SUSTAINABLE FISHERIES
IN THE ANDAMAN SEA COAST OF THAILAND

Sampan Panjarat

The United Nations-Nippon Foundation Fellowship Programme 2007 - 2008

DIVISION FOR OCEAN AFFAIRS AND THE LAW OF THE SEA
OFFICE OF LEGAL AFFAIRS, THE UNITED NATIONS
NEW YORK, 2008

DISCLAIMER

The views expressed herein are those of the author and do not necessarily reflect the views of the Government of Thailand, the United Nations, the Nippon Foundation of Japan, or the University of Rhode Island.

Abstract

Thailand is facing several fisheries problems. They include the depletion of fishery resources, overfishing, excessive fishing effort, conflicts among the fishers and violation of regulations and illegal fishing. Furthermore, the fuel crisis since 2001, and the tsunami event on 26 December 2004 have impacted fishery activities significantly. It is anticipated that the fisheries problems will continue with significant effect on the economy of Thailand and the lives of fishers unless adequate measures for sustaining marine resources are developed. This study addresses the fisheries problems and considers solutions for sustainable use of the fisheries resources.

This study focuses on the fisheries status of Thailand and the Andaman Sea coast. Fisheries law at both the global and regional level are examined as they relate to Thai fisheries. And this study considers how these principles can be used to develop effective instruments for fisheries management, concluding with recommendations for sustainable fisheries management in Thailand.

Summary

WORKING TITLE:
Sustainable Fisheries in the Andaman Sea Coast of Thailand

SUPERVISORS:
Prof. Lawrence Juda
Dr. Francois Bailet

Acronyms

AFRDEC	Andaman Fisheries Research and Development Center
APFIC	Asia-Pacific Fisheries Committee
AQD	Aquaculture Department
ASEAN	Association of Southeast Asian Nations
BOBP	Bay of Bengal Programme
BOBLME	Bay of Bengal Large Marine Ecosystem
CPUE	Catch per Unit of Effort
CCRF	Code of Conduct for Responsible Fisheries
COBSEA	Coordinating Body in the Sea of East Asia
COFI	FAO Committee of Fisheries
DMCR	Department of Marine and Coastal Resources
DOF	Department of Fisheries
EAS/RCU	East Asian Seas Regional Coordinating Unit
EEPSEA	Economy and Environment Program for Southeast Asia
EEZ	Exclusive Economic Zone
FADs	Fish Aggregating Devices
FAO	Food and Agriculture Organization
FCG	Fisheries Consultative Group meeting
GDP	Gross Domestic Product
GEF	Global Environment Facility
GPP	Gross Provincial Product
ICLARM	International Center for Living Aquatic Resources Management
IOTC	Indian Ocean Tuna Commission
IPOA	International Plans of Action
ITLOS	International Tribunal for the Law of the Sea
IUU	Illegal Unreported and Unregulated
LL/GDS	Landlocked/Geographic Disadvantage State
LMEs	Large Marine Ecosystems
LOSC	Law of the Sea Convention
MFRDMD	Marine Fishery Resources Development and Management Department
MNPs	Marine National Parks
MSY	Maximum Sustainable Yield
NESDB	National Economic and Social Development Board
NGOs	Non Government Organizations
NOAA	National Oceanic and Atmospheric Administration
NPOAs	National Plans of Action
NSO	National Statistics Organization
OFCF	Overseas Fisheries Cooperation Foundation
RFMOs	Regional Fisheries Management Organizations
SAP	Strategic Action Plan
SEAFDEC	Southeast Asian Fishery Development Centre
SIDA	Swedish International Development Agency

TACs	Total Allowable Catch
TD	Training Department
TDAs	Transboundary Diagnostic Analysis
TDRI	Thailand Development Research Institute
TLRC	Thai Law Reform Commission
UN	United Nations
UNCED	United Nations Conference on Environmental and Development
UNCLOS III	Third United Nations Conference on the Law of the Sea
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFSA	United Nations Fish Stocks Agreement
USAID	United States Agency for International Development
USD	US Dollar
WWF	World Wildlife Foundation

Acknowledgements

The academic part of my fellowship was undertaken at the Department of Marine Affairs, University of Rhode Island, Rhode Island, United States of America. I wish to extend my sincere thanks to my supervisor, Prof. Lawrence Juda, Director of the Department of Marine Affairs, for his support and professional guidance during the six months of my academic studies. Many thanks to Prof. Richard B. Pollnac, Prof. Richard Burroughs, Brian Crawford, Dr. James Tobey and Dr. Seth Markinko for the valuable assistances as well as the warm hospitality they have provided. Also thanks to Dawn Kotowicz, Kate Mulvaney and Azure Westwood, the officers, staff and students of the Department of Marine Affairs who have been my good friends and supporters.

I would like to deeply thank Dr. Francois Bailet, the United Nations Program Advisor, for his valuable assistance, guidance and all the time he dedicated to me.

I also must thank André Tahindro, the senior law of the sea and ocean affairs officer, for his valuable guidance. Also thanks to the officers and staff of the United Nations Division for Ocean Affairs and the Law of the Sea for all of their support and specially the opportunity for me to learn and understand the important role of the Division in providing advice, studies, assistance and research on the implementation of the Law of the Sea Convention.

Lastly, special thanks to The Nippon Foundation of Japan for its kind support to this fellowship program.

Table of Contents

Abstract ii
Summary iii
Acronyms iv
Acknowledgements vi
Table of Contents vii
List of Figures x
List of Tables xi
Part I Introduction 1
Part II Thailand: The Physical Profile 3
A. Geography 3
B. Biodiversity 5
C. Marine Fisheries Resources Potential and Trend 8
1. In the Thai territorial sea and EEZ 9
(a) Pelagic Fish 12
(b) Demersal Fish 16
(c) Cephalopod 17
(d) Crustaceans 18
2. Fishing outside the EEZ of Thailand 20
(a) EEZs of other coastal States 20
(b) High Sea Fisheries 23
Part III Status of Fisheries of the Andaman Sea Coast of Thailand 25
A. Introduction 25
B. Social Structure of Fisheries Communities in the Andaman Sea Coast 26
C. The Structure of Fisheries in the Andaman Sea Coast 33
1. The Nature of Fisheries 33
(a) Commercial fisheries 37
(b) Small scale fisheries 38
2. Stress Factors and Problems 40
(a) Tsunami 40
(b) Fuel crisis 42
(c) Violation of regulations and illegal fishing 44

Part IV Fisheries Law and Policy 47
A. The Global Framework 47
1. The 1982 United Nations Convention on the Law of the Sea 47
2. Agenda 21 of 1992 UNCED 50
3. The FAO Compliance Agreement 53
4. The 1995 the United Nations Convention Agreement on Straddling Fish Stocks and Highly Migratory Fish Stocks 55
5. The 1995 Code of Conduct for Responsible Fisheries 59
6. FAO IPOAs. 61
(a) IPOA-SEABIRDS 61
(b) IPOA-SHARKS 62
(c) IPOA-CAPACITY 62
(d) IPOA-IUU 63
B. Regional Framework 65
1. Indian Ocean Tuna Commission (IOTC) 65
2. Bay of Bengal Large Marine Ecosystem Program (BOBLME) 68
3. Asia-Pacific Fisheries Committee (APFIC) 71
4. Coordinating Body in the Sea of East Asia (COBSEA) 73
5. Southeast Asian Fishery Development Centre (SEAFDEC) 74
C. The Thai National Framework 76
1. The Fisheries Law of Thailand 76
(a) The EEZ Proclamation 76
(b) Directed Enforcement Fisheries Law 79
(c) Legislation indirectly impacting fisheries 89
2. National Fisheries Policy 92
(a) Development of Fisheries and Involved Organization 93
(b) Management of Fisheries Resources and Environment 93
(c) Aquaculture Development 93
(d) Oversea Fisheries Development 93
(e) Fisheries Industry Development 93

Part V Conclusion and Recommendations for Sustainable Fisheries Management 96
A. The ratification and implementation of International Instrument 97
B. Implement the regional instruments. 100
C. National Fisheries Law and regulation reform 100
D. The potential approaches for sustainable management and recommended measures 101

List of Figures

Figure 1: Thailand and adjacent ocean 4
Figure 2: Marine and Inland Capture Fisheries: Top ten producer countries in 2004. 9
Figure 3: Thailand capture fisheries production 11
Figure 4: Thailand capture fisheries production (Andaman Sea) 15
Figure 5: Overlapping of Thailand's EEZ with those of neighboring countries. 22
Figure 6: Provinces in the five coastal zones of Thailand 27
Figure 7: The Bay of Bengal Region. 69
Figure 8: Fisheries management is a partnership 106

List of Tables

Table 1: Production and value of fishery production of marine capture, inland capture, coastal aquaculture, and freshwater aquaculture during 1994-2004 10

Table 2: Catch and percentage of Thai marine capture by category in 2004 12

Table 3: Composition of pelagic fish in Thailand, 2004 13

Table 4: Sustainable and actual fish yields in Thai waters in 1991 (tons) 14

Table 5: The catch of Cephalopod and Crustaceans from the Andaman Sea and the Gulf of Thailand during 1970-2004 19

Table 6: Thai boats and crews arrested by neighboring countries, 1983-2004 21

Table 7: Annual catch by Thai tuna vessels 23

Table 8: Number of fisheries establishment, fishing boat and fishers during peak season in the Andaman Sea coast 29

Table 9: Number of fishing port, ice plant, freezing and processing factory by Province, 2004 30

Table 10: Number of foreign workers in fisheries and coastal aquaculture by Province and nationality 31

Table 11: Estimate of undocumented migrant workers in the Andaman Sea Province 31

Table 12: Number of important fishing gear unit along the Andaman coast of Thailand registered by Province, 2004 34

Table 13: Number of boats licensed fishing gear by length, number of fishing boat by engine and number of registered fishing boat by gross ton 36

Table 14: Fisheries damage to fishing vessels, fishing gears, fishing ports caused by Tsunami and compensated by the DOF 41

Table 15: Estimated losses value cause by illegal fishing in the Andaman Sea coast of Thailand 45

Table 16: Maritime Boundary Agreements between Thailand and Other Coastal States 78

Table 17: Fishing gear requiring licensees and rate of fishery tax 86

Table 18: Rate of fishery tax on permit for catch fishermen on reserved fisheries 87

Table 19: Rate of fee 87

Table 20: The fisheries policy and missions of the Department of Fisheries of Thailand 93

Table 21: Ecosystem-Based Management as a paradigm Shift 104

Part I Introduction

Fishing has a long history in Thailand and it is especially important for the people in the coastal Provinces who fish to feed their families and supply the food market. Domestic consumption, approximately two thirds direct, and one third indirect, accounted for 70-80% of the total catch. Fish is the major animal protein source for Thai people. In 2001, the average yearly fish consumption was 32.4 kilogram per capita and provides on average 10-14 grams of protein per capita per day. It provides 40.5% of animal protein sources and 17.6% of total protein.[1] However, fish consumption may actually be higher because many caught fish are consumed directly in households without passing through the market. Thailand's GDP was estimated at USD 176.6 billion in 2005.[2] Agricultural and fisheries are the main occupations of the Thai people (35%) and it is noteworthy that fisheries accounts for 2.5% of the total GDP.[3] The Thai fishing industry is one of the ten largest in the world. Ninety percent of total Thai fishery output is composed of marine fish. Marine fisheries capture grew rapidly from 1.3 to 2.6 million tons during 1970-1987.[4]

Because of the rapid extension and development of marine capture fisheries without proper controls, Thailand has faced problems with the development of marine fisheries since 1982.[5] Marine fish resources are over exploited, and while the catch has increased, the catch per unit of effort (CPUE) has decreased. At the same time the cost of fishing increased following the increase in fuel prices. Conflicts among the fishers who exploit coastal fishing grounds are increasing while the freedom to fish in more distant waters is disappearing because of the Exclusive Economic Zones (EEZs) proclamation of neighboring countries. Indeed, disputes with neighboring countries have arisen because of fishing by Thai fishing vessel.

