals and reefs which working as spawning beds for fish breeding[290].Especially trawling has been banded for Sri Lankan fishers by ministry of fishery as a result of higher environmental impact[291]. Since impact of the bottom trawling has also been identified by the Indian government, many regulations have been imposed to control the trawling fishery. Trawling are only permitted at sea during 3 days a week with maximum of 24 hours (3-4 days rule), trawling are not allowed within the first three nautical miles, mechanized trawling were banned 45 days lasting from April 15th to may 29th (45 days ban) and pair trawling was banned[292]. In addition, there are many steps have been taken by international levels[293] to minimize the damage of seabed and bottom fishing. Therefor it is really important to take immediate action to stop Indian fishing issues to protect employment opportunities, sea bed resources, fish production, food security and export earning of the country.

It can't be seen that the reasonable efforts are being taken by Indian side to solve this issue as a result of short term negative impact for the livelihoods of the India fisheries and export earnings from fishing. According to the 2014-2015 statistics, shrimp export contributes 67% to the total Indian fishery products export value, while fish contribute only 11%. USA (26%), Southeast Asia (26%) and EU (20%) are the major fish and fishery products export markets of the India[294]. Late 1960 Indian government promote trawl fishing in Palk bay to increase

[289]FAO, "Fishing gear type – Bottom otter trawls", 2016.Available From http://www.fao.org/fishery/geartype/306/en

[290] Ministry Of Fisheries, "Hon. Mahinda amaraweera announces government's appreciation towards the tamil nadu chief minister jayalalitha jayaram's decision to ban bottom trawling of Indian fishers on Sri Lankan waters",2016. Available From http://www.fisheries.gov.lk/news_more.php?nw=431

[291] The Fishing (Import and Export) Regulations 2010, 04 August 2010

[292] Scholtens, Joeri, and Maarten Bavinck. "South Indian trawl fisheries–Assessing their governability." In *Governability of Fisheries and Aquaculture*, pp. 177-199. Springer Netherlands, 2013.

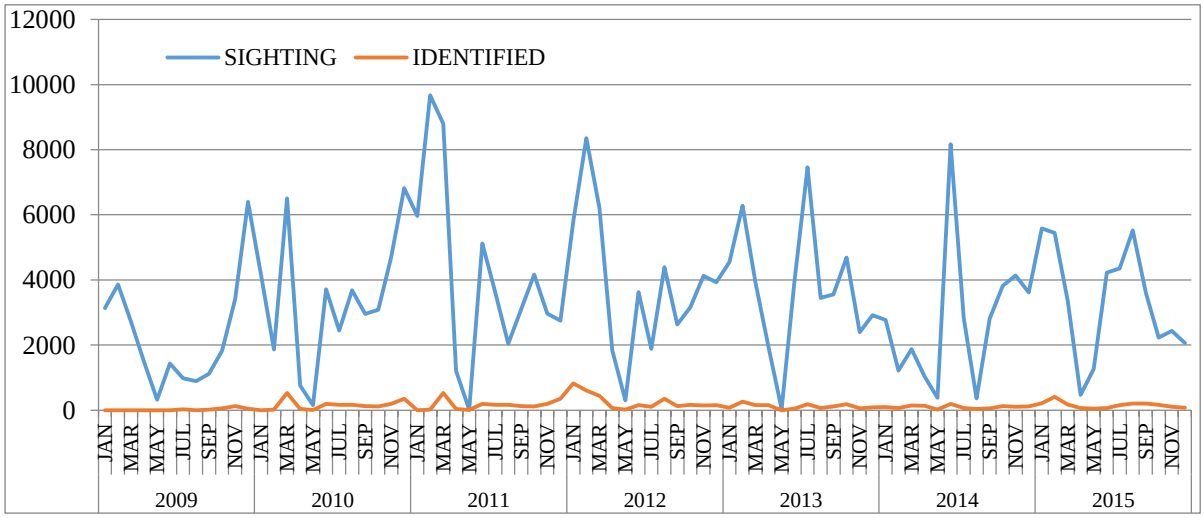
[293] UNGA resolutions 61/105 and 64/72, EU trawling ban on trawling fishing below a depth of 800

[294] Gibin kumar T.R, "National traceability practices for fish and fishery products –India"

the export earnings from prawns that resulted damage for the sea bed and crate empty fish zone in the Indian side of the Palk bay[295]. Therefore it is clear that the major source of Indian capture shrimp come from the historical waters of Sri Lanka. If the government of the Sri Lankan do not immediately involve to this matter for permanent solution, empty fish zone will immediately be created in the Sri Lankan water of the Palk bay.

Patrolling in the Sri Lanka waters and arresting illegal fishers are really important to minimize the short term effect of illegal fishing practices and legal action to be taken under regulation of foreign fishing boats act no. 59 of 1979[296]. Especially during the Mondays, Wednesdays and Saturdays and November to March higher trawling vessels can be seen and identified in the Sri Lankan waters. Therefore proper inspection should be practiced during the days and periods above mentioned. The trend of illegal fishing boats enter in to Sri Lankan waters can be explained by following chart (chart 6).

Chart 6 Trend of sighted and identified illegal fishing vessels in Northern sea of Sri Lankan



Source: Sri Lanka NAVY

Marine Products Export Development Authority Ministry of Commerce & Industry, Govt. of India

[295] Suryanarayan .V, "Indian fishermen and their bottom trawlers are the real problem" 15 March 2015. Available From https://bharatabharati.wordpress.com/2015/03/15/indian-fishermen-and-their-bottom-trawlers-are-the-real-problem-v-suryanarayan/

[296] Sec 15 and 16- foreign fishing boats act no. 59 of 1979

There are some solutions such as lease properties (kachchatheeve) to India, licensed for Indian fishers[297] for fishing in Sri Lankan waters, limiting the fishing days and time frame are proposed to minimize negative effect of this issue. After 30 years war, fishers in the Northern Province have started their fishing activities that are really important to uplift their living conditions. Therefore, fishers in the northern side request to protect their right of fishing in the Sri Lankan waters and immediate discontinue the bottom trawling in the palk bay.

State government of the Thamilnadu and the central government should help to Indian fishers to switch their fishing techniques and fishing areas that they engage in the present (from Sri Lankan waters to Indian EEZ and High Sea). Further both government should assess the resources in the Palk bay and make proper management plan to protect the resources in the Palk bay to protect both countries' livelihoods, fish production food security.

Chapter 2: Compliance issues and Fishers prospects on fisheries law in the country
Section A: Violation of fisheries act and socio-economic status of sampled fishers

Paragraph 1: Recorded violent by the department of fisheries and Sri Lanka NAVY

Legal department of Department of fisheries, collect information on violations of the fisheries act. Recorded incidences significantly differ from month to month and districts to districts. In 2014 to 2016, recorded violation incidences are summarized in the table 1 and all other offences are summarized except incidents recorded on Indian trawling.

Table 6 Recorded violence activities against fisheries act by years

Offence	2014	2015	2016 up to Aug
Violation of purse seine regulation	33.49	6.09	12.06
Usage of monofilament net	30.19	19.71	21.28
Usage of illegal fishing gear	16.98	12.90	23.40
Boat without registration no	10.85	8.96	7.09
Possession or use of Dynamite	6.60	13.26	0.00
Usage of trammel net	1.89	25.09	0.00
Sea cucumber collection without permits.	0.00	3.23	23.40
Lobster catch without permit	0.00	2.87	2.13
Fishing without license	0.00	7.89	4.26
Violation of chank regulation	0.00	0.00	6.38
Others	13.21	20.07	16.31

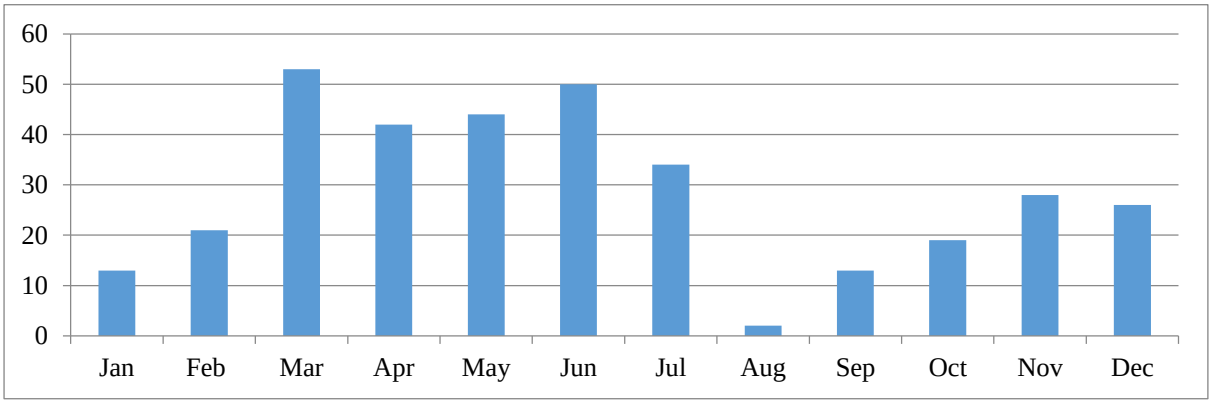
Source: Department of fisheries

[297] uryanarayan V, **"**The india-sri lanka fisheries dispute: creating a win-win in the palk bay", 09 September 2016. Available Fromhttp://carnegieendowment.org/2016/09/09/india-sri-lanka-fisheries-dispute-creating-win-win-in-palk-bay-pub-64538

Above table (table 1) explain that the violation of purse seine regulation, usage of monofilament net, usage of other illegal fishing gears, boat without registration no are the major common violent activities. Usage of trammel net is dominant violent activity in 2015 and both sea cucumber collection without permits, usage of illegal fishing gears are major violent activities in 2016. The average recorded violent activities per month are 35, 28 and 23 in 2014, 2015 and 2016 gradually.