---

[1] FAO, Food Balance Sheet of Fish and Fisheries Products in Live Weight and Fish Contribution to Protien Supply, Thailand, 2001. 1-1 pp.

[2] World Bank, Total GDP 2005, World Development Indicators Database. 1-1 pp.

[3] P. Flewwelling and Hosch G., "Country Review: Thailand (Andaman Sea)" 175-186 pp. Review of the State of the world marine capture fisheries management: Indian Ocean. De Young, C. (ed.) FAO *Fisheries Technical Paper*. No. 488. Rome, FAO. 2006. 458 p.

[4] FAO, "Thailand Fisheries Capture 1970-2003" in Statistic of Capture Fisheries Production. 1-1 pp.

[5] W. Janekitkosol, Somchanakij, H., Eiamsa-ard, M., and Supongpan, M., "Strategic Review of the Fishery Situation in Thailand" 915-956 pp. *In* G. Silvestre, I Stobutzki, M. Ahmed, R. A. Valmonte-Santoa, C. Luna, L. Lachina-Aliňo, P. Muńro, V. Christensen and D. Pauly (eds.) Assessment, Management and Future Direction for Coastal Fisheries in Asian Countries. World Fish Center Conference Proceedings 67, 1: 120 p.

While those fisheries problems were difficult enough, problems were further complicated by the 2004 Indian Ocean earthquake.[6] Known by the scientific community as the Sumatra-Andaman earthquake, the event was a great undersea earthquake that occurred on December 26th, 2004 with an epicentre off the west coast of Sumatra, Indonesia. The earthquake triggered a series of devastating tsunamis along the coasts of most land masses bordering the Indian Ocean, killing large numbers of people and inundating coastal communities across South and Southeast Asia, including parts of Indonesia, Sri Lanka, India, and the six Provinces along the Andaman Sea coast of Thailand. No one knows exactly how many people perished in the tsunami, but official tallies put the number of known dead at over 181,000 and another 50,000 unaccounted for, or a total of over 231,000 from 12 countries from Southeast Asia to East Africa.[7]

In Thailand, hundreds of thousands of people have been affected. Nearly 500 fishing villages along the Andaman coast were seriously affected, about 30,000 households dependent on fisheries have lost their means of livelihood with over 10,000 fishing boats, and 7,000 sets of fishing gear have been destroyed or damaged.[8] In many affected areas, traditional social communities were wiped out. Although there were many recovery and rehabilitation projects undertaken by the Thai Government, international organizations and NGOs, the tsunami created many long-term difficulties for fishers.

This report provides a broad view of Thailand's physical profile, Thailand's fisheries status, both of fishing in the Thai territorial sea and EEZ, and outside its EEZ. The report then focuses on the status of the Andaman Sea coast fisheries, describing the social structure of the fisheries communities, and a structure of capture fisheries which compose of the nature of fisheries, and outlining stress factors and problems. The report also provides an overview of fisheries laws and policy at the global, regional, and national level, as well as a discussion on the implementation at each level framework. Conclusion and recommendations for sustainable fisheries management are presented, including the potential approaches for long term effective managements.

---

[6] J. Park, Anderson, K., Aster, R., Botler, R., Lay T., and Simson, D. Global Seismographic Network Records the Great Sumatra-Andaman Earthquake Eos, Vol. 86, No. 6, 8 February 2005. 57-64 pp.

[7] UNDP, Survivors of the tsunami: One Year Later. The tsunami: a natural disaster of unprecedented proportions. 2-4 pp. *In* UNDP report, Daniel Shepard (ed.). 2005. 22 p.

[8] AFRDEC, Data of Tsunami Recovery and Rehabilitation for Fisheries Sector in Thailand. Phuket, 2005. 3 p.

Part II Thailand: The Physical Profile

A. Geography

Thailand is a peninsular country in the middle of mainland Southeast Asia, lying between 5°-20° N and 97°-106° E. (Figure 1), with a total land area of approximately 514,000 km^2 divided into 76 Provinces. There are 23 coastal Provinces surrounding the two main fishing areas, the Gulf of Thailand (17 Provinces) with a coastline of approximately 2,700 km (1,143 miles) and the Andaman Sea (six Provinces) 865 km (537 miles), the EEZ of Thailand covers 420,280 km^2: 304,000 km^2 in the Gulf of Thailand and 116,280 km^2 in the Andaman Sea. Its maritime border is shared with Cambodia and Vietnam in the south east, Myanmar in the west and Malaysia in the south. Thailand's EEZ within the Gulf of Thailand included overlapping areas between Thailand and Cambodia (34,000 km^2), Thailand, Cambodia and Vietnam (14,000 km^2) and Thailand and Malaysia (4,000 km^2).[9]

[9] N. Nakthon. Marine Territory of Thailand and Neighbouring Countries. Hydrograph Department, Royal Thai navy. Master of Science Thesis (in Thai). 1992. 1-9 pp.

Figure 1: Thailand and adjacent oceans

Source: United Nations, Map No. 3853 Rev. 1, Department of Peacekeeping Operations, Cartographic Section (January 2004[cited 31 April 2007]); available from <http://www.un.org/Depts/Cartographic/map/profile/thailand.pdf>.

The Gulf of Thailand has a maximum depth of 85 m and is covered by a sandy and muddy bottom. Water from the west, northwest mountains and the high eastern plain flow to the Gulf of Thailand through four river systems: the Chao Phraya; Tha Chin; Mae Klong; and the Bang Pakong.

On the west coast, there are six Provinces, namely: Ranong, Phang-Nga, Phuket, Krabi, Trang, and Satun. The west coast of Thailand has a narrow continental shelf and deepens offshore. Inshore, areas within three km have an average dept of about three m. It has a slightly wider area in the north and a narrow area in the south; the latter area comprising mangroves and sea grasses. The bottom for the most part is sand, mud and coral remnants. Tidal currents and along shore flows dominate the water circulation along the Andaman Coast. The water movements vary with the monsoon period, nearshore surface water generally move northward during the northeast monsoon and southward during the southwest monsoon. The water of the northern region (Ranong to Phuket) has a high salinity (32.9-33.4 ppt) due to deep sea upwelling, while the southern region (Phuket to Satun) has a lower salinity range (32.0-32.8 ppt) due to the influence of surface run-off. The temperature range along the Andaman Sea Coast is 27.6-29.3°C.[10]

B. Biodiversity

Thailand's coastal habitats are biologically complex due to the variability of their taxonomic composition, overall community structure, topography and oceanographic condition. The biological complexity and variability of tropical nearshore environments are perhaps influenced by tropical rain forest monsoon winds, tidal currents and river discharges creating complex circulation patterns including downwellings and upwellings. Taxonomic composition, overall community structure and topography conditions vary widely along the coastal zone, even over short distances. Nevertheless, nearshore ecosystems commonly comprise three distinct, but intimately interdependent habitats: mangrove forests, coral reefs, and seagrass meadows with unconsolidated sand or mud bottoms. The ecological and economic importance of these habitats extends beyond the exploitable species that use them and is described below:

[10] M. Eiamsa-ard, and Amornchairojkul, S. 1997. The Marine Fisheries of Thailand, with emphasis on the Gulf of Thailand trawl fisheries, 85-95 pp. *In* G.T. Silvestreband and D. Pauly (Eds.) Status and Management of the tropical coastal fisheries in Asia. ICLARM Conf. Proc. 53, 208 p.

Coral: coral and coral reefs are dominant shallow water features of tropical marine environments that are remote from major upwelling or fresh water inflows. Broadly defined, a coral reef comprises both the physical structure formed from calcareous secretion of coral and other marine organisms. Large coral colonies may contain tens of thousands of individual polyps, and reef can be hundreds or thousands of years old. It is the carbonate skeleton of these shallow water marine organism that form the massive reef structure protecting coastlines and creating habitat for the associated biota.[11] The economic good and services of coral reefs include: the creation of complex habitats for a variety of fishes and other important organism; the role of reefs as barriers to storm wave and debris; and the aesthetic and recreational value of reefs in attracting coastal tourism.

Over 300 major coral reefs, covering approximately 12,000 km^2, have been identified in both the Gulf of Thailand and the Andaman Sea. Blasting of coral reefs is reported to be declining in many places because of public awareness but reef degradation continue due to factors including sediment and pollution from waste water discharge associated with rapid and uncontrolled coastal development.[12] After the 2004 tsunami, 22% of 174 survey sites along the Andaman Sea Coast suffered while over 31% were damaged.[13]

Mangrove: According to the first mangrove forest assessment in 1961, mangroves covered an area of nearly 3,678 million m^2, with 37.1% in the Gulf of Thailand and approximately 60% on the southern Thai coastline.[14] Mangroves are an integral component of coastal ecosystems and fulfill many fundamentally important functions for coastal ecology and the local economy. Mangroves supply wood and other forest products and contribute to coastal productivity. As prop roots develop and spread, they trap and stabilize terrigenouse sediment, building land and protecting reefs and lagoons from agricultural and urban pollution. Mangroves support an extremely diverse and important community of marine plants, invertebrate and seabirds and provide shelter and nursery for a rage of commercially important fish. Mangrove detritus provides an important nutrient base for food webs that

---

[11] S. Suraswadi. The policy of the department of fisheries for community-based coastal fisheries management. *In* Nickerson DJ (ed.) 1998: Communities Based fishery management in the Phang Nga Bay. Thailand. Proceeding of the National Workshop on Communities based management organized by the Department of Fisheries of Thailand. FAO and the Bay of Bengal Programme, Phuket, Thailand, 14-16 February 1996. FAO Bangkok. RAP Publication 1998/3 (BOBP) Report No. 78: 35-53 pp.

[12] S. Sudara. Who and what is to be involve in successful coastal zone management: Thailand example. *Ocean and Coastal Management*, Vol. 42 (1999). 1999. 39-47 pp.

[13] R. Mather. Coral Reef Management and Conservation in Andaman Sea Marine Protected Areas, After the Tsunami. 2005. 8 p.