Violent activities against fisheries act significantly fluctuated during the year, during March to July highest violent activities recorded in 2015. The highest violent activities recorded during suitable fishing season (May to September) for East coast and the end of suitable fishing season (November to April) for Western and Southern coast[298] (The southwest monsoon late May to late September and The northeast monsoon November to February)[299]. Following chart 1 explain the recorded violence fishing activities in 2015.

Chart 7 Recorded violent activities of fishing act in -2015



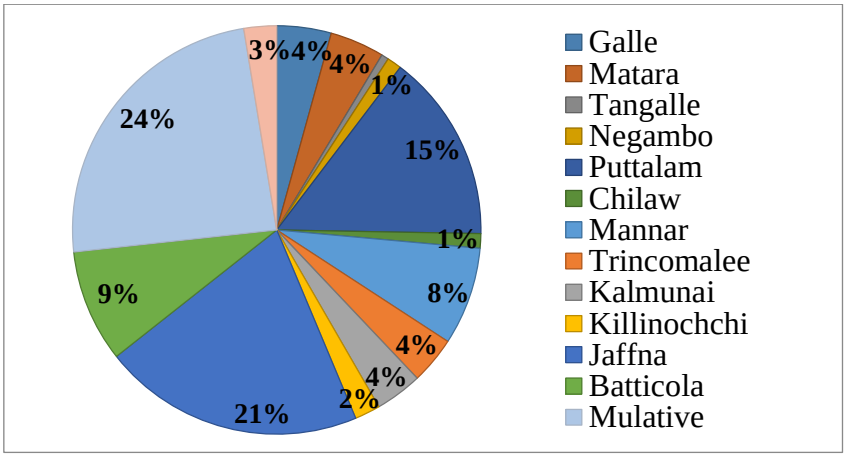
Source: Department of fisheries

Mulative (24%), Jaffna (21%), Puththalum (15%), Batticola (9%), Mannar (8%) are the major fishery districts where highest violent activities were recorded in 2015. Small scale fishers are mainly located in these districts and the fishing incomes of the fishers of the districts are low compared to the majority of other fishery districts.

[298] Sri Lanka expeditions, "Fishing in Sri Lanka" , Available from http://www.srilankanexpeditions.com/activity.php?id=16

[299] FAO, " Geography, climate and population", Available from http://www.fao.org/nr/water/aquastat/countries_regions/lka/index.stm

Chart 8 Recorded violent activities by districts -2015



Source: legal department of department of fisheries

a. Ideas of Additional Directors (ADs) of district fisheries' office on implementation of fisheries law and management initiatives

ADs of district fishery offices that were selected for data collection from the fishers provided their ideas on issues related to the application of fishery law. ADs say that the fishery law is important to utilize fishery resources in sustainable manner. However, sustainable utilization of the fishery can't only be expected from law. According to the sample data of the fishers, it was clear that the level of education of the fishers is low. This result has been proven by the several other research and the publications. Therefore, it is important better awareness system on the fishery law. However, there is no proper mechanism to aware fishers on the fishery law. Though, posters and leaflet use to aware fishers on law, there is no simply explained publications, annually allocated budget, human capacity to aware fishers on the law and fishery management initiatives.

According to the ADs, VMS has been applied by the Ministry of fisheries to minimise the IUU fishing in deep sea and separate officers have been employed to monitor IUU fishing in the country. Further, office has been functioned by the CHFC in each fishery habour to facilitate for fishers and monitor IUU fishing. Although there is proper system for monitor IUU fishing in deep sea fishing, there is no strong system for monitoring IUU fishing in coastal waters.

ADs say that the fishery act provides the legal procedure for fishery management, but act do not strongly provide the bases for dispute settlements. ADs mentioned that illegal fishing

activities have been declined as a result of application of the last few years. Further, there are some round-up based on the information receiving from different sources.

Ministry of fisheries conducted workshops for fisheries Inspectors who were employed to the district offices to aware the fishery law. However, it is needed to conduct robust trainings on fisheries law and fisheries management initiatives for the fisheries Inspectors. ADs mentioned that important of the fishers ideas to formulate rules and regulation on fisheries law. However, there is no proper flat form to gather fishers' ideas for formulating of the fisheries law, regulations and other fishery management practices. As a result of fishing practices are functioning at the sea, monitoring of the fishery is difficult than the other activities happen in the land. Therefore, fishers' ideas and their contributions are highly important to increase the compliance. Especially fishers traditional knowledge can be apply for fishery management practices through the discussion with fishers.

There are some practical issues for efficient function of the fishery law. Weak local political will to proper implementation of the fisheries law, badly affected for the lack of compliance of the law. Further poor recognition of the fishery officers compared to the other officers such as Police, NAVY and Coast Guard is also negatively affected for the compliance. The function of the fishery law and the management initiatives can't only be practiced through the district fishery offices. Therefore, all institutes attached to the Ministry of fishery and local offices should be made collective effort to apply fishery law and fishery management initiatives. Facilities such as human, physical and financial should also be provided to the district fishery office to increase the compliance of the fishery law and management initiatives, especially patrolling boats are needed to monitor the fishing activities. Further strong organization of the fishers and flat form to collect their ideas for law enforcement will be really important to increase the compliance.

Table 6 Ideas of Additional Directors on fisheries law enforcements

Statements	**CS**	**S**	**LS**	**D**
Procedure to aware fishers on Fisheries law and management initiatives				
Monitoring IUU fishing in deep sea				
Monitoring IUU fishing in coastal waters				
Availability of facilities for fishers awareness on fisheries law				
Legal basis for fisheries management				
Training for FI on fisheries law				
Fishers Ideas for formulation on fisheries law				
Other government institutions support to implement fishery law				
Support from social and regional political bodies				
Recognition for fisheries offices				
Time taken for legal procedures				

(CS- Completely satisfied / S-Satisfied / LS-Less Satisfied / D-Dissatisfied)

The above result shows that the several parts should be developed to improve the application of fisheries law in the country. Therefore, it should be collective effort to improve the application and the compliance of the fishery law and the other management initiative in the country.

Sri Lanka NAVY is acting major role for monitoring fishing activities in the coastal water of the country. Fishers who use the illegal fishing gears and explosive are arrested by the NAVY and reported to the Ministry of Fisheries. Considered to the recorded past cases of Sri Lanka NAVY, it cannot be seen positive trend of the fishers complying with fishery regulations. 379, 450 and 913 fishers who involved with illegal fishing activities, were arrested by Sri Lankan NAVY in 2014, 2015 and 2016 respectively.

Purse sense, Disco, Monofilament, Surrukku nets[300] were main fishing gears and lobster, turtle, sea cucumber and conch shells were major seafood items, arrested in last two years by Sri Lanka NAVY.

Dynamite is still using for fishery in the country. The arrested dynamite by Sri Lanka NAVY is described by the following table (Table 3). According to the data, it is clear that there is no declining trend of usage of dynamite for fishing activities.

[300] Allowable fishing gears and fine for illegal fishing gears explained in Sri Lanka national plan of action to prevent, deter and eliminate illegal, unreported and unregulated fishing 2013, the fine is changed in 2016 amendment, Available from http://www.fao.org/3/a-bl359e.pdf

Table 7 Summary of blast fishing equipment arrested by Sri Lanka NAVY – Kg

Year	C 4	TNT	Gelignite	Water gel	Total
2010			3.725		3.725
2011	22.500	15.620	75.980	5.300	119.400
2012	7.930	14.550	5.650	25.193	53.323
2013	3.190	5.700	100.398	20.980	130.268
2014	2.060	33.295	67.708	57.955	161.018
2015	7.040	35.620	5.040	207.965	255.665
2016 (Up to 3 Aug 2016)	0.300	22.262	1.500	193.879	217.941

Source: Sri Lanka NAVY

Destructive fishing practices have been negatively affected for the coastal fish production and environment in the country. In 2015, coastal fish production has declined by 1.4% mainly because of illegal fishing practices including the use of high explosives[301]. Trincomalee, Mannar and Jaffna districts are significant for the dynamite fishing activates. 81%, 13% and 6% of dynamite were arrested by Sri Lanka NAVY in 2016 at Trincomalee, Mannar and Jaffna districts respectively.

Paragraph 2: Social status of the fishers and factors influence for the income of the fishers (finding of the primary data collection)

Fishers who fishing using three major types of boats in three fisheries districts were concerned for the study. The collected data from above three categories can be summarized as follows. Although the quantities of completed questionnaires of three fisheries districts are quite similar, there are some differences of the quantities of type of fishing boats.

Table 8 Summary of Sample - Fishing district and fishing boats

		Type of boats			**Total**
		IMUL	OFRP	NTRB	
Fishing districts	Kalpitiya*	9	13	7	**29**
	Kalutara	8	19	1	**28**
	Negambo	9	7	11	**27**
Total		**26**	**39**	**19**	**84**

Source: Field data collection – 2016 * Kalpitiya belongs to the puththalum fishing district

[301] Sri Lanka, Ministry of fisheries, *Fishermen nabbed by Sri Lanka navy while engaged in dynamite fishing*, Available from http://www.fisheries.gov.lk/news_more.php?nw=348

Education of the fishers was concerned under four major types such as "no formal education", "grade 1to 5", "grade 6 to ordinary level (O/L)" and "up to advance level (A/L)". It was found that, 31% of fishers have schooled up to grade 1 to 5, 61% of fishers schooled up to grade 6 to O/L, and 3.6% of fishers have educated up to A/L. while 3.6% of fishers have not attend school for education. Fishers in Negambo and Kalutara areas acquired higher level of education compared to the fishers in Kalpitiya area which is a rural area (low facility) compared to the other two districts. It may be a major reason for the low level of education of the fishers at the Kalpitiya area. However, it is difficult to identify the differences (no correlation) of the education levels and the type of fishing boats.