[14] U. Hampanya, Vermaat J. E., Sinsakul S. and Panapitakkul N. Coastal erosion and mangrove progradation of Southern Thailand. *Estuarine, coastal and shelf science*. 2006, Vol. 68, No. 1-2: 75-85 pp.

include commercially important food fish and invertebrate and augment the growth of adjacent seagrass and coral reef community.[15] Like coral reefs, mangroves protect the coast from storm damage and protected many of the people in villages along the Andaman Sea coast from the 2004 tsunami. Much of the mangrove area was lost during the first extensive phase of brackish water shrimp farming in the 1980s.[16] Despite recent measures to control encroachment on mangroves and efforts to replant in degraded areas, including the area impacted by tsunami, deforestation has continued though at a slower rate.[17]

Seagrass beds: Seagrass and mud bottoms within lagoons and between the shore and reef crests serve many crucial ecological functions and are of direct and indirect economic importance to coastal communities. The associated sand, coral rubble, fish and invertebrate are commonly harvested for material and food throughout the coralline area of Thailand.[18] Nine species of seagrass are found in 13 Provinces along the Gulf of Thailand[19] while the seagrass meadows along the Andaman Sea coast cover an area of 79 million m^2.[20]

The sand and mud bottom on which seagrass beds form create a habitat for many burrowing and benthic organisms. The leaves and interwoven roots provide extensive shelter for small organisms and gazing surfaces for a variety of species. Many species migrate to and from seagrass either daily or at fixed stages during their life cycle.[21]

The degradation of seagrass beds is due to waste water discharge from coastal industry, urban development, shrimp farms and other forms of coastal development. Trawling and the use of push nets and dragnets can also cause severe impacts on seagrasses. After the 2004 tsunami, 3.5% of seagrass areas along the Andaman Sea were impacted through siltation and sand sedimentation, while 1.5% suffered total habitat loss.[22]

Marine Wildlife: Thailand's coastal habitat hosts a number of fauna species, especially along the Andaman coast, there are 16 Marine National Parks (MNPs) on the

---

[15] S. Suraswadi. op. cit. 38-38 pp.

[16] M. Kaosa-ard and Pednekar S. S. 1998. Background report in the Thai marine rehabilitation plan 1997-2002. Natural resources and environmental program. Thailand Development Research Institute, Bangkok, 111 p.

[17] USAID, Thailand: Replanting mangrove forest. Washington, DC. 2006. 1-1 pp.

[18] S. Suraswadi. op. cit. 39-39 pp.

[19] S. Sudara. 1999. Who and what is to be involve in successful coastal zone management: Thailand example. *Ocean and Coastal Management*, Vol. 42 (1999). 39-47 pp.

[20] U. Seenprachawong. An Economic Analysis of Coral Reefs in the Andaman Sea of Thailand. Output *Research Reports* of research projects supported by the Economy and Environment Program for Southeast Asia (EEPSEA), 2001. 42 p.

[21] S. Suraswadi. op. cit. 39-39 pp.

[22] UNEP, Natural Rapid Environmental Assessment: Thailand. 36-55 pp. *In* UNEP report. After the Tsunami: Rapid environmental assessment. 2005. 140 p.

coast and four of them have been proposed to be listed as World Natural Heritage Sites.[23] The Andaman Sea is host to many threatened fauna species, including Dugong (*Dugong dugon*) which is globally vulnerable, a number of dolphin species, and four species of sea turtles: leatherback turtle (*Dermochelys coriacea*)-critical endangered, green turtle (*Chelonia mydas*)-threatened, hawksbill turtle (*Eletmochelys imbricata*)-critical endangered and olive ridley turtle (*Lepidochelys olivacea*). Some 150 dugongs are estimate to live in the Andaman Sea, in scattered groups from Ranong to Satun Province. Accidental catch dugong in nets and the degradation of seagrass meadows are the two main threats to dugong.[24]

The ecological and economic importance of these habitats to communities of the coast extends beyond the particular exploitable species within them. Coastal habitats provide the foundation for small scale fisheries, aquaculture, wood production and fuel, village settlements, tourism, urban development, ports and harbors and numerous other activities.

C. Marine Fisheries Resources Potential and Trends

Thailand is among the top ten fish exporting countries of the world. In 2004, the total capture fisheries production was 2.8 million tons (Figure 2).

[23] T. Sethapun. Marine National Park in Thailand. Department of National Park, Wild Life and Plant Conservation, Ministry of National Resources. 2000. 1-1 pp.
[24] UNEP, op. cit. 36-55 pp.

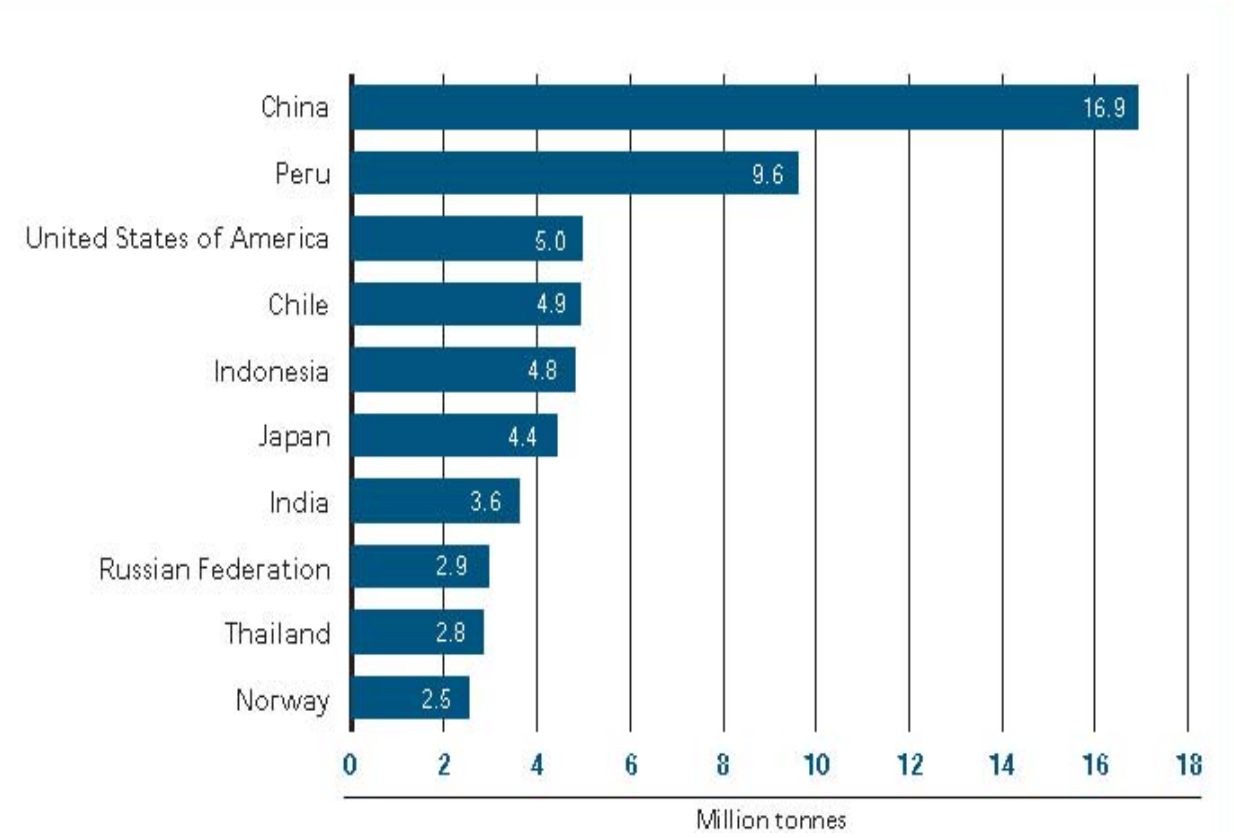

Figure 2: Marine and Inland Capture Fisheries: Top ten producer countries in 2004

Source: FAO, World review of fisheries and aquaculture. 8-8 pp. *In* The State of World Fisheries and Aquaculture SOFIA-2004. 127 p.

1. In the Thai territorial sea and EEZ

The production and value of Thai fisheries from marine, freshwater or inland capture fisheries, coastal aquaculture and fresh water culture from 1994-2004 is shown in the Table 1 below.

Table 1: Production and value of fishery production of marine capture, inland capture, coastal aquaculture, and freshwater aquaculture during 1994-2004

Year	Marine Capture		Inland Capture		Coastal Aquaculture		Freshwater Aquaculture	
	Production (mil tons)	Value (mil USD)	Production (mil tons)	Value (mil USD)	Production (mil tons)	Value (mil USD)	Production (mil tons)	Value (mil USD)
1994	2.804	908.4	0.203	120.1	0.346	1,024.0	0.170	102.2
1995	2.827	1,129.6	0.192	115.0	0.358	1,026.0	0.196	132.2
1996	2.786	1,170.4	0.208	124.9	0.326	1,050.7	0.229	169.6
1997	2.680	1,178.4	0.205	128.9	0.300	1,260.0	0.200	148.9
1998	2.709	1,209.5	0.202	192.2	0.368	1,538.2	0.227	173.8
1999	2.725	1,211.1	0.206	180.5	0.441	1,766.6	0.253	198.8
2000	2.774	1,235.0	0.202	175.6	0.467	2,315.1	0.271	210.8
2001	2.632	1,343.0	0.203	176.2	0.534	1,714.3	0.280	232.0
2002	2.644	1,459.4	0.198	157.3	0.660	1,416.0	0.294	274.7
2003	2.651	1,604.2	0.198	176.7	0.703	1,187.9	0.361	329.6
2004	2.635	1,574.4	0.204	190.7	0.736	1,262.8	0.524	495.2

Source: DOF, Thailand. Fishery Policy Directions of Thailand, Ministry of Agriculture and Cooperatives, Bangkok, August 2006. 3-3 pp.

Marine fisheries in Thailand developed and expanded due to the use of new fishing gears and technologies, movement of fishing fleets into new fishing grounds, improvement of fishing vessels and development of support facilities and infrastructure. The Thai fisheries industry is one of the ten largest in the world. Fishery output is more than 90% marine fish. Marine fisheries capture grew rapidly from 1.3 to 2.6 million tons during the period 1970-1987. During 1994-1996, the total capture productivity of Thailand reached a peak of 2.8 million tons and dropped slightly to 2.6 million tons in the following year. The Gulf of Thailand contributed approximately 70% of this total catch, while the Andaman Sea accounted for the remainder (Figure 3).

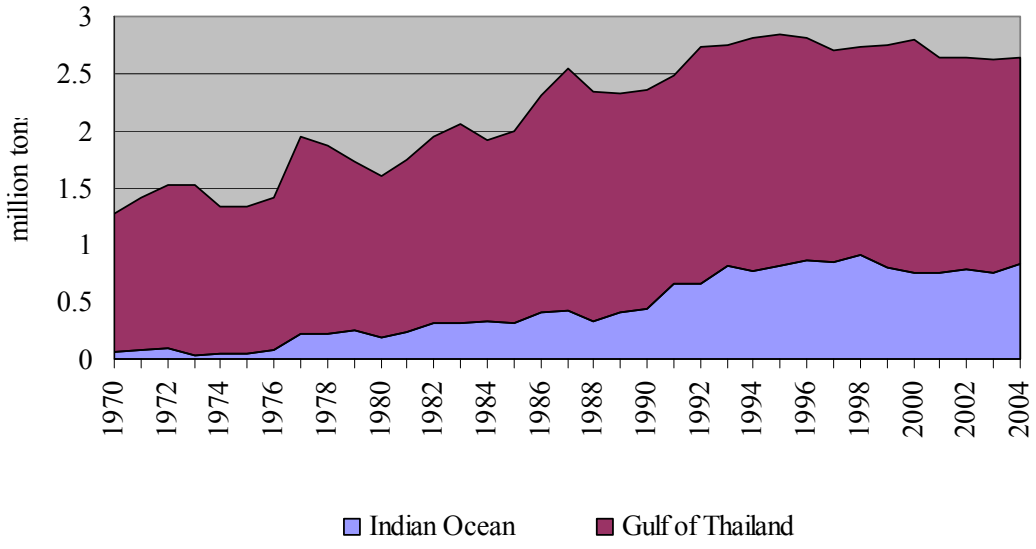

Figure 3: Thailand capture fisheries production (including inside and outside Thai's EEZ)

Source: FAO, "Thailand Capture" Capture Fisheries Production. FAO data base. 2005.;
DOF, Thailand. Statistic on Fisheries Production 2004. Ministry of Agriculture and Cooperatives, Bangkok. 2006. 31-33 pp.