Finding of the research of Nadanasabesan[302] based on the northern fishery districts showed that 31% fishers schooled up to grader 3 to 6, 54% fishers schooled up to grade 7- O/L and 15% fishers attended school up to A/L. The study[303] based on Batticaloa fishery district, revealed that, 13% of fishers had no education, 51.4% of respondent had primary level of education, 23.2% of respondents have completed middle level of education, 11.1% of respondents had secondary level of education and around 1% of respondents had advanced level of education. Ekanayake[304] found that 2% of head of the households of fishing families have attained up to A/L, 47% has received grade 8 or more and 4% have not attend school for education. Wijeratne[305] explained that the low level of education is generational links (occupation pass down from father to son) of the fishers.

Fishing experience of the sample is categorized into five parts such as "below 5 years", "5 to 14", "15 to 24", "25 to 34", and "over 35". Majority of the fishers (38%) have 25 to 34 years of experience and then 26% of fishers have 15 to 24 years of experience for fishing. However, only 2% of the fishers of sample have less than 5 years of experience for fishing. In general more than 80% of the fishers of the sample have more than 15 years of experience for fishing. Therefore ideas of the fishers on fisheries rules and regulation are really important for study.

[302] Nimalan, Nadanasabesan. "The need for sustainable development of the small-scale fisheries-A case study from the Northern Province, Sri Lanka." (2015)
[303] S Jeyarajah and SSanthirasegaram, "Socio Economic Factors Influencing Marine Small Scale Fishers' Income in the Batticaloa District of Sri Lanka", The International Journal Of Humanities & Social Studies (ISSN 2321 - 9203) Available from https://www.researchgate.net/publication/304774714_Socio-Economic_Factors_Influencing_Marine_Small_Scale_Fishers'_Income_in_the_Batticaloa_District_of_Sri_Lanka
[304] Lalith Ekanayake, *Baseline socio economic survey in six fishing villages around puttalam lagoon*, 2016. Available from www.dugongconservation.org/media/2016/10/pre-Socio-Economic-Survey.pdf
[305] Wijayaratne, B. "Coastal Fisheries in Sri Lanka: Some Recommendations for Future Management." (2001)

Fishers' organizations are important to ensure the success of fisheries management process and it can be considered as a coordinating institute of fishers and the government. 86% of fishers of Kalutara district became a member of fishers' organizations, while 69% and 67% of fishers (sample) of Kalpitiya and Negambo districts gradually became member of fishers' organizations. Although, the majority of the fishers (87%) who are fishing using OFRP fishing boats become members of the fishers' organizations, 47% of fishers who use NTRB crafts do not take the membership of the fishers' organizations.

a. Income of the Fishers

In general, majority of fishers (36%) of the sample enter into the income group of Rs: 15000 – 29999 per month and then the 29% of fishers enter into the income group of Rs: 30000 – 44999 per month. Only 11% of fishers enter into the lowest level of income group of below Rs: 15000. Fishers who are fishing using IMUL fishing boats, earn higher income from fishing and then the fishers who fishing using OFRP fishing boats. The lowest income gain by the fishers who use NTRB crafts for fishing. The average income of fishers, fishing by NTRB, OFRP and IMUL are 20263, 30789, and 57083 gradually.

According to the sample data, it is clear that there is no association of the fishers' income with experience, education, age, and living places (fishing districts) of the fishers. The following table explain the result of Pearson chi-square, shows that there is no association of fishers' income with the experience, education, age and fishing districts (0.05 < significant values).

Table 9 Pearson Chi-Square test results

Associations	Value	df	Asymp. Sig. (2-sided)
Fishers Experience Vs Income	14.349[a]	16	.573
Education Vs Income	7.265[a]	12	.840
Age Vs Income	17.538[a]	16	.352
Fishing districts Vs Income	6.513[a]	8	.590

Source: Sample data collection - 2016

Above table clearly shows that the significant values (p values) of the fishers' experience (.573), fishers' education (.840), fishers' age (.352), and fishers' district (.590) are greater than the alpha value of 0.05. Therefore, it can't be said that there are association of the above variables with the income of the fishers.

However, it was found that there is an association of the fishers' income and the type of fishing boats that they use for fishing. Chi-square value of the fishers' income and type of fishing boats is 45.016 and related p value is 0.000. Therefore it is clear that there is an association of fishers' income and type of fishing boats that the fishers use. Table 2 shows the result of the chi-square test.

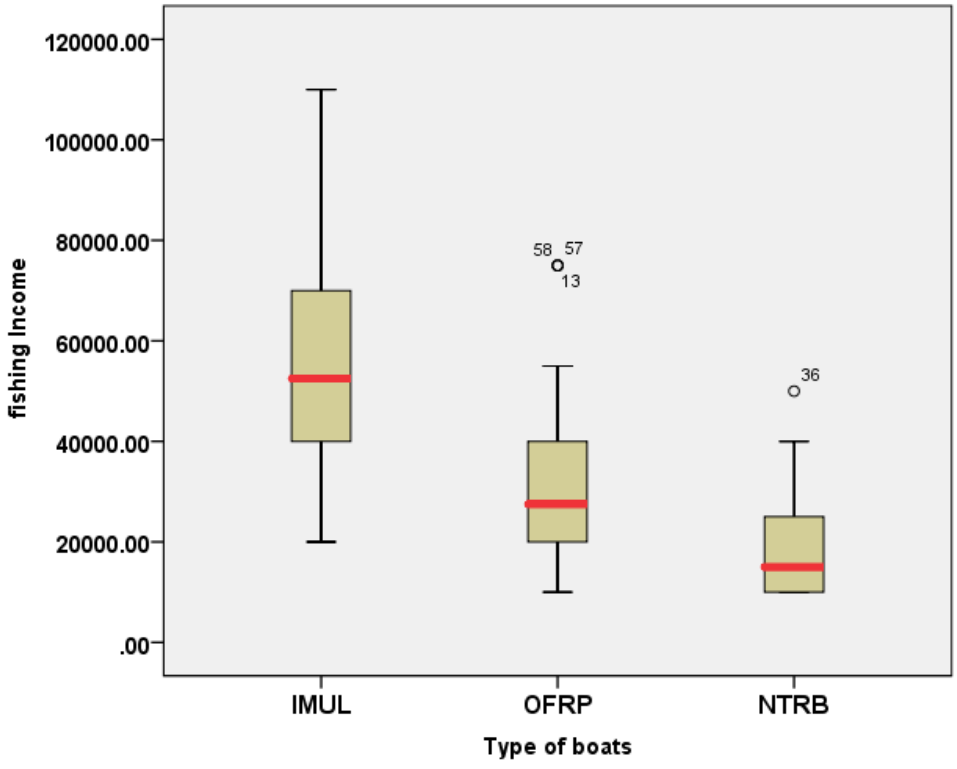
Table 10 Chi-Square Tests for fishers' income groups and fishing boats

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	45.016[a]	8	.000
Likelihood Ratio	44.657	8	.000
Linear-by-Linear Association	29.007	1	.000
N of Valid Cases	84		

a. 8 cells (53.3%) have expected count less than 5. The minimum expected count is 1.36.

The box-plot result of the fishers income of different types of fishing boats shows that the highest income gain by the IMUL fishers ,then OFRP and NTRB gradually.

Figure 2 Box-plot result of the fishers' income vs different types of fishing boats



Monthly salary (with allowances) of the government unskilled labour is about Rs 24250[306] in 2016 (US $ 167) and average income of our sampled fishers is about Rs 35800 (US$ 247). It is clear that the income of fisher is high than the salary of unskilled labour of the government. However salary of the government unskilled labour is higher than the average income of the fishers who use NTRB craft. B. Wijeratne (2001)[307] showed that the income of the boat owners far a better income than comparable socio-economic groups such as owner-cultivators, share-croppers, office workers and state employees. Similarly, the average daily earnings of crewmen (Fishers) on motorised boat two to three times higher than the daily earnings of agricultural labours and unskilled and semi-skilled workers. The earnings of crewmen on non-mechanized traditional craft were comparable to those of agricultural workers. Therefore, it is clear that the gap of the fisher income and the salary of the government unskilled labour have been minimized during last 15 year. Saravanamutthu. J and Selvarathnam S. (2016)[308] found that the average monthly income of small scale fisheries of Batticolar district was Rs 18,284.00 which is similar result compared to the finding of the NTRB fishers income of this study.

Section B: Fishers perception on fisheries law
Paragraph 1: Fishers understanding about fishery law

It was found that 96.4% of fishers aware that there is fishery law in the country, while 3.6% of fishers do not aware about the fishery law in the country. Since, IMUL fishers always engage with the fishery related institutes, 100% of IMUL fishers aware about the fishery law.

Majority of OFRP and NTRB fishers (90%) answered to the question "what is fishery law?" as rules and regulations for protect fishery resources and prohibition of illegal fishing nets. Although, majority (70%) of IMUL fishers answered same as OFRP and NTRB fishers, 23% of IMUL fishers replied fishery law as prohibition of the illegal entrance to the other territories.

Fisheries inspectors (29%), fishermen societies (24%), other fishers (15.5%) and districts fishery office (11.9%) are the major sources of fishers where find the information related to

[306] Sri Lanka, Ministry of Public Administration and Management ,*Public Administration Circular: 03/2016*, 25.02.2016, Available from http://www.pubad.gov.lk/web/eservices/circulars/2015/E/03_2016(e).pdf
[307] Wijayaratne, B. "Coastal Fisheries in Sri Lanka: Some Recommendations for Future Management." (2001)
[308] S Jeyarajah and SSanthirasegaram, "Socio Economic Factors Influencing Marine Small Scale Fishers' Income in the Batticaloa District of Sri Lanka", The International Journal Of Humanities & Social Studies (ISSN 2321 - 9203) Available from https://www.researchgate.net/publication/304774714_Socio-Economic_Factors_Influencing_Marine_small_Scale_Fishers'_Income_in_the_Batticaloa_District_of_Sri_Lanka

the fishery law. This illustrate that the districts fishery office and fishermen societies are doing a major role to aware fishers on fishery law in the country. In addition to the above methods, minor influence has been done by TV and radio, NAVY, NARA and fish buyers for the awareness of fishery law. Following table explain the answer of the fishers for the question on "How do you know about fishery law?"

Table 11 Sources of awareness of fishers on fishery law

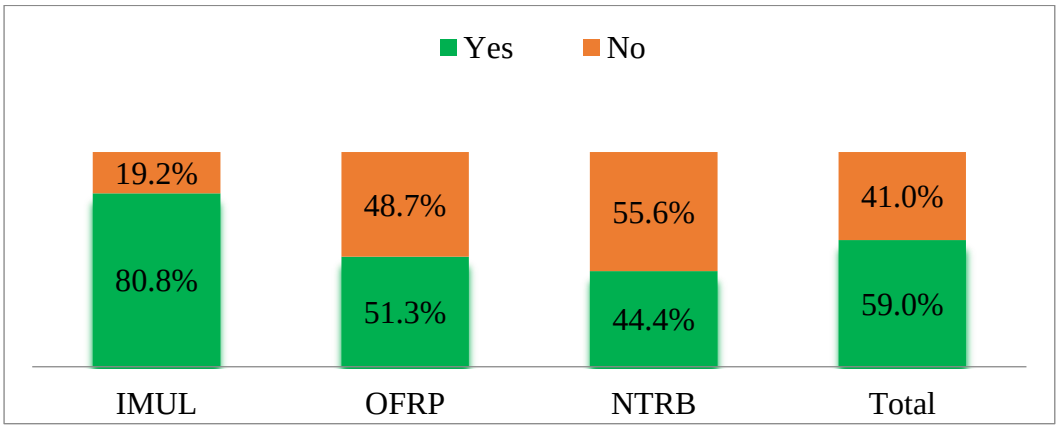
Boat type	How do you know about fishery law?											
	TV& Radio	Fisheries inspectors	Buyers	Fishermen	Fishermen society	District fisheries office	Others	Navy	DFAR	Notice board	NARA	Own experience
IMUL	0.0%	26.9%	0.0%	3.8%	26.9%	19.2%	3.8%	7.7%	0.0%	3.8%	3.8%	3.8%
OFRP	7.7%	29.5%	2.6%	16.7%	23.1%	10.3%	2.6%	5.1%	2.6%	0.0%	0.0%	0.0%
NTRB	0.0%	34.3%	0.0%	28.9%	21.1%	5.3%	0.0%	0.0%	0.0%	0.0%	5.3%	5.3%
Total	3.6%	29.8%	1.2%	15.5%	23.8%	11.9%	2.4%	4.8%	1.2%	1.2%	2.4%	2.4%

Source: Field data collection - 2016

Fishers do not proper understanding that "who does prepare the rules and regulations". Majority of fishers, aware that the ministry of fishers involve with the fisheries rules and regulations. However some fishers (7.1%) think that NARA involve with making rules and regulations and 17.9% of fishers think both ministry of fisheries and NARA make fishery law. 3.6% of fishers believe that international community make the laws for fisheries.

In general, 59% of fishers satisfy with the process of the formulation and implementation of the fishery law in the country, while others do not satisfy. Considered to the fishers who use different types of boat, 80% of fishers who use IMUL boat satisfy with the process of formulation and implementation of fishers' law, while 49% of OFRP and 56% of NTRB fishers do not satisfy. Therefore it is clear that the majority of coastal fishers do not satisfy on the process of formulation and implementation of the fisheries law in the country. Following chart (chart 1) explain this situation.

Chart 9 Fishers satisfaction on law formulation and implementation process



Source: Field data collection -2016

Fishers, who do not satisfy with the process and implementation of the fishery law, explained the reasons for dissatisfaction on it. 79.9% OFRP and 40% NTRB fishers expressed that the fishery law is not properly implemented in the country. However, no one of the IMUL fishers expressed this idea. This may be the result of recently implemented, rules and regulations on deep sea fishery by the ministry of fisheries. In general, 25% of the fishers expressed that the fishers' ideas should be considered in the process of formulation of fishery rules and regulations. Especially this idea has been mentioned by 50% of IMUL fishers. It means that the fishes have attitude that the fishers' ideas have been less considered in the process of fishery law formulation and implementation. Following table (table 5) explained the reasons for dissatisfaction of fishers on process of formulation and implement fishery law in the country.

Table 5: Fishers perception on fishery law and implementation process

Boat type	Fishery law should be revised	Should consider fishers ideas	should consider about small boats' fishers	Should be strengthened the rules	Law is not properly implemented	Should be established for protect aquatic resources	Should be changed according areas
IMUL	0.0%	50.0%	0.0%	16.7%	0.0%	16.7%	16.7%
OFRP	7.7%	15.4%	0.0%	0.0%	76.9%	0.0%	0.0%
NTRB	0.0%	20.0%	20.0%	0.0%	40.0%	20.0%	0.0%
Total	4.2%	25.0%	4.2%	4.2%	50.0%	8.3%	4.2%

Source: Field data collection -2016

a. Fishers' perception of fishery law in the country

Thirteen statements were tested with the fishers of three fishery districts, have summarized in the following table (table 6). The null hypothesis of the test is the median (η) is equals to the

hypothesized median (η_0) (H_0: $\eta = 4$) and the alternative hypothesis of the test is the median (η) differs (not equal) from the hypothesized median (η_0) (H_1: $\eta \neq 4$). The alpha (α) value of the test is 0.05. If calculated p value less than 0.05, it indicate that the null hypothesis can be rejected and otherwise not rejected. It is clear that the p values of the all statements are less than the α value. It means that our null hypothesis of all statements is rejected and alternative hypothesis is accepted. It says that the fishers have ether agreed or disagreed with the statements. Therefore it is important to consider estimated median value to decide the ideas of fishers on the each statement. Median values of the statements 1, 2, 6, 7, 10, 11, 12, 13 are less than estimated median 4. It says that the fishers agree with the statements,(based on the Likert scale) especially the fishers highly agreed with the statements of 1, 6, 10, 11, 12. The estimated median values of the statements 3, 4, 5, 8 and 9 are higher than estimated median 4, especially statement 5 and 8. It says that the fishers do not agree with the statements.

Table 13 Wilcoxon test results of the statements

No	Fishers Ideas	Wilcoxon Statistic	P	Estimated Median
01	**Fisheries law is important for sustainability of the resources**	**90.5**	**0.000**	**1.500**
02	Government imposes fisheries rules according to the requirements	675.0	0.000	3.000
03	There is proper awareness programme to aware fishery law to the fishermen	1809.0	0.023	4.500
04	The authorities take immediate actions to eliminate IUU fishing	1910.0	0.021	4.500
05	**There is better monitoring system to examine IUU fishing**	**2379.0**	**0.000**	**5.000**
06	**Penalty is the best method to prevent IUU fishing**	**87.0**	**0.000**	**1.500**
07	**Majority of fishers respect to rules and regulations**	**460.5**	**0.000**	**2.500**
08	**I have enough access to the information on laws and regulations**	**2229.5**	**0.000**	**5.000**
09	Fishers' ideas are considered to impose rules and regulations	2185.0	0.000	4.500
10	**Existing rules and regulations are strong enough to promote sustainable use of fishery resources**	**385.0**	**0.000**	**2.000**
11	**Existing rules and regulations are always implemented or enforced using top-down approach**	**64.0**	**0.000**	**2.000**
12	**Decreasing catch and incomes leads to IUU fishing**	**126.0**	**0.000**	**2.000**
13	Weaknesses of low enforcement of authorities lead to IUU fishing	600.0	0.000	2.500

The table: 7 describe the differences of the fishers' ideas in different fishing districts. According to the Wilcoxon result, fishers in each districts significantly agreed with the statements of 1, 6, 7, 10, 11, and 12. It clearly says that the fishers in each districts agreed

that the fisheries law are important for sustainability of the resources, penalty is the best method to prevent IUU fishing, majority of fishers respect to rules and regulations, existing rules and regulations are strong enough to promote sustainable use of fishery resources, existing rules and regulations are always implemented or enforced by top-down approach, and decreasing catch and incomes leads to IUU fishing. While fishers in each district significantly disagree with the statement of "I have enough access to the information on laws and regulations". Although the fishers in each district do not disagree with some statements, majority of fishers disagree with the statements of "there is better monitoring system to monitor IUU fishing (especially fishers in Kalpitiya and Kalutara), fishers ideas are considered to impose rules and regulations (especially Kalpitiya and Negambo) and there is proper awareness programme to aware fishery law to the fishermen (especially Kalpitiya and Negambo).