The composition of the total catch of 2.6 million tons includes pelagic fish (33%), trash fish[25] (30%), demersal fish (18%), cephalopod (7.5%), miscellaneous fish (7%) and crustaceans (4.5%) (Table 2).

Table 2: Catch and percentage of Thai marine capture by category in 2004

Category	Catch	
	Ton	%
TOTAL	2,635,969	100.0
Pelagic fish	878,254	33.0
Demersal fish	482,949	18.0
Cephalopod	200,041	7.5
Crustacean	119,526	4.5
Miscellaneous fish	181,674	7.0
Trash fish	771,723	30.0

Source: DOF, Thailand. Statistic on Fisheries Production 2004, Ministry of Agriculture and Cooperatives, Bangkok. 2006. 31-33 pp.

Marine catch in Thailand is classed as tropical, multi-species and can be categorizes into five main groups of pelagic fish, demersal fish, Cephalopod, and Crustacean as described below.

(a) Pelagic Fish

Pelagic resources are mainly exploited by using various types of purse seine nets, drift gillnets, encircling gillnets, lift nets and other surrounding nets. They can be divided into three groups according to size of pelagic fish: small, medium and large.[26] In the past, Indo-Pacific mackerel (*Rastrelliger brachysoma*) or "Pla Tu" was the most popular for Thai

[25] "Trash fish" refers to the catch of large or small size uneatable fish (true trash fish) and small size of commercial fish (false trash fish). Trash fish will be processed to be fishmeal or used to feed in fish aquaculture farming.

[26] S. Chullasorn. Status of fisheries resources along the Andaman Sea coast of Thailand. *In* Nickerson DJ (ed.) 1998: Communities Based fishery management in the Phang –Nga Bay. Thailand. Proceeding of the National Workshop on Communities Based management organized by the Department of Fisheries of Thailand. FAO and the Bay of Bengal Programme, Phuket, Thailand, 14-16 February 1996. FAO Bangkok. RAP Publication 1998/3 (BOBP) Report No. 78: 72-84 pp.

consumers. In 1971, catch of Indo-Pacific mackerel was about 100,000 tons.[27] However, the development of improved pelagic fishing gear and techniques, especially light luring, contributed to the increasing catch of small pelagic fish and squid. In 2004, pelagic fish catch comprised mainly of anchovies (19%), Indo-Pacific mackerel (18%), sardinellas (14%), scad (11%), longtail tuna (9%), eastern little tuna (6%), trevallies (6%), big-eye scad (5%), Indian mackerel (4%), king mackerel (3%), hardtail scad (2%), wolf-herrings (1%) and the other retain (2%) were black banned king fish, mullet, pomfret and threadfin (Table 3). While the cephalopod accounted for 7.5% of the total marine catch.[28]

Table 3: Composition of pelagic fish in Thailand, 2004

Category	Catch	
	Ton	%
TOTAL Pelagic fish	878,254	100
Anchovies	163,237	19
Indo-Pacific mackerel	160,398	18
Sardinellas	119,901	14
Scad	100,355	11
Longtail tuna	81,531	9
Eastern little tuna	54,887	6
Trevallies	50,867	6
Big-eye scad	40,741	5
Indian mackerel	34,889	4
King mackerel	26,238	3
Hardtail scad	17,077	2
Wolf-herrings	12,910	1
Others	15,223	2

Source: DOF, Thailand. Statistic on Fisheries Production 2004, Ministry of Agriculture and Cooperatives, Bangkok. 2006. 31-33 pp.

[27] FAO, "Thailand Fisheries Capture 1970-2003" in Statistic of Capture Fisheries Production.1-1 pp.
[28] DOF, Thailand. Statistic on Fisheries Production 2004. Ministry of Agriculture and Cooperative, Bangkok. 2006. 31-33 pp.

Most of these pelagic resources are overfished, and Indo-pacific mackerel (*Rastrelliger brachysoma*) have been fully exploited since 1984 in the Gulf of Thailand. Analysis based on purse seine fishing effort, has estimated a maximum sustainable yield (MSY) of 105,000 tons and an optimum fishing effort of 145,000 fishing days.[29] The catch of this species decreased during the period 1990-1991. Sardines (*Sardinellars spp*.) have been over exploited since 1988 (estimated MSY of 104,000 tons and an optimum fishing effort of 190,000 purse seine fishing days). The anchovy (*Stolephorus spp*.) resource has likewise been fully exploited since 1990 (estimated MSY of 104,000 tons and an optimum fishing effort of 53,000 purse seine fishing days). The small tuna and round scad stocks have also been fully exploited since 1988 and 1977 with the estimated MSY at 86,000 and 100,000 tons, respectively. Other pelagic fish stocks including the Spanish mackerel (*Scomberomorus commersoni*), carangids and hardtail scad (*Meggalaspis spp*.) have not been fully exploited.[30] In 1991, the Thailand Development Research Development Institute (TDRI) analyzed the sustainable and actual fish yields in Thai waters and reported that the sustainable yield was 400,000 tons and the actual yield was 559,502 tons. It indicated the pelagic overfishing in the Gulf of Thailand was 139.90% (Table 4).

Table 4: Sustainable and actual fish yields in Thai waters in 1991 (tons)

Area	Fish Category	Sustainable Yield (i)	Actual Yield (ii)	Overfishing [(i)/(ii)*100]
Gulf of Thailand	Pelagic	400,000	559,502	139.90%
	Demersal	750,000	1,261,185	168.20%
Andaman Sea	Pelagic	50,000	166,628	333.30%
	Demersal	200,000	491,292	245.60%

Source: TDRI. *Natural Resources Management in Mainland Southeast Asia*, 1995. 36 p.

[29] M. Supongpun. 1996. Marine Capture Fisheries of Thailand. Thai Fisheries Gazette, 49(2) March-April 1996: 154-162 pp.
[30] Ibid.

Historically the pelagic fisheries in the Andaman Sea have been less intensively developed than fisheries in other areas of Thailand. Because of this there has been a gradual mechanization of fishing gear, vessel improvement, and migration of fishers from the Gulf of Thailand to the Andaman Sea. There has also been a considerable increase in the pelagic fish production since 1985, as shown in Figure 4. The total pelagic catch has exceeded the level of 100,000 metric tons each year since 1987, with a catch peak in 1994 (0.31 million tons). According to a 1991 TDRI report, the sustainable and actual pelagic yields in the Andaman Sea were 50,000 and 166,628 tons respectively. The report indicated that pelagic species are overfished by 333.30% in the Andaman Sea (Table 4).

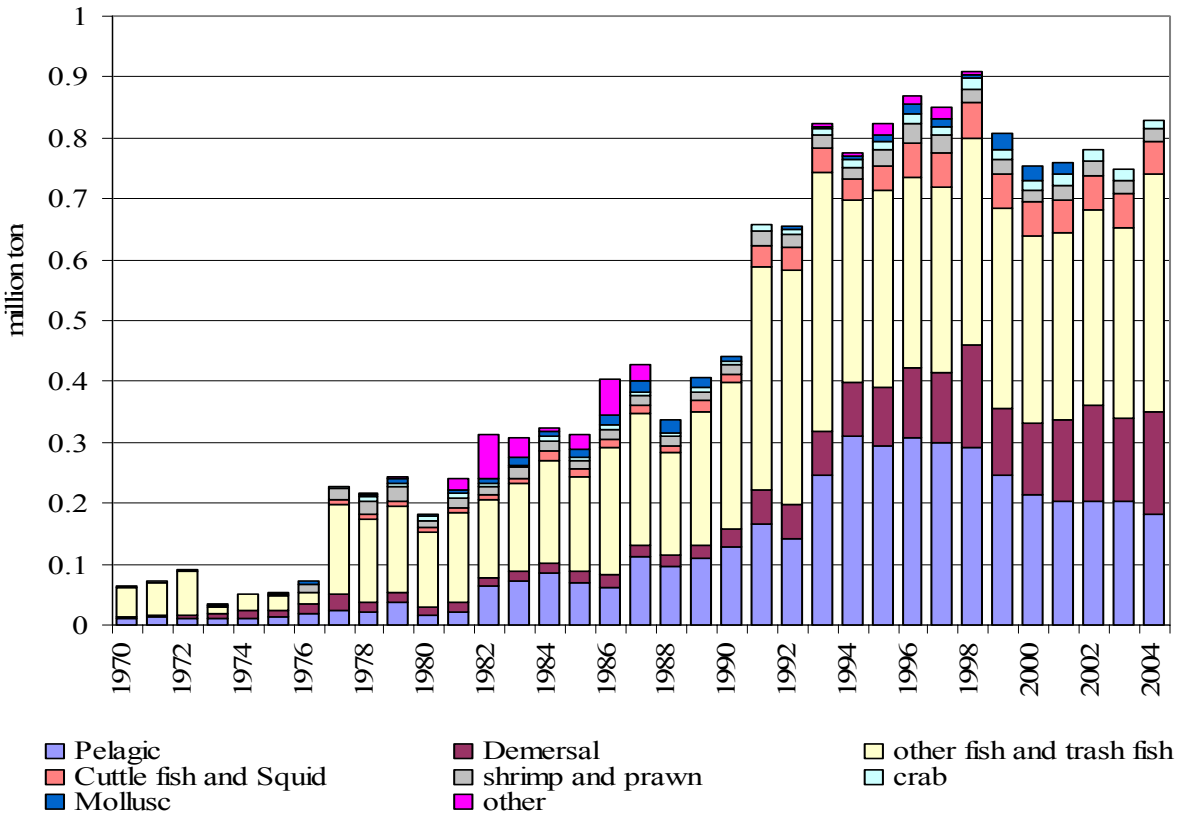

Figure 4: Thailand capture fisheries production (Andaman Sea)

Source: FAO, "Thailand Capture" Capture Fisheries Production. FAO data base. 2005.
; DOF, Thailand. Statistic on Fisheries Production 2004. Ministry of Agriculture and Cooperatives, Bangkok. 2006. 31-33 pp.

(b) Demersal Fish

Demersal resources are the fish that live on or in closed proximity to the sea bed. Demersal fish are mainly caught by various sizes of otter board and pair trawls, beam trawl and push net. More than 300 species have been caught and commercially utilized. More than 30% is trash fish which is comprised of non-edible species, edible species of low commercial value and juveniles of commercial important species. The demersal fish resources in Thai coastal waters have been severely depleted, as shown by estimates of potential yield of various fish stocks, the change in catch composition toward smaller size fish and low value species.[31] On the other hand, the previously low values of fish or trash species that were not directly consumed in the past have been upgraded and directly consumed and increasing in value.