Table 14 Fishers ideas on 13 statements by three different districts

No	Statements	Kalpitiya		Kalutara		Negambo	
		P	E:M	P	E:M	P	E:M
1	Fisheries law is important for sustainability of the resources	**0.000**	**1.5**	**0.000**	**1.5**	**0.000**	**1.5**
2	Government imposes fisheries rules according to the requirements	0.305	3.5	**0.000**	**2.5**	**0.004**	**2.0**
3	There is proper awareness programme to aware fishery law to the fishermen	0.182	5.0	0.330	4.5	0.093	5.0
4	The authorities take immediate actions to eliminate IUU fishing	0.018	6.0	0.170	4.5	0.954	4.0
5	There is better monitoring system to examine IUU fishing	0.001	6.0	0.003	5.5	0.657	4.0
6	Penalty is the best method to prevent IUU fishing	**0.000**	**1.5**	**0.000**	**2.0**	**0.000**	**1.5**
7	Majority of fishers respect to rules and regulations	**0.001**	**2.5**	**0.013**	**3.0**	**0.000**	**2.0**
8	I have enough access to the information on laws and regulations	**0.006**	**5.0**	**0.036**	**4.5**	**0.036**	**5.0**
9	Fishers' ideas are considered to impose rules and regulations	0.024	5.0	0.204	4.5	0.018	5.0
10	Existing rules and regulations are strong enough to promote sustainable use of fishery resources	**0.000**	**2.0**	**0.001**	**2.0**	**0.001**	**2.0**
11	Existing rules and regulations are always implemented or enforced using top-down approach	**0.000**	**1.5**	**0.000**	**2.0**	**0.000**	**1.5**
12	Decreasing catch and incomes leads to IUU fishing	**0.000**	**1.5**	**0.000**	**2.0**	**0.000**	**2.0**
13	Weaknesses of low enforcement of authorities lead to IUU fishing	0.000	1.5	0.733	4.0	0.000	2.5

P= P value, E M = Estimated Median

Fishers who use different types of fishing boats were separately tested using the same test. However the ideas of the fishers of different type of boats were not significantly different. All fishers who use different type of boats have significantly agreed with the statements of 1, 6, 7, 10, 11, and 12. Therefore, it can be said that the fishers who use different types of fishing boats have similar idea on fisheries laws and regulations in the country.

Chi-square test was being tested for the study to find the association between thirteen statements with the variables such as fishers' districts, types of fishing boats, fishers experience, fishers' income and fishers' education. The null hypotheses and alternative hypothesis can be mentioned as follows.

H_0: Fishers location (fishers' Districts) is not associated with the fishermen statements

H_1: Fishers location (fishers' Districts) is associated with the fishermen statements

H_0: Different type of fishing boats (fishers who use different type of fishing boats) is not associated with the fishermen statements

H_1: Different type of fishing boats (fishers who use different type of fishing boats) is associated with the fishermen statements

H_0: Fishers experience is not associated with the fishermen statements

H_1: Fishers experience is associated with the fishermen statements

H_0: Fishers income is not associated with the fishermen statements

H_1: Fishers income is associated with the fishermen statements

H_0: Fishers education is not associated with the fishermen statements

H_1: Fishers education is associated with the fishermen statements

The result of the chi-square test based on the thirteen statements with the five variables can be summarised by following table (Table 8). The p value less than the alpha value (α=.05) clarify that the null hypothesis is rejected and the alternative hypothesis is accepted.

Table 15 Relationship of fishers' statements with five different factors

No	Description	Fishing districts P value	Type of boats P value	Fishers Experience P	Fishers Income P value	Fishers education P
1	Fisheries law is important for sustainability of the resources	.312	.521	.607	.466	.955
2	Government imposes fisheries rules according to the requirements	**.002**	.360	.225	.330	.236
3	There is proper awareness programme to aware fishery law to the fishermen	.243	.363	.875	.252	.428
4	The authorities take immediate actions to eliminate IUU fishing	.062	.192	.491	.690	.885
5	There is better monitoring system to examine IUU fishing	.272	.185	.453	.748	.898
6	Penalty is the best method to prevent IUU fishing	.099	.343	.692	.189	.806
7	Majority of fishers respect to rules and regulations	**.037**	.296	.694	.132	**.002**
8	I have enough access to the information on laws and regulations	.589	**.030**	.543	.172	.497
9	Fishers' ideas are considered to impose rules and regulations	.103	.284	.503	.427	.957
10	Existing rules and regulations are strong enough to promote sustainable use of fishery resources	.540	.691	.512	**.033**	.152
11	Existing rules and regulations are always implemented or enforced using top-down approach	**.034**	.782	.836	.619	.868
12	Decreasing catch and incomes leads to IUU fishing	**.04**	.062	.265	.226	.374
13	Weaknesses of low enforcement of authorities lead to IUU fishing	**.003**	.294	.697	.135	.313

The P values of the above table clearly show the association between five major factors with 13 statements. It is clear that p values of five statements such as government impose fishery rules and regulations according to the timely requirements, majority of fishers respect to rules and regulations, existing rules and regulations are always implemented or enforced using top down approach, decreasing catch and incomes leads to IUU fishing, and weaknesses of low enforcement authorities leads to IUU fishing are less than the alpha value. Therefore we reject the null hypothesis and accept the alternative hypothesis. It means that there is significant association between fishing district with above five statements. The following bar charts further illustrate the differences of the fishers' ideas of different districts and the above mentioned statements.

Chart 10 Relationship with fishers' districts vs Statement 2

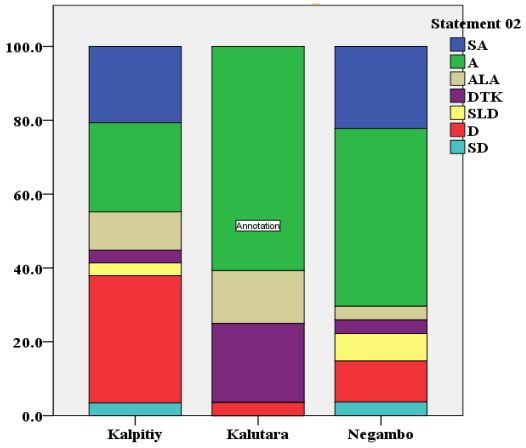


Chart 11 Relationship with fishers' districts vs Statement 7

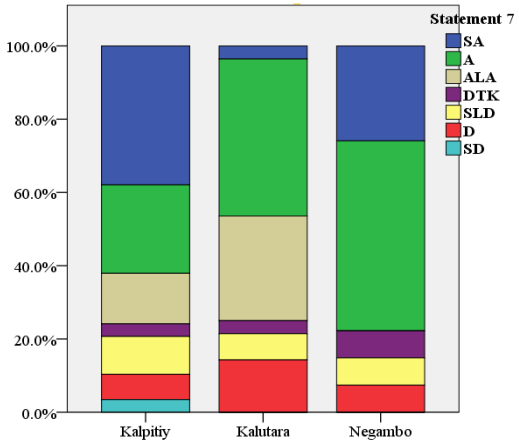


Chart 12 Relationship with fishers' districts vs Statement 12

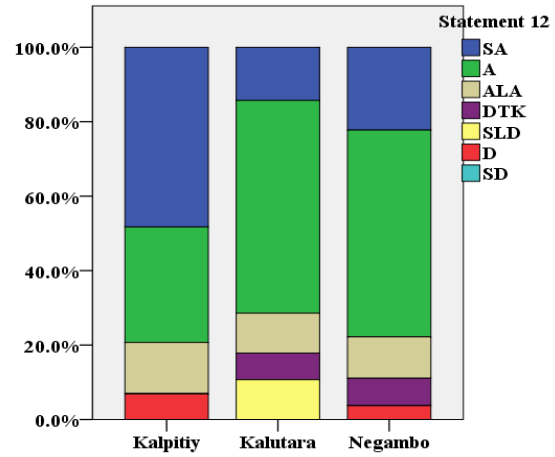
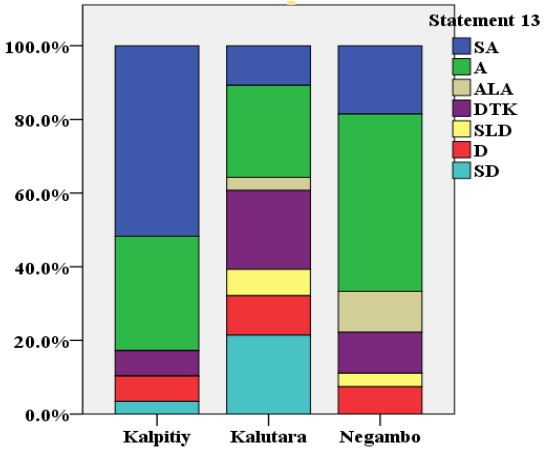


Chart 13 Relationship with fishers' districts vs Statement 13



Source: field data collection-2016

Statements 2, 7, 11, 12 and 13 significantly associated with fishers who live in different fishing districts. Chart 1 (statement 2) clearly show that the disagree side of the Kalpitiya area is higher than the other two districts (especially disagree colour). Chart 2 (statement 7) shows the Kalutura district strongly agree is significant (different) from the other two districts and Chart 3 (statement 12) strongly agree of Kalpitiya area significant (different) from other two districts. The chart 4 (statement 13) explain the strongly agree of Kalpitiya area significant (different) from other two districts. Kalutara district strongly agree (statement 11) significant compared to other two districts. This result can be proven by statistically using associated probability values. Calculated alpha value to the associated alpha (α=.05) value is 0.00238 (new alpha value) and the calculated new probability value associated to the adjusted residual values are 0.001465 (statement 2, Kalpitiya area-disagree), 0.00031 (statement 7, Kalutara

district-Strongly agree) 0.002111 (statement 11, Kalutara district-Strongly agree), 0.000370 (Statement 12, Kalpitiya area-Strongly agree) and 0.000280 (Statement 13, Kalpitiya area-Strongly agree). It is clear that the calculated new probability values are less than the calculated alpha value.

Chart 14 Type of boats– Statement 8

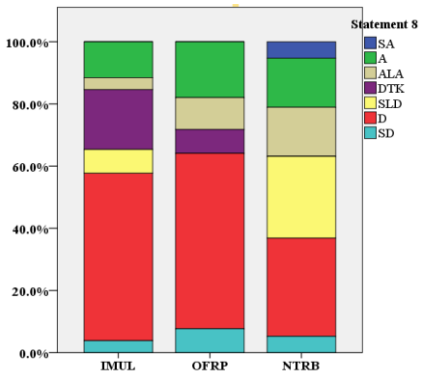


Chart 15 Fishers Income – Statement 10

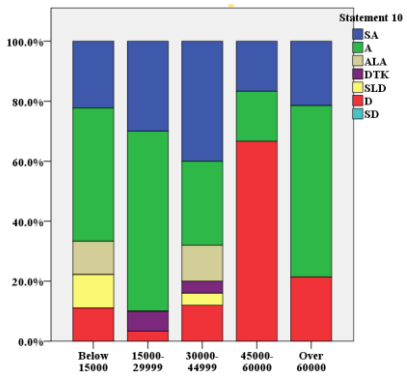
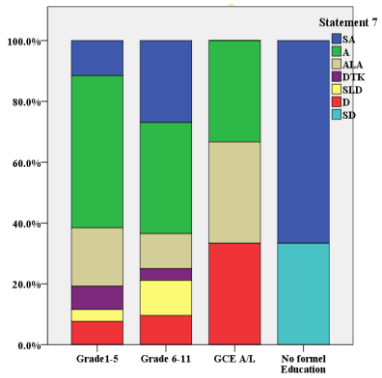


Chart 16 Educations – Statement 7



Source: field data collection-2016

Other variables such as boat type, fishers' income and education are significantly associated with the statements 8, 10 and 7 respectively, while fishers experience does not significantly associated with any statements. Type of fishing boat is significantly associated with "I have enough access to the information on laws and regulations". Chart 5 explain "slightly disagree" of the fishers of NTRB boat type is significant than the other two type of fishing boats. Calculated alpha value to the associated alpha (α=.05) value is 0.00238 (new alpha value) and the calculated new probability value associated to the adjusted residual value of the statement 8 is 0.001242 and it is proven that the significant association of the boat type and the statement 8 (0.001242 < 0.00238). Fishers' income levels are associated with the statement "existing rules and regulations are strong enough to promote sustainable use of resources". Chart 6 shows "disagree" of the income level 45000-60000 are significant. It further explains by new alpha value (0.001428) and the calculated new probability value associated to the adjusted residual value (0.0001417) of the statement 10 (0.0001417<0.001428). Chart 7 shows that no education (strongly disagree) associated with the statement of "majority of fishers respect to rules and regulations". This result explains by the new alpha value of 0.001786 and the calculated new probability value associated to the adjusted residual value of 0.000000 (0.000000 < 0.001786).

Paragrhap2: Fishers ideas to improve Compliance on fisheries law.

a. **Fishers respond against illegal fishing practices**

Awareness on illegal fishing is important to minimize the illegal fishing activities. 96% of fishers who subjected for the study have general understanding on illegal fishing activities. However, it does not mean that the fishers have proper understanding on environment impact of illegal fishing. All type of fishers aware on illegal fishing without significant differences with fishery districts, fishers experience, education, and different type of fishing boats. Chart 8 graphically shows the fishers awareness on illegal fishing activities.

Fishers have mentioned that different type of illegal fishing activities are practiced in their areas, mainly fishing using small mess size gill net, trawling fishing, dynamite, monofilament nets, surrounding nets (*surrukku*, *lila*), IMUL fishing boats without VMS, fishing tortoises, nets use on coral or rocks, surrounding nets using light attraction and Indian fishermen issues are significant. 8% of the fishers of our sample, were complained (chart 9) against illegal fishing activities such as illegal fishing nets, fishing in the prohibited areas (security purpose) and entering into other countries' EEZ.

Although 96% of fishers aware on illegal fishing, only 52% of fishers take actions against illegal fishing, while others didn't take any actions. This result says that the significant amount of fishers do not act against illegal fishing activities. Chart 10 shows the portions of fishers' actions against illegal fishing.

Chart 17 Understanding on Illegal fishing

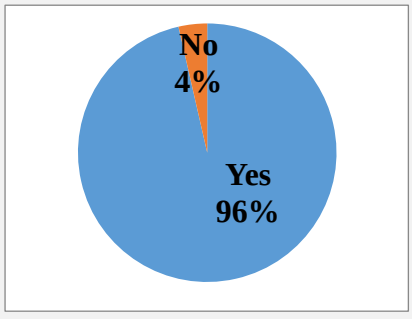


Chart 18 Complain against sample fishers' fishing activities

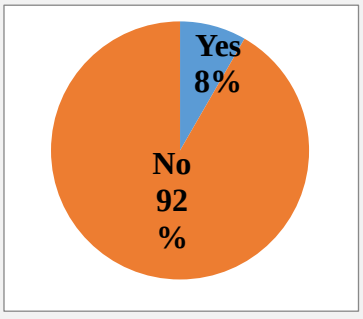
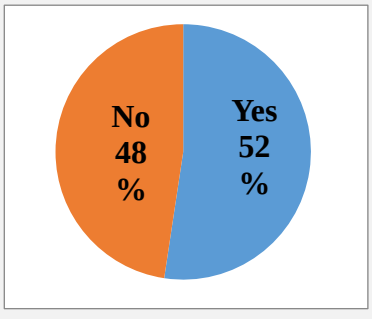


Chart 19 Fishers actions taken to stop Illegal fishing

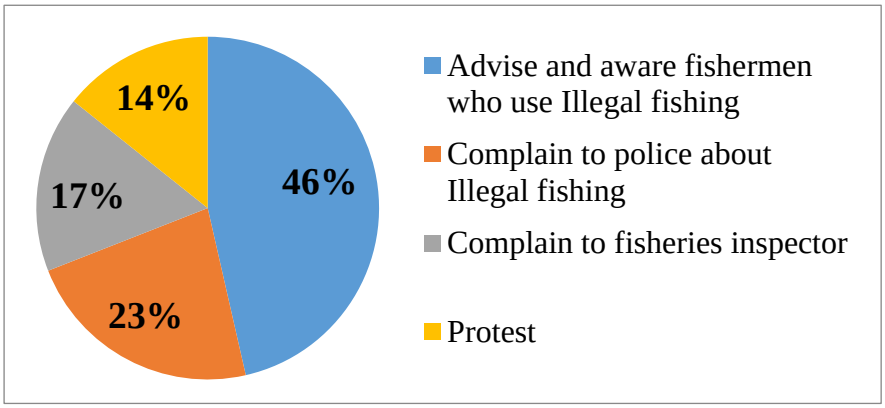


Source: Field data collection – 2016

Different steps were taken by fishers to minimize the illegal fishing practices in their fishing areas. Fishers always interact with other fishermen who are fishing in the same fishing

grounds. Therefore, fishers advise to their fishers to prevent illegal fishing practices. Further, the fishers complain to fisheries inspectors and police regarding illegal fishing activities. Protest against illegal fishing activities is famous method in the present and several protests could be seen in this year especially at Puttalam fishing district. Fishers tend to attend protest because of they couldn't get the positive reply against illegal fishing from the related authority. Following chart (chart 11) explain the percentage of the fishers actions on illegal fishing activities.

Chart 20 Fishermen actions against illegal fishing



Source: field data collection - 2016

Fishermen communication (telephone communication) with fishery related institutes to find fishery related information is week. According to the findings, it was reviled that only 17% fishermen contacted fishery related institutes to find the information while others do not.

b. Fishers' ideas to minimize illegal fishing and proper implementation of fisheries law

To minimize the illegal fishing practices, fishers proposed few methods that should be applied by the authorities. More than $^{1}/_{3}$ of fishers proposed to increase punishments is the best method to minimize illegal fishing methods. It means fishers believe that the current penalties and punishments not strongly enough to minimize illegal fishing techniques. Prohibition of environmentally harmful fishing practices is second dominant idea of fishers to prevent illegal fishing. Harmful fishing practices badly effect especially for the small scale fishers who are fishing in the coastal and lagoon areas. Thirdly, fishers propose to practice unbiased fisheries law. It means that the fishers believe that the fishery law is biasedly practice in the country. Implement fisheries law after best awareness, implement proper investigation plan, banning production and selling illegal nets, aware fishermen, sudden round-up, getting fishermen's ideas and proper recognition of illegal fishing methods are other approaches that mentioned by fishers to minimize illegal fishing practices in the

country. Following table (Table 9) clearly show the fishes ideas to minimize illegal fishing method and their importance.

Table 16 Proposed actions should be taken by authorities against Illegal fishing

Fishers ideas	Frequency	Percent	Cumulative Percent
Increase punishments	30	35.7	35.7
Prohibit harmful fishing nets	11	13.1	48.8
Unbiased fisheries law implementation	8	9.5	58.3
Implement fisheries law after best awareness	6	7.1	65.5
Implement proper investigation plan	6	7.1	72.6
Banned production and sell illegal net	5	6.0	78.6
Take actions to aware fishermen	4	4.8	83.3
Sudden round-up and punishments	4	4.8	88.1
Round up by fisheries officers with navy	4	4.8	92.9
Get fishermen's ideas before investigation	3	3.6	96.4
Proper recognition of illegal fishing methods	3	3.6	100.0

Source: field data collection - 2016

Fishers propose that the awareness program on fisheries law is important to proper implementation of fisheries law in the country. It is difficult to implement the fisheries law, if the fishers do not proper aware on the law. Since the fishing activities complex and running in the sea, it is difficult to monitor and inspect the illegal fishing activities from the limited financial and other resources availability in the relevant authorities of the fishery. Although the fishery law is available in the country, fishers believe that the poor system of punishment, and biased implementation badly affect for the proper implementation. Therefore, fishers have mentioned the importance of application of the above mentioned requirements. Rests of the ideas are similar to the action related to minimize illegal fishing methods. Table 10 clearly explains the fishers' ideas for proper implementation of fisheries law in the country.