The demersal resources (including trash fish) in the Gulf of Thailand have been over-fished since 1973 with an estimated MSY of 750,000 tons and optimum fishing effort at 8.6 million hours of trawling.[32] According to a 1991 TDRI report, stocks were overfished by 168.20% (Table 4). Five dominant species in trawl catch (i.e. *Priacanthus tayenus*, *Nemipterus hexodon*, *Saurida undosquamis*, *Saurida elongate* and *Metapenaeus affinis*) were over-exploited at the 1991 fishing level.[33]

According to a Marine Fisheries Division (Department of Fisheries) of Thailand report, the estimated MSY for the demersal fish in the Andaman Sea is 17,700 tons and optimum fishing effort is estimated at 357,646 days of trawling. For the dominant species in trawl catch, Threadfin breams (*Nemipterus spp*.), estimated MSY is 3,500 tons and optimum fishing effort is estimated at 323,945 days of trawling. It indicated that the demersal resources in the Andaman Sea coast were also consistently over-exploited at the current level of fishing.[34] According to a 1991 TDRI report, MSY was 200,000 tons while the actual yield was 491,292 tons. The stocks were overfished by 168.20% (Table 4).

---

[31] W. Janekitkosol *et* al, op. cit. 915-956 pp.

[32] T. Panayotou, and Jetanavanich, S. The economic and management of Thai marine fishes. International Center for living Aquatic resources Management, Manila, Philippines and Winrock International Institute for Agriculture Development, Arkansas, USA. ICLARM Studies and Review. 1987. 14 p.

[33] D. Menasveta. 1997 (cited as Supongpan, 1996). Fisheries management frameworks of the countries bordering the South China Sea. RAP Publication 1997/33. FAO Regional Office for Asia and the Pacific, Bangkok. 151 p.

[34] DOF, Thailand. Marine Fisheries Division, The Seminar Report on the Resuscitate of the Thai Marine Resources (in Thai). Kung Krabane Bay Development Education Center, Chataburi Province. 1993. 79 p.

In 1966, the Andaman Sea Fisheries Research and Development Center (AFRDEC) conducted a monitoring survey in Phang-nga Bay and adjacent areas using the research vessel R. V. Pramong 3. The CPUE of demersal resources was 238.9 kg/hr. It decreased to 105.3 kg/hr. in 1971, 64.6 kg/hr. in 1978 and to a rather consistent average of 37.5 kg/hr. during the period 1987-1988.[35] Recently, AFRDEC conducted a monitoring survey along the Andaman Sea Coast with the research vessel R. V. Pramong 4 (before and after tsunami on December 26th, 2004), the average CPUE for the demersal resources in November 2004 was 63.5 kg/hr. and included 36% of fish for direct consumption, and 42% of small commercial fish, and 22% of trash fish. The average CPUE of the demersal resources in January 2005 was 58.35 kg/hr. and included 37% of fish for direct consumption, and 60% of the small commercial fish, and 3% of trash fish.[36]

(c) Cephalopod

In Thailand, the marine capture of cephalopod is categorized into two groups: squid and cuttle fish and molluscs.

The squid and cuttle fish in Thai waters consists of 10 families, 17 genera and over 30 species.[37] During the period 1977-1978, small trawlers were replaced with squid light luring purse seiners. Fishing gears have changed from cast nets to falling nets, lift nets and scoop nets, while the electric powers of light lures were increased to 20 – 30 Kw. At the same time, traps were developed for fishing big fin squid and cuttle fish.[38] As a consequence, the catch of squid and cuttle fish in the Gulf of Thailand and the Andaman Sea increased from 33,800 and 300 tons respectively in 1970 to 111,808 and 51,697 tons in 2004 (Table 5). The 2004 catch composition for squid and cuttle fish was composed of 45% squid, 42% cuttle fishes and 13% octopus.[39]

---

[35] S. Chullasorn. 1998. op. cit. 72-84 pp.

[36] AFRDEC, Post Tsunami Assessment and Fisheries of Marine Resources along the Andaman Sea Coast of Thaialnd Fisheries Journal. 2006. Vol. 58 No. 6. 519-531 pp.

[37] C. Chottiyaputta. Cephalopod Resources of Thailand. Recent advances in Cephalopod fisheries biology. 1993. 69-78 pp.

[38] See The more important species of the squid fisheries are *Loligo chinensis*, *L. duvauceli*, *L. singharensis*, *L. edulis*, *Sepioteuthis lessoniana*; the cuttle fishes; *Sepia pharaonis*, *S. aculeata*, *S. recurvirostra*, *S. lysidas*, *S. brevimana* and *Sepiella inermis* and the octopus; *Octopus membranaceous*, *O. dollfusi* and *Cistopus indicus*. DOF. Evolution of Fishing Gear in Thailand [in Thai], Marine Fisheries Research and Development Bureau. Marine Fisheries Research and Technology Development Institute. Bangkok. 2006. 4 p.

[39] DOF, Thailand. Statistic on Fisheries Production 2004. Ministry of Agriculture and Cooperatives, Bangkok. 2006. 31-33 pp.

Within the Mollusks category, the main species captured are scallop, blood cockle and short necked clam. Bottom dredge gears are used for this fishing. These kinds of fishing gears damaged the fishing grounds and sea floor thereby rapidly decreasing the potential production of the fishing ground. In the Gulf of Thailand, the mollusk catch decreased from 210,000 tons in 1971 to 36,218 tons in 2004 (Table 5).

The mollusks capture from the Andaman Sea fluctuates. The lowest catch was 130 tons in 1991. The highest catch was 27,374 tons in 1999 and the catch was 318 tons in 2004 (Table 5).

(d) Crustaceans

Although shrimp, prawn and crabs compose only 4.5 % of the total marine capture in 2004, it accounted for 21% of the total value. The more important crustacean fisheries included banana prawn, tiger prawn, king prawn, school prawn, flathead lobster, mantis shrimp, swimming crabs and mud crabs.[40]

In the Gulf of Thailand, the penaeid prawns (*Penaeus spp*.) have been overexploited since 1982 (MSY of 22,000 tons and optimum fishing effort of 25 million hours). The small size shrimp (*Trachypenaeus spp*. and *Metapenaeopsis spp*.) have also been over-exploited with estimated MSY of 110,000 tons and an optimum fishing effort of 44 million hours.[41]

In the Andaman Sea shrimp, and prawn are mainly caught by gill nets, pair trawl, and beam trawl. Crabs are caught by traps and net. The catch increased from 2,879 tons in 1975 to 13,923 tons in 1976 and has slightly increased since then to a peak catch of 45,942 tons (Table 5).

[40] DOF, Thailand. Statistic on Fisheries Production 2004, Ministry of Agriculture and Cooperative, Bangkok. 2006. 31-33 pp.
[41] M. Supongpun. op. cit. 154-162 pp.

Table 5: The catch of Cephalopod and Crustaceans from the Andaman Sea and the Gulf of Thailand during 1970-2004

Year	Cephalopod				Crustaceans	
	Squid & Cuttle fish		Mollusks			
	The Gulf of Thailand	The Andaman Sea	The Gulf of Thailand	The Andaman Sea	The Gulf of Thailand	The Andaman Sea
1970	33,800	300	191,320	-	75,900	2,200
1971	37,200	300	210,010	-	83,000	2,400
1972	72,500	300	81,300	-	82,350	2,900
1973	61,000	300	35,580	-	128,600	4,200
1974	63,700	900	28,060	-	118,800	1,000
1975	64,806	1,042	48,949	1,250	125,936	2,879
1976	62,899	1,053	67,211	5,159	121,929	13,923
1977	84,321	9,373	32,642	667	146,159	20,163
1978	85,034	8,620	27,525	673	141,197	29,083
1979	70,820	9,322	35,772	6,596	127,140	29,913
1980	65,416	6,897	46,730	3,476	140,819	19,321
1981	72,707	8,098	78,604	3,628	148,089	24,103
1982	108,614	7,993	118,113	5,886	187,437	20,935
1983	122,731	9,313	62,425	9,628	155,926	22,032
1984	113,835	15,434	97,136	6,981	129,006	22,262
1985	103,777	12,258	123,927	11,773	118,528	19,926
1986	121,332	13,583	119,283	8,984	133,591	24,780
1987	120,046	12,492	162,518	9,642	146,121	22,227
1988	113,564	10,679	151,959	16,762	130,447	21,641
1989	126,540	16,383	109,628	13,655	129,823	23,275
1990	119,091	15,981	104,998	7,916	126,507	21,216
1991	120,281	34,121	75,849	130	138,307	35,931
1992	113,893	36,422	90,446	4,136	130,648	30,505
1993	114,004	39,233	64,684	2,738	135,404	32,412
1994	109,031	35,405	53,577	5,082	141,162	31,040
1995	115,810	40,587	40,727	10,818	142,578	41,506
1996	115,966	57,217	54,986	18,334	141,213	45,942
1997	116,277	57,371	42,876	11,630	133,716	43,403
1998	130,554	57,602	62,949	6,227	113,869	40,264
1999	119,742	54,640	52,196	27,374	100,635	40,775
2000	120,483	56,972	69,266	23,189	110,240	34,814
2001	112,925	52,465	36,946	19,115	94,302	42,684
2002	126,318	58,512	34,509	299	84,528	41,717
2003	119,925	55,460	53,518	298	100,033	41,827
2004	111,808	51,697	36,218	318	83,455	36,071

Source: FAO, "Thailand Capture" Capture Fisheries Production. FAO data base. 2005.; DOF, Thailand, Statistic on Fisheries Production 2004. Ministry of Agriculture and Cooperatives, Bangkok. 31-33 pp.

2. Fishing outside the EEZ of Thailand

(a) EEZs of other coastal States

Thailand lost access to some 300,000 miles^2 of ocean fishing grounds after establishment of EEZs by neighboring coastal States in 1977-1978.[42] Soon after the delimitations, during 1983-1985, some Thai fishers still fished in the EEZs of those coastal States and consequently incidents of Thai fishing boats caught because of encroachment have been reported. The number of Thai fishing boats caught increased during 1986-1995 because of the stronger enforcement of those coastal States. Since 1996, arrests have decreased because of the stricter enforcement of those coastal States and also the joint fishing venture procurance (Table 6). The reasons that Thai fishers transgress into the EEZs of other coastal States is due to the high potential for the boats. Some Thai fishers can not adapt themselves to the EEZs of other coastal States. The intense fishing and effect of overexploitation of the inner Thai waters led the fishers to operate in the EEZs of other coastal States. The fishers accept the risk of arrest by neighboring countries because they want to fish in those areas.

The other complicated situation is that the EEZ declarations of Thailand, Vietnam and Cambodia created overlapping EEZs in the Gulf of Thailand[43] (Figure 5). To solve the dispute, Thailand and Vietnam signed the Agreement on the Delimitation of the Maritime Boundary in the Gulf of Thailand, on 9 August 1997.[44] However at this time, there are no resolutions about the overlap EEZs in Gulf of Thailand between Thailand and Cambodia, and between Thailand, Vietnam and Cambodia.[45] Thus the fishers still do not know where the borders of EEZs are between the countries.

---

[42] See United Nations, the legislations and treaties of Myanmar, Vietnam, Cambodia, Philippines and Malaysia; Myanmar; Territorial Sea and Maritime Zone Law, 1977, Pyithu Hluttaw Law No. 3 of 9 April 1977; available from <http://www.un.org/Depts/los/LEGISLATIONANDTREATIES/PDFFILES/MMR_1977_Law.pdf>; Vietnam; Statement on the Territorial Sea, the Continuous Zone, the Exclusive Economic Zone and the Continental Shelve of 12 May 1977; available from <http://www.un.org/Depts/los/LEGISLATIONANDTREATIES/PDFFILES/VNM_1977_Statement.pdf>; Cambodia; Statement Issued by the Spokesman of Ministry of Foreign Affairs of 15 January 1978; available from <http://www.un.org/Depts/los/LEGISLATIONANDTREATIES/PDFFILES/KHM_1978_Statement.pdf>; Philippines; Presidential Decree No. 1599 of 11 June 1978 establishing an Exclusive Economic Zone and other proposes; available from <http://www.un.org/Depts/los/LEGISLATIONANDTREATIES/PDFFILES/PHL_1978_Decree.pdf> and Malaysia; Proclamation of the Economic Zone of 25 April 1978; available from <http://www.un.org/Depts/los/LEGISLATIONANDTREATIES/PDFFILES/MYS_1978_Proclamation.pdf>.

[43] Mom Ravin, "Law of the Sea: Maritime Boundaries and Dispute Settlement Mechanisms," (New York: United Nations-Nippon Foundation Fellowship on the Law of the Sea, 2005).

[44] United Nations, Thailand, Maritime Boundary Delimitation Agreements and other Materials. (cited 31 April 2007); available from <http://www.un.org/Depts/los/LEGISLATIONANDTREATIES/STATEFILES/THA.htm>.

[45] P. Kemakorn. "Sustainable Management of Pelagic Fisheries in the South China Sea Region," (United Nations – The Nippon Foundation Fellow New York, November, 2006).

Table 6: Thai boats and crews arrested by neighboring countries, 1983-2004

Year	Vietnam		Myanmar		India		Indonesia		Bangladesh		Malaysia		Cambodia		Australia		Total	
	boat	crew	boat	crew	boat	crew	boat	crew	boat	crew	boat	crew	boat	crew	boat	crew	boat	crew
1983	38	238	33	378	2	35	2	31	1	18	9	99	10	12	-	-	95	811
1984	21	101	4	30	2		1	19	-	-	6	44	-	-	-	-	34	194
1985	39	366	16	148	2		4	19	-	-	1	18	43	43	-	-	105	594
1986	7	135	24	412	14	233	-	-	1	22	53	357	-	-	-	-	99	1,159
1987	30	508	35	379	4	67	3	69	1	27	83	894	7	7	-	-	63	1,951
1988	36	269	33	427	-	-	6	91	-	-	60	627	-	-	-	-	35	1,414
1989	51	973	36	582	1	10	24	395	-	-	71	927	-	-	-	-	183	2,887
1990	67	1,340	38	512	15	209	7	142	1	22	117	1,156	-	-	-	-	245	3,381
1991	108	1,686	28	377	3	55	-	-	1	25	95	1,062	5	60	-	-	240	3,265
1992	42	683	72	490	-	-	13	168	2	35	57	442	-	-	-	-	186	1,818
1993	82	794	44	734	22	208	31	310	6	100	55	399	-	-	-	-	240	2,545
1994	98	990	115	100	5	66	-	-	2	40	84	737	-	-	-	-	304	1,933
1995	42	379	117	118	3	38	8	48	10	69	82	549	-	-	-	-	262	1,201
1996	42	303	82	19	1	14	11	110	-	-	27	179	12	120	-	-	175	745
1997	16	69	99	183	2	26	21	256	7	76	25	153	7	30	4	120	181	913
1998	5	61	62	29	8	38	42	193	-	-	36	136	11	95	-	-	164	552
1999	-	-	23	5	1		63	1,346	3	5	27	334	4	1	-	-	121	1,691
2000	1	15	50	11	12	22	9	140	10	15	20	123	-	-	-	-	102	326
2001	7	48	48	15	9	37	23	399	2	6	23	115	-	-	-	-	112	620
2002	9	97	23	11	2	7	17	170	-	-	22	176	-	-	-	-	73	461
2003	11	11	17	n	2	18	4	n	-	-	11	25	-	-	-	-	45	54
2004	n	n	18	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
2005	n	n	8	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
2006	n	n	3	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n
2007	n	n	7	n	n	n	n	n	n	n	n	n	n	n	n	n	n	n

n: data not available

Source: DOF, Statistic of Thai boats and crews arrested by neighboring countries during 1983-2004 (in Thai). 2006. 1-1 pp.; Wudhichai Wangkahart, Chief of Ranong Marine Fisheries Station, Department of Fisheries. Personal communication. 25 July 2007.

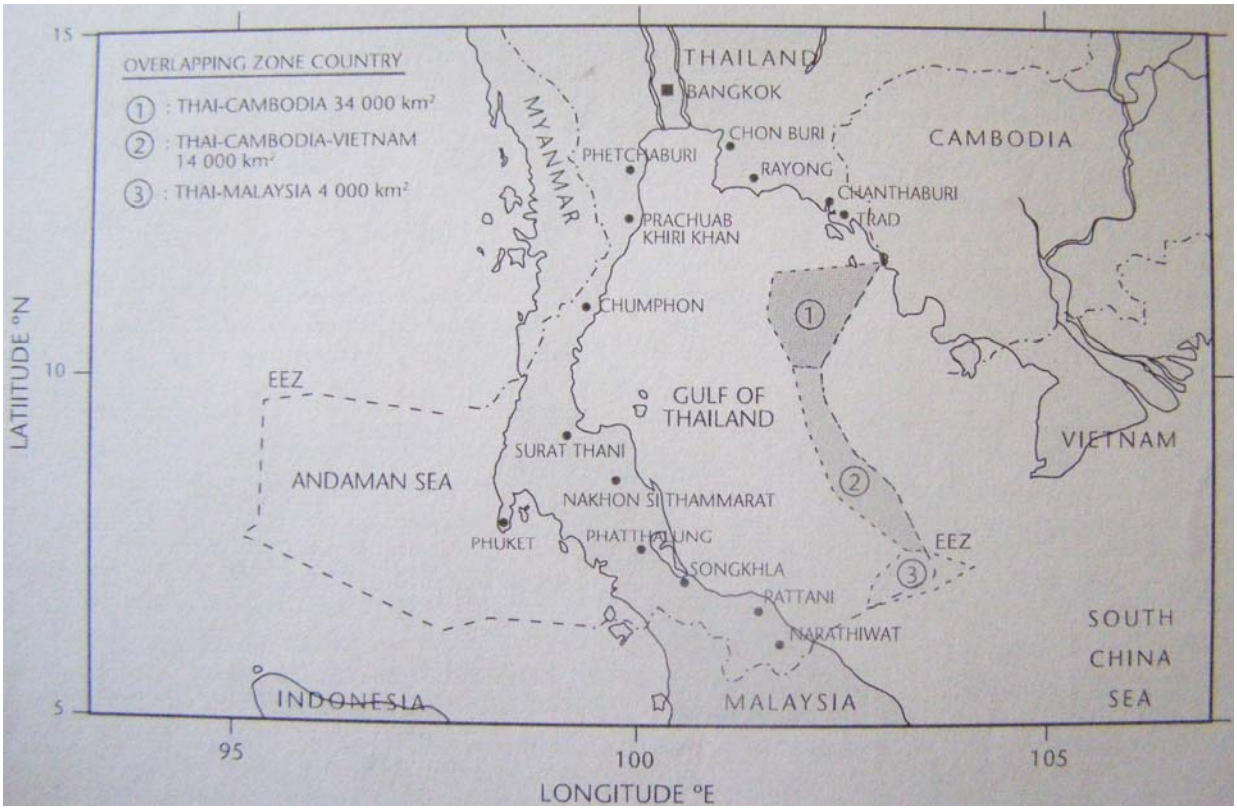

Figure 5: Overlapping of Thailand's EEZ with those of neighboring countries

Source: W. Janekitkosol, Somchanakij, H., Eiamsa-ard, M., and Supongpan, M., "Strategic Review of the Fishery Situation in Thailand" 915-956 pp. *In* G. Silvestre, I Stobutzki, M. Ahmed, R.A. Valmonte-Santoa, C. Luna, L. Lachina-Aliño, P. Muńro, V. Christensen and D. Pauly (eds.) Assessment, Management and Future Direction for Coastal Fisheries in Asian Countries. WorldFish Center Conference Proceedings 67, 1: 120 p.

At present, there are about 4,000 Thai vessels operating in the EEZs of others coastal States of which over 2,000 have licenses. To overcome the effect of EEZs and boundary disputes with neighboring countries, the Thai Government has to find new fishing grounds for those vessels and promote private joint fishing ventures with foreign States aimed at alleviating the problem of limited fishing sources. This approach is being done in the waters of Indonesia, Malaysia, Bangladesh, Australia, India, Vietnam, Cambodia, Madagascar and Myanmar.[46] At the same time, it is necessary for Thailand to control Thai fishers who seek to fish in the EEZs of other coastal States without authorization, installation a Vessel

[46] Ministry of Foreign Affairs, Thailand. (cited 9 June 2007); available from <http://yuwathut.mfa.go.th/business/page67.php?id=7251>

Monitoring System (VMS)[47] in fishing vessels and penalties for violations should be an effective method that should be conducted.

(b) High Sea Fisheries

Thai tuna purse seine fisheries started in 2000 - 2001 with only one purse seiner. The annual catch was 1,530 tons in 2000 and 763 tons in 2001. It was not successful and ended. In 2005, six new purse seiners operated and their annual catch was 11,937 tons (Table 7)

Thai tuna longline fisheries have started in 2000 by only two vessels and increased to six vessels in 2005, the annual catches shown in Table 7.

Table 7: Annual catch by Thai tuna vessels

Year	Catch (tons)	
	Purse Seiner	Longliner
2000	1,530	385
2001	763	387
2002	-	94
2003	-	253
2004	-	514
2005	11,937	280

Source: IOTC, nominal catch database ([cited 31 April 2007]); available from <http://www.iotc.org/English/data/databases.php>.

There is a deep-sea fishery potential on the western coast of Thailand, in the Indian Ocean. Thailand is a member of the Indian Ocean Tuna Commission (IOTC) since 1997 and started operating deep sea tuna fisheries in 2000. At present, Thailand has 15 tuna vessels

[47] Vessel Monitoring Systems (VMS) are used in commercial fishing to allow environmental and fisheries regulatory organizations to monitor, minimally, the position, time at a position, and course and speed of fishing vessels. They are a key part of monitoring control and surveillance (MCS) programs at the national and international levels. VMS may be used to monitor vessels in the territorial waters of a country or a subdivision of a country, or in the EEZ of coastal States.

fishing in the Indian Ocean including six purse seiners, six longliners and three research-training vessels.[48]

Thailand has supported the tuna fisheries investment that aimed to find the raw material to supply tuna canning factories. Thailand is now among the top exporting canned tuna countries in the world, but it must import about 80% of the raw material.[49] Thailand is still at an initial stage in tuna fisheries. Acquisition of gear and modern fishing technology is needed, and it involves high initial investments. Only new private investors have expressed interest as it is difficult for the present fishers to adapt their boats and equipments for fishing in high sea fishing grounds.

Thailand fisheries are operated inside and outside its EEZ. There are two marine fishing grounds inside the EEZ: the Gulf of Thailand and the Andaman Sea. The distinct and remarkable development of marine capture fisheries in its EEZ since 1970s has resulted not only in an increase of fishery production, leading Thailand to became among the top ten exporting countries in the world, but at the same time a decline of living resources. Catch and CPUE in its two main fishing grounds has decreased and reached the status of overfished for some time. Some fish supply that helps Thailand maintain its fisheries exports also comes from fishing conducted outside Thai EEZ. The fisheries take place both which in the EEZs of other coastal States and in the high sea. However, the freedom to fish in the waters near neighboring coastal States no longer exists with the establishment of the EEZ regime in those States. Thus, there is a high potential for Thai boats to come back to fish within Thai waters. Thailand has to find alternative choices of income or find the new fishing grounds for those fishers such as joint fishing venture with other coastal States.

Even if there is a high potential for developing a fisheries in the high sea, especially tuna fisheries in the Indian Ocean, such fisheries are only for new investors can invest large capital. It is not a choice for present fishers. However, the developments of the high sea fisheries in Thailand help to support the fish canning factories which need a large supply to maintain fisheries economic.

Thailand has to rehabilitate the marine resources in its EEZ urgently and also balance the utilization and conservation of the marine resources both in its EEZ and elsewhere.

---

[48] IOTC, Record of Authorized Vessel 2007, Thailand, as October 2007. 2007. 1 p.

[49] Ministry of Foreign Affairs, Thailand. Thailand's Seafood Production. Division of Economic Information, Department of Economic Affairs. Bangkok, 2004. 5 p.

Part III Status of the Fisheries of the Andaman Sea Coast of Thailand

A. Introduction

The Andaman Sea is part of the Bay of Bengal Large Marine Ecosystems (LMEs).[50] The Andaman Sea contains one of the largest barrier reefs in the Indian Ocean and biologically rich in both diversity and abundance.[51]The coastal waters are rich in nutrients and two sources for these nutrients have been identified. The northern part, from Ranong to Phuket Provinces, is influenced by deep-sea upwelling processes of nutrient-rich deep-sea water; whereas the waters in the southern part are influenced by surface water runoffs transporting nutrient-rich freshwater into the coastal areas.[52] There is a high level of species diversity of copepod communities,[53] macrobenthic fauna, polychaeta, Crustaceans, Mollusca, Echinodermata, Chordata and other living organisms.[54]

The Andaman Sea coast is marked by mangrove forest and seagrass meadows distributed along the coastal belt. Large mangrove forests are the main habitat structure along the coast.[55] On the northern stretch, the mangrove coverage ranges from 218 to 367 million m^2,

[50] Large Marine Ecosystems were defined by Sherman and Alexander as "region of ocean space encompassing coastal areas from river basins and estuaries on out to the seaward boundary of continental shelves and the seaward boundary of coastal current systems. They are relatively large regions on the order of 200,000 km^2 or larger, characterized by distinct bathymetry, hydrography, productivity, and trophically dependent population" in K. Sherman and L. M. Alexander, Variability and management of large marine ecosystem (Boulder, Colorado: Westview Press, 1986) see also L. M. Alexander, "Large Marine Ecosystem: A New focus for Marine Resources Management ," *Marine Policy* 17 (1993): 186-198; and K. Sherman, " Sustainability, Biomass Yields, and Helth of Coastal Ecosystem: An Ecological Perspective," *Marine Ecology Progress series* 112 (1994): 277-301; for a description of the Bay of Bengal see Aziz Ahmad, H.B., Luqueman, A., Atapattu, A., Chullasorn, S., et al, 1998. Regional stewardship for sustainable marine resources management in the Bay of Bengal. *In*: K. Sherman, E. Okemwa and M. Ntiba (eds), "Large Marine Ecosystems of the Indian Ocean: Assessment, Sustainability, and Management" Blackwell Science.

[51] World Wildlife Foundation (WWF), Andaman Sea-A Global Ecoregion. 2006. 1 p.

[52] V. Janecarn, Chullasorn, S. Environmental impacts on coastal fisheries along the west coast of Thailand. In: *Asia-Pacific Fishery Commission (APFIC): Environmental aspects of responsible fisheries*. Proceedings of the APFIC Symposium Seoul, the Republic of Korea, 15-18 October 1996. FAO Bangkok. RAP Publication 1997. 1997/32: 222-233 pp.

[53] S. Satapoomin, Torkel G. Nielsen, Per J. Hansen. Otto Kinne (editor). Oldendorf/Luhe, Germany International Ecology Institute, Nordbünte 23. Marine ecology progress series. Vol. 274. 24 June. 99-122 pp.

[54] U. Seenprachawong. An Economic Analysis of Coral Reefs in the Andaman Sea of Thailand. Output *Research Reports* of research projects supported by the Economy and Environment Program for Southeast Asia (EEPSEA), 2001. 42 p.

[55] U. Satapoomin, and Sombat, P. Fish fauna in the mangrove and Seagrass beds in the West Cost of Thailand, the Andaman Sea, Phuket Marine Biological Center. 1997. Technical Paper No. 2: 36 p.

whilst the southern stretch of mangrove areas ranges from 265 to 315 million m^2. The seagrass meadows along the coast cover an area of 79 million m^2.[56]

Fishes inhabiting mangroves and seagrass beds in the west coast of Thailand total 280 species, belonging to 75 families, of which 232 species (69 families) and 149 species (51 families) were found in mangrove and seagrass habitats, respectively. One hundred and one species (36%) were common to both habitats.[57]

This high biodiversity of the Andaman Sea is encountered from genes to individuals to species, habitats, and ecosystems. The coral reefs, mangroves, sea grass beds, marine lakes and deep sea valleys of the region form a constellation of diverse habitats that support a spectacular variety of flora and fauna.[58] The concentration of the resources attracts people to live along the coast and depend on them to earn their living.

B. Social Structure of Fisheries Communities in the Andaman Sea Coast

There are 23 coastal Provinces surrounding the two main fishing areas. They are divided into five internal administrative coastal fisheries zones; four zones in the gulf of Thailand (17 Provinces) and the six Provinces along the Andaman Sea coast are ranked in the fifth zone (Figure 6).

The five coastal zones are taken responsible by Marine Fisheries Research and Development Bureau which has five branch Marine Development Centers. These centers work on marine resources surveying and research, rehabilitating of fishing grounds, fishing gear development study on marine life history, stock assessment, and all relevant data that supports marine fisheries administration and policy. The five Centers form a network and share data which is compiled so as to establish a complete picture of the marine fisheries status along the cost of Thailand.

In addition, the Administrative and Fisheries Management Bureau, through its five branches centers and patrol service vessels (for inspect the illegal fishing and awareness) are responsible for activities related to marine protections.

[56] U. Seenprachawong, op. cit. 42 p.
[57] U. Satapoomin, and Sombat, P. Fish fauna in the mangrove and Seagrass beds in the West Cost of Thailand, the Andaman Sea, Phuket Marine Biological Center. 1997. Technical Paper No. 2: 36 p.
[58] WWF, Andaman Sea Ecoregion. Geographic location: Andaman and Nicobar Islands (India), Indonesia, Malaysia, Myanmar and Thailand. International Coral Initiative. 2007. 2 p.

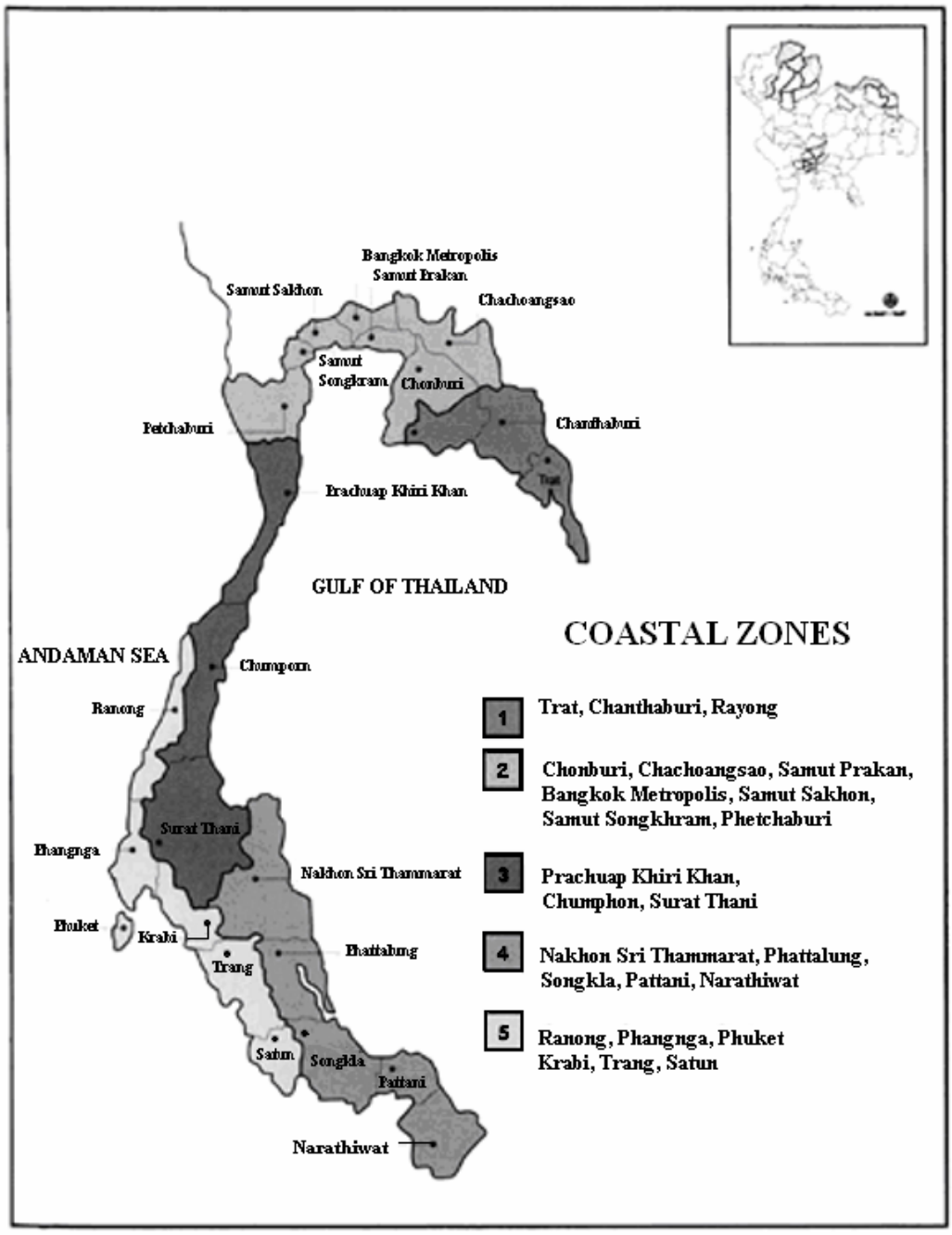

Figure 6: Provinces in the five coastal zones of Thailand

Source: National Statistic Organization (NSO). Province in the five coastal zone of Thailand. *Marine Fishery Census*1995, *Whole Country*. *In* A. Pornachit Koseiporn. Fishing communities in Thailand. FAO, Regional office for Asia and the Pacific. Bangkok. 2000. 10-10 pp.