Table 17 Fishermen ideas for implement effective fishery law

Fishers Ideas	Frequency	Percent	Cumulative Percent
Aware all fishermen about fishery law	22	26.2	26.2
Increase punishments	16	19.0	45.2
Unbiased fisheries law implementation	16	19.0	64.3
Sudden round-up and punishments	10	11.9	76.2
Banned production and sell illegal net	8	9.5	85.7
Enact flexible fisheries law	6	7.1	92.9
Practice proper implementation plan	5	6.0	98.8
Provide facilities and alternative earning methods for fisherman	1	1.2	100.0

Source: field data collection – 2016

4. Summary

Enforcement of fishery rules and regulations is important for domestic, regional and global perspectives. As a result of lack of compliance with international and national legal instruments on fisheries, several issues have emerged in the fishery sector of the country. Further lack of adherence to the laws and regulations that were imposed on fisheries and IUU fishing is a key issue for marine resource sustainability. Therefore, this study focuses on identifying the barriers to implementation and practice rules and regulations of the fisheries, especially fishers' prospects. In addition, international fisheries management initiatives which are practiced in the present are also considered in this study. The studies were conducted to identify the management issues and to identify the barriers to ensuring compliance with the fisheries law and management initiatives.

Binding and Non-binding fisheries management initiatives have been introduced by the international communities/organizations to allow sustainable existence of biological, ecological, economic and social parts of the fisheries considered in the first part of the study. UNCLOS, UNFSA, FAO Compliance Agreement, PSMA are the major binding instruments of the fisheries. UNCLOS promotes the peaceful use of the seas and oceans, the equitable and efficient utilization of their resources, the conservation of their living resources, and the study, protection and preservation of the marine environment. UNFSA is basically providing the background of conservation and management straddling fish stocks and highly migratory fish stocks. The compliance agreement helps to promote compliance with international conservation and management measures by fishing vessels in the high seas. PSMA came in to force in 2016 and provides a powerful and cost-effective means of preventing, deterring and eliminating IUU fishing with increasing coordination at the regional and interregional levels against IUU fishing. UN, FAO, RFMOs and other international organizations provide guidelines and best practice for the sustainable fisheries which can be considered as non-binding instruments of the fisheries. CCRF, IPOAs, UNEP, CBD, Rio Summit, Aichi Biodiversity targets, CMS /Bonn Convention, SDGs CITES and RFMOS provide guidelines for sustainable fishers as nonbinding instruments.

Several institutes were established by the government to formulate policies, strategies to facilitate the sustainable utilization of fisheries resources of Sri Lanka. The major legal framework of the fishery is "Fisheries and Aquatic Resources Act, no. 2 of 1996, as amended subsequently by Acts no. 4 of 2000, 4 of 2004 and 22 of 2006" which help to administer the fishery sector towards sustainable utilization. The amendments of no. 35 of 2013, No 1 of

2014, and no 2 of 2015 are mainly based on the international fisheries management initiatives. The Minister of Fisheries makes regulations in respect of matters such as reservation areas, condition of fishing boats, stats of fishing nets, management and conservation and so on. Therefore, many significant regulations have been passed by the Ministry of Fisheries for the sustainable existence of fishery resources for the country. In addition to the act, amendments and regulations of the Ministry of Fisheries, the provisions of Fauna and Flora protection ordinance 1937, and Marine pollution prevention Act no 35 of 2008, Department of coast guard act, no. 41 of 2009, Central environmental authority act no. 47 of 1980, Coast conservation act, No. 57 of 1981, and Maritime Zones Law no 22 of 1976 provide the legal background for protection of coast, ocean and ocean resources.

In addition to the lack of compliance with fisheries law and management initiatives, few other issues related to the fisheries were described. Indian fishermen poaching, lack of sound data and information, post-harvest losses and poor marketing and transportation, inadequate and poor management and maintenance of fishery infrastructure, poor and destructive fishing gear practices, inadequate investment in the fishery sector, poor application of the fisheries development plans, insufficient expertise of the fishery sector, high operational cost of fishing are major issues.

To find the fishers' prospects in fisheries law in the country, three fisheries districts were selected for study and based on structured questionnaire randomly selected 84 fishers who used three different types of fishing boats of the districts were subjected to interviews. It was found that the fishers' income was significantly associated with the type of fishing boats that they use for fishing. To minimize illegal fishing practices and to increase compliance with fisheries law, fishers have mentioned the importance of increasing punishments, unbiased law implementations, awareness on fisheries law, and fishermen's participation in the fisheries management process. Ideas of the ADs are similar for the ideas of the fishers. Especially they mentioned the importance of the fishers' participation in the fisheries management and identification of the requirements of the resources to improve compliance.

4.1 Conclusion and Recommendation

As there are several issues identified in the fishery sector of the country, it is important to identify and implement proper mechanisms to minimize the negative impact of the issues. Since data is one of the key factors, support for proper policy decisions, accuracy and cost effective methods should be applied for data collection. Activation of the weight measures

at the harbours, log books for each type of fisher, electronic monitoring systems[309], continuous data collection for significant areas and periodical stocks assessments need to be applied. Similarly collected data should be properly analyzed and applied to management of the fishery. Infrastructure development, especially in the northern fishery districts, helps to increase fish production, improves quality of the fish and minimizes the post-harvest losses. Policy priority needs to be given to the aquaculture development of the country. Otherwise it will not be easy to meet the local fish market requirements and face the competitive international fish markets. Social, economic and environmental negative consequences have been created by Indian poaching in last few years. Therefore short-term and long-term solutions need to be found by the authority as soon as possible to minimize the economic and ecological damage from the poaching.

The average annual fish production of a fisher is about two metric tonnes. The average fish production of the majority of fishers in the northern and eastern fishery districts are significantly less compared to the other fishery districts. Especially this trend can be seen among small scale fishers and the final outcome of the poor fish production is poor living standards of the fishers. Poverty is worsened by poor compliance with the fishery law. According to the legal department of the Department of Fisheries, higher noncompliance incidence has have been recorded from the above two districts. It was found that the local fishers use illegal fishing practices (dynamite) due to the pressure of poverty[310] and limitation of alternative sources of income and opportunities for livelihood diversification for small-scale fishers' course of overfishing[311]. Therefore it is important to maintain balance between socio-economic sustainability and ecological resilience.

Recent studies have shown that the total catch limits decline as a result of non-compliance with fisheries regulations[312]/[3]. Law enforcement is an integral ingredient in fisheries management[313]. Etiegni and others[314] found that weak law enforcement contributes to low

[309]Australian fisheries management authority, " combating Illegal fishing", Available from: http://www.afma.gov.au/monitoring-enforcement/combating-illegal-fishing-2/

[310] Slade, Lorna M., and Baraka Kalangahe. "Dynamite fishing in Tanzania." *Marine pollution bulletin* 101, no. 2 (2015): 491-496

[311] Ha, Tran Thi Phung, and Han van Dijk. "Fishery livelihoods and (non-) compliance with fishery regulations—A case study in Ca Mau Province, Mekong Delta, Viet Nam." *Marine Policy* 38 (2013) 417-427

[312] Porter, Read D. "Fisheries observers as enforcement assets: Lessons from the North Pacific." *Marine Policy* 34, no. 3 (2010): 583-589

[313] Patlis, Jason. "Indonesia's new fisheries law: will it encourage sustainable management or exacerbate over-exploitation?." *Bulletin of Indonesian Economic Studies* 43, no. 2 (2007): 201-226.

[314] Etiegni, C. A., E. Ostrovskaya, J. Leentvaar, and F. Eizinga. "Mitigation of illegal fishing activities: enhancing compliance with fisheries regulation in Lake Victoria (Kenya)." *Regional Environmental Change* 11, no. 2 (2011): 323-334.

compliance and leads to further degradation of resources. Fisheries law enforcement is confronted by several challenges, including lack of funding, facilities, trained personnel, interagency coordinating mechanisms among allied institutions and local government offices, and the and lack of local political will and commitment. Similar results have been found by the Dirham Dirhamsyah[315] in Indonesian maritime law enforcement and compliance in Indonesia. The government therefore needs to develop strategies for effective resource management and allocate an appropriate budget for law enforcement[316].

Though the fishers know the importance of the fishery law, they do not have a proper understanding of the fishery law and have a weak understanding of the source of fishery law in the country. Fishers have mentioned the importance of awareness of fishery law to increase the compliance with the law. Therefore, awareness programs and environment awareness on the impact of environment degradation[317] is really important. Further awareness of cases of violations of the fisheries laws is also increases their consciousness of the fisheries laws and therefore is critical in improving compliance levels among them[318]. Awareness programmes and mass-media can be used to increase awareness of fishers. Alyssa S. Thomas[319] has shown that the articles in local newspapers and fishing magazines highlighting the extent of regulation compliance and benefit of compliance are useful.

Fishers and the district fishery officers mentioned that there is no proper platform to collect fishers' ideas for fishery management. Therefore it is better to develop meaningful mechanism to collect fishers' ideas for fishery management process. Fishers' knowledge is important to preserving specific species and to understanding migration patterns and spawning sites and periods[320]. Co-management techniques need to be applied in different ways to improve the compliance of fisheries management. Village committees were formed

[315] Dirhamsyah. "Maritime Law Enforcement and Compliance in Indonesia: Problems and Recommendations." *Maritime Studies* 2005, no. 144 (2005): 1-16.
[316] Aldon, Ma ET, Armando C. Fermin, and Renato F. Agbayani. "Socio-cultural context of fishers' participation in coastal resources management in Anini-y, Antique in west central Philippines." *Fisheries research* 107, no. 1 (2011): 112-121.
[317] Satumanatpan, Suvaluck, Pisase Senawongse, Weranit Thansuporn, and Hugh Kirkman. "Enhancing management effectiveness of environmental protected areas, Thailand." *Ocean & Coastal Management* 89 (2014): 1-10.
[318] Catedrilla, Liah C., Liberty N. Espectato, Genna D. Serofia, and Caridad N. Jimenez. "Fisheries law enforcement and compliance in District 1, Iloilo Province, Philippines." *Ocean & coastal management* 60 (2012): 31-37.
[319] Thomas, Alyssa S., Taciano L. Milfont, and Michael C. Gavin. "A New Approach to Identifying the Drivers of Regulation Compliance Using Multivariate Behavioural Models." *PloS one* 11, no. 10 (2016).
[320] Le Gallic, Bertrand. "The use of trade measures against illicit fishing: Economic and legal considerations." *Ecological Economics* 64, no. 4 (2008): 858-866.

in Tanzanian waters to minimize the fishery-related issues, especially dynamite fishing[321]. Japanese coastal fishery management is mainly managed by multilevel coordinating organizations. The government and research agencies provide support to fishermen in the form of administrative advice and scientific information. This system has helped to minimize the transaction cost of fisheries such as monitoring, enforcement and compliance cost[322]. Liah C. Catedrilla and others[323] found that the establishment of co-management structure for common resources allows for a more integrated and complementary approach in law enforcement activities. Dirham Dirhamsyah[324] recommend a model of community – based law enforcement for the management of coastal and coral reefs in Indonesia. There is a top-down approach for the fishery policies in the country. This top-down approach can be costly and ineffective due to the low compliance of resource users. Conversely, employing users' local knowledge and involving them in decision-making processes could decrease costs and conflicts, in addition to increasing the chances of management success[325]. Chilean artisanal fishers strongly support a bottom-up process in the conservation of marine biodiversity[326]. Since top-down management or enforcement by the local community alone does not work effectively[327], better community based Sri Lankan system should be developed in once with past experience.