In 2005 the population in the six Provinces along the Andaman Sea coast was 2.03 million (Table 8). Approximately one percent of the populations are fishers.[59] The number of fisheries establishment is 20,703. The number of fishers during peak season is over 47,000 including about 30,000 family members and about 18,000 employees. The 2005 GDP of Thailand was estimated at USD 176.6 billion baht,[60] and fisheries account for 2.5% of the total GDP.[61] Total Gross Provincial Product of the six Provinces is USD 4754.8 million and the GPP for fisheries is 482.5 million or 9.85% of the total GPP. The GPP per capita is USD 2,335 (Table 8).

Fisheries have led to the development of related business concerns such as fishing ports, ice plants, freezing and processing factories (Table 9) and created employment not only for the local people but also for migrant workers, both Thai and foreign. In 2000 there were over 7,600 foreigners, most of them from Myanmar, working in Ranong (Table 10), the frontier Province. In addition there were also undocumented migrant workers, with the highest percentage in Ranong Province (5.48%) and the lowest in Satun Province (0.08%) (Table 11).

Approximately 34% of the fishers have other parallel occupations, mostly in agriculture, such as in rubber orchards and the raising of livestock, but others are involved in small retail businesses with some working as employees.[62]

[59] FAO, Thailand: Fishers and fish farmers. FAO data base. 2005.
[60] World Bank, Total GDP 2005, World Development Indicators Database. 2006. 1-1 pp.
[61] P. Flewwelling and Hosch, G. op. cit. 175-186 pp.
[62] S. Panjarat, Sumontha, M. and K., Loychuen. 2005. Fishermen's Attitude on Conservation Measure of Phang-Nga Bay during Spawning Season. Technical Paper no. 13/2005. Marine Fisheries Research and Development Bureau, Department of Fisheries, Ministry of Agriculture and Cooperatives. 11-11 pp.

Table 8: Number of fisheries establishment, fishing boat and fishers during peak season in the Andaman Sea coast

Province	Population[63]	Total village[64]	Total households[65]	Fisher villages[66]	No. of fishery establishment[67]	No. of fishers during peak season[68]			GPP[69] (mil lion baht)	GPP for fisheries [70](million baht)	GPP/capita[71]
						Total	Family member	Employee			
Total	2036,000	1,883	470,942	621	20,703	47,537	29,820	17,699	191,239	19,406	93,929
Ranong	183,000	162	48,744	59	2,279	6,471	3,051	3,402	14,412	4,439	78,856
Phang-Nga	237,000	311	65,419	132	4,667	9,382	6,964	2,418	24,613	2,569	104,053
Phuket	292,000	90	78,413	66	962	4,131	1,256	2,875	50,229	2,900	171,823
Krabi	402,000	372	92,442	116	4,908	9,205	7,502	1,703	32,663	1,253	81,282
Trang	642,000	685	127,695	132	3,789	8,459	4,739	3,720	48,878	3,948	76,165
Satun	280,000	263	58,229	116	4,098	9,889	6,308	3,581	20,444	4,297	73,026

[63] Office of National Economic and Social Development Board (NESDB), Thailand. Population (2005[cited 31 April 2007]); available from <http://www.nesdb.go.th/econSocial/macro/gpp_data/index.html.>

[64] Ministry of Interior, Thailand. General Data by Province (2005[cited 16 May 2007]); available from <http://webcmoi.moi.go.th/reports/report45rpt/menu45rpt-6.html>.

[65] Ibid.

[66] H. Sielert and SangChan S. Small scale fisheries in Southeast Asia: a case study in southern Thailand, FAO Regional Asia and the Pacific, Bangkok, Thailand. RAP Publication. 2001/19. 2001. 63 p.

[67] DOF, Thailand. Number of fisheries establishment, fishing boat and fishers during peak season, Excerpt of the 2000 intercensal survey of marine fisheries. 2003. 83-83 pp.

[68] Ibid.

[69] NESDB, Thailand. Gross Provincial Product at Current Market Prices (2005[cited 31 April 2007]); available from <http://www.nesdb.go.th/econSocial/macro/gpp_data/index.html.>

[70] Ibid.

[71] Ibid

Table 9: Number of fishing port, ice plant, freezing and processing factory by Province, 2004

Province	Fishing port	Ice plant[72]	Freezing[73]	Processing Factory[74]				
				Fish meal factory[75]	Canning	Fish sauce	Steaming	Smoking
Total	136	46	28	22	2	2	2	4
Ranong	60	20	9	7	-	-	-	-
Phang Nga	19	8	-	3	-	-	-	-
Phuket	5	6	10	3	-	1	-	-
Krabi	3	2	1	-	-	-	-	-
Trang	19	7	5	7	1	1	2	4
Satun	30	3	3	2	1	-	-	-

[72] DOF, Thailand. Statistic on Fisheries 2004. Table 2.2. 20-20 pp. Statistic of Fishery Factory 2004, Information Technology Center, Ministry of Agriculture and Cooperatives, Bangkok. Technical Paper 7/2006. 35 p.
[73] Ibid. Table 7.1. 18-18 pp.
[74] Ibid.
[75] Ibid. Table 7.6. 32-32 pp.

Table 10: Number of foreign workers in fisheries and coastal aquaculture by Province and nationality

Province	Nationality			
	Total	Myanmar	Cambodian	other
Total	7,664	7,561	9	94
Ranong	3,062	3,062	-	-
Phang-Nga	1,297	1,297	-	-
Phuket	1,555	1,461	-	94
Krabi	2	2	-	-
Trang	1,274	1,269	5	-
Satun	474	470	4	-

Source: NSO, Thailand. Marine fisheries census (2003 [cited 31 April 2007]); available from <http://service.nso.go.th/nso/data/data23/stat_23/toc_2/2.10-2.xls>.

Table 11: Estimate of undocumented migrant workers in the Andaman Sea Province

Province	Estimated number of undocumented migrants	%	Main activity
Total	74,168		
Ranong	27,898	5.48	fishery, pier, industry
Phang-	26,290	5.17	fishery, rubber orchard, construction
Phuket	14,000	2.75	Fishery, rubber orchard, construction
Krabi	4,550	0.89	palm orchard, rubber orchard, construction
Trang	1,000	0.20	fishery, construction, labor, factory

Source: Y. Chalamwong. "An estimate of undocumented migrant workers in Thailand" paper prepared for a project study on the management of undocumented migrant workers in Thailand, TDRI. 1996. 16-16 pp.

In 1996, the average household size of all six Provinces is was five members. The smallest average household size was found in Phang-Nga Province, the biggest in the southernmost Province, Satun. The average size of a fishery-employee household was 4.4 members. The smallest households, with 4.0 members, were again found in Phang-Nga, and the largest in Satun, with 4.8 members.[76] Data collected in October 2003 confirmed this. The interview of 100 fishing households along the Andaman coast found that the average size of fishing household was 4.8 members[77] compared with the 5.0 members officially reported in 1996.

The average number of years of schooling of Thai nationals is 7.2 and their average literacy at 90.8%.[78] Approximately 10% of fishers in the 6 Provinces have lower elementary school, 71% have completed elementary school and only 19% have completed upper primary school.[79]

Most of present Thai fishers do not want to see their children pursue fishing as an occupation because, in their opinion, it is hard work with uncertain income and unhonored. They thus try to support their children's education as long as they can. However, according to the size of family, it means approximately three children in each family, together with uncertainty income and lack of social security, children, especially from small scale fisheries family, have their education limited only to primary or secondary school. Some of the children who attended upper primary school must drop out prior to completion because of insufficient funds. For this reason, the opportunities for education are limited and the poverty cycle within the fishing communities unbroken. It can't help the children involving in fisheries occupation follow their parents. It is the compasses tragedy for the small scale fishers.

Information in fisheries management and conservation is lacking among fishers, who put in long hours of fishing and are not readily available for training and outreach.[80] Thai fishers, especially small

---

[76] NSO, Thailand. Report of the 1996 Household Socio-Economic Survey. Bangkok. 1998. 47-48 pp.

[77] S. Panjarat, Sumontha, M., Loychuen, K., Pantakit, V. and Singtongyam, W. 2005. Fishermen's Attitude on Management of Blue Swimming Crab Resources in The Andaman Sea.. Technical Paper no. 14/2007. Marine Fisheries Research and Development Bureau, Department of Fisheries, Ministry of Agriculture and Cooperatives. 33-33 pp.

[78] NSO, Thailand. The 2000 Population and Housing Census- Education. (2000[cited 31 April 2007]); available from <http://web.nso.go.th/eng/indicators/educat_e.htm>.

[79] S. Panjarat, *et.* al. 2005. Fishermen's Attitude on Conservation Measure of Phang-Nga Bay during Spawning Season. op. cit. 52 p.

[80] Ibid.

scale fishers, are similar to farmers in having less opportunity to obtain a formal education due to low average income[81] and are often classified as being part of "backward communities".[82]

C. The Structure of Fisheries in the Andaman Sea Coast

1. The Nature of Fisheries

The fisheries in Thailand are an open access resources that means the condition where access to the fishery (for the purpose of harvesting fish) is unrestricted: the right to catch fish is free, limitless and open to all.

In Thailand DOF is responsible for licensing fishing gear while the Department of Harbours registers the vessels and operators. The DOF licenses only main fishing gears that have a significant impact on the fishery, such as: trawls, purse seines, gillnets, trammel nets while many other fisheries remain unlicensed and virtually unrecorded.

As shown in Table 12, the most varied kind and highest number (821) of registered fishing gear were in Satun Province. In Ranong, there were 256 registered fishing gears, the most common is the otter board trawl (81) followed by Spanish mackerel gill nets (69). In Phang-Nga, there were 330 registered fishing gears, the most common is the Squid trammel net (77) followed by Squid falling net (63). In Phuket, there were 283 registered fishing gears, the most common is the pair trawl (136) followed by otter board trawl (52). In Krabi, there were 127 registered fishing gears and the most common is the Squid falling net (45) followed by Surrounding net (33). And in Trang, there were 393 registered fishing gears, the most common is Otter board trawl (303) followed by Surrounding net (53).

[81] J. Pimoljinda. Coastal fisheries management in Phang-Nga Bay. Proceeding of the Regional Workshop on Coastal Fisheries Management Based on Southeast Asian Experiences, 19-22 November 1996, Chaing Mai, Thailand. 1997. 4 p.
[82] S. Chullasorn. op. cit. 72-84 pp.

Table 12: Number of important fishing gear unit along the Andaman coast of Thailand registered by Province, 2004

Fishing gear	Total	Provinces					
		Ranong	Phang-Nga	Phuket	Krabi	Trang	Satun
Total	2,210	256	330	283	127	393	821
Beam trawl	73	-	-	11	-	-	62
Otter board trawl	552	81	28	52	-	302	89
Pair trawl	178	4	-	136	-	-	38
Surrounding net	289	46	58	23	33	53	76
Anchovy surrounding net	112	5	33	12	13	-	49
Anchovy falling