According to the fishers, enforcement of fishery law is biased. Similarly the district fishery offices mentioned that the lack of local political will for law enforcement results in low compliance. Therefore, it is necessary to show an unbiased law enforcement system to the fishers to achieve high compliance. Bribes from fishermen in the form of finance, food, or friendship result in inadequate enforcement, low monitoring and misreporting[328]. When the

[321] Slade, Lorna M., and Baraka Kalangahe. "Dynamite fishing in Tanzania." *Marine pollution bulletin* 101, no. 2 (2015): 491-496.
[322] Makino, Mitsutaku, and Hiroyuki Matsuda. "Co-management in Japanese coastal fisheries: institutional features and transaction costs." *Marine Policy*29, no. 5 (2005): 441-450.
[323] Catedrilla, Liah C., Liberty N. Espectato, Genna D. Serofia, and Caridad N. Jimenez. "Fisheries law enforcement and compliance in District 1, Iloilo Province, Philippines." *Ocean & coastal management* 60 (2012): 31-37.
[324] Dirhamsyah. "Maritime Law Enforcement and Compliance in Indonesia: Problems and Recommendations." *Maritime Studies* 2005, no. 144 (2005): 1-16.
[325] Lopes, P. F. M., E. M. Rosa, S. Salyvonchyk, V. Nora, and A. Begossi. "Suggestions for fixing top-down coastal fisheries management through participatory approaches." *Marine Policy* 40 (2013): 100-110.
[326] Gelcich, Stefan, Natalio Godoy, and Juan C. Castilla. "Artisanal fishers' perceptions regarding coastal co-management policies in Chile and their potentials to scale-up marine biodiversity conservation." *Ocean & Coastal Management* 52, no. 8 (2009): 424-432.
[327] Ha, Tran Thi Phung, and Han van Dijk. "Fishery livelihoods and (non-) compliance with fishery regulations—A case study in Ca Mau Province, Mekong Delta, Viet Nam." *Marine Policy* 38 (2013): 417-427.
[328] Sundström, Aksel. "Covenants with broken swords: Corruption and law enforcement in governance of the commons." *Global Environmental Change*31 (2015): 253-262.

fishers consider that the institutional framework is not legitimate, the chances that they will fail to comply with regulations is higher[329].

Fishers mentioned that the increase in penalties leads to a minimization of illegal fishing activities. Bodmen and others[330] suggest that increasing penalties and reducing the length of time that elapses between a breach being issued and the matter coming to court will reduce the crime rate. Input and output market controlling system of fisheries can be used to minimize illegal fishing activities. Trade measures that can effectively be used in the context of IUU fishing are a sound option for fishery policy at the present time[331].

Lack of resources is a major issue for law enforcement and monitoring IUU fishing activities. There could be better coordination among fishery related institutes and local institutes sharing different capacities to improve compliance. For an instant resource of Sri Lanka NAVY, Coast Guard and Police can be used to monitor fishing activities. Further separate management plans need to be developed to protect vulnerable fish species and sensitive fishing grounds, with meaningful community participation. Further incorporation of the precautionary approach to the legal framework[332] should help to sustain the exploitations. Lack of compliance and regulatory enforcement may fail even the most robust fishery management plan. Therefore government intervention with community participation is recommended for the success of fisheries management in the country. Finally a proper management plan for fisheries leads to the achievement SDG 14.4, 14.5, and14.6 by 2020 as planned to conserve and sustainably use the oceans, seas and marine resources for future development.

[329] Dresdner, Jorge, Carlos Chávez, and Omar Barriga. "Compliance in Artisanal Fisheries: Do Morality, Legitimacy, and Peer Effects Matter?." *Marine Resource Economics* 30, no. 4 (2015): 349-375.
[330] Dresdner, Jorge, Carlos Chávez, and Omar Barriga. "Compliance in Artisanal Fisheries: Do Morality, Legitimacy, and Peer Effects Matter?." *Marine Resource Economics* 30, no. 4 (2015): 349-375.
[331] Le Gallic, Bertrand. "The use of trade measures against illicit fishing: Economic and legal considerations." *Ecological Economics* 64, no. 4 (2008): 858-866.
[332] Dolman, Sarah, Sarah Baulch, Fiona Read, Fabian Ritter, and Peter Evans. "Towards an EU Action Plan on Cetacean Bycatch.", *Marine Policy 2*016, 67–75

Annex: 1

Identifying fisheries law enforcement barriers in Sri Lanka –Fishers' prospects

Questioner for fishermen

Date: ..... Location .....

Interviewee:..... Contact Detail :.....

1. Personal Information

Birthday/ Age	No of years engaged in Fishery	Year Schoole d	Marital Status	No of Children	Type of boat	No. Of boats	Income from Fishing	Income from others	Fishery Society Membership

2. Fishing Gear Information

Own Fishing Gear/s	Amount (pieces/ hook)	Year Purchase / Prepared	Life times	Target species	Average depth use	General Use Months

3. General idea on fishery law

What do you know about fisheries law?

.....

How do you know about fisheries law?

.....

.....

Do you aware that who formulate fisheries laws of the country

.....

.....

Do you generally satisfy with the process of formulation and implementation of fisheries law?

Yes	
No	

If not, what would be the process of formulating and implementing of fisheries law?

.....

.....

4. To what extent do you agree or disagree with the following statements?

Statements	SA	A	SLA	SLD	D	SD	D'TK
Fisheries law is important for sustainability of the resources							
Government imposes fisheries rules according to the requirements							
There is proper awareness programme to aware fishery law to the fishermen							
The authorities take immediate actions to eliminate IUU fishing							
There is better monitoring system to examine IUU fishing							
Penalty is the best method to prevent IUU fishing							
Majority of fishers respect to rules and regulations							
Fishers' ideas are considered to impose rules and regulations							
I have enough access to the information on laws and regulations							
Existing rules and regulations are strong enough to promote sustainable use of fishery resources							
Existing rules and regulations are always implemented or enforced using top-down approach							
Decreasing catch and incomes leads to IUU fishing							
Weaknesses of low enforcement of authorities lead to IUU fishing							

(Strongly Agree (SA), Agree (A), slightly Agree (SLA), Slightly Disagree (SLD), Disagree (D), Strongly Disagree (SD), Don't know (D'TK)

5. Do you aware about IUU fishing?

Yes	
No	

6. What type of IUU fishing activities are operating in your area?

.....
..... 7. What are the actions, you have taken to stop IUU fishing?

.....
.....

8. Do you reluctant to involve stopping IUU fishing? If yes what are the reasons.

.....
.....

9. Do you engage with the IUU fishing activities, if yes what are the reasons for that?, Are there any complaints against your fishing activities. Please explain

.....
.....

10. What are the steps that the authorities need to be taken to minimize IUU fishing?

.....

.....

.....

11. What are the steps that the authorities need to be taken to effective implementation of fisheries law in the country?

.....

.....

.....

12. Have you ever call to Fisheries Office to find fisheries Information? If yes, How many time (approximately)……

…….

13. What types of media do you generally use and what is the specific time of use?.

…..……

……

……..

Internet	TV	Radio	Newspaper	Other (Describe)

Annex: 2

Identifying fisheries law enforcement barriers in Sri Lanka –Fishers' prospects

Questioners for District Fishery Officers (Additional Directors)

1. What is the importance of fishery laws/regulations for the sustainable utilization of fisheries resources?

2. Whether there is easy access to aware on fishery rules and regulations for fishers and allied stakeholders?

3. What are the existing barriers to awareness on fishery rules and regulations?

4. What are the available mechanisms/systems to monitor IUU fishing in the ocean/ Land?

5. Do you believe there are sufficient financial and physical resources to make aware on rules and regulation to the grass roots levels of the fishing community?

6. What are the dispute settlement mechanisms provided by the existing legal framework for efficient management of fishery resources?

7. What is your view regarding trend of IUU fishing during last five years?

8. Is there specific training regarding fisheries rules and legislation for the field staff (FI)?

9. Whether regular inspections are carried out in fishing ports/ landing centres periodically?

10. Do fisherman cooperatives participate/contribute in the process of formulation, implementation and monitoring of fishery rules and regulations?

11. If yes, how?

12. What are the perceived barriers for effective implementation of fisheries law?

13. What are the viable options for effective implementation of fisheries law?

14. Whether, institutional, and policy support available effective implementation of fisheries law?

15. Whether, institutional roles and responsibilities overlapping in this area among different institutions? If yes how?

16. What are the procedural mishaps and delays in the implementation process of fisheries laws?

17. What are the physical, human and other barriers for effective implementation of fisheries law within your authority?

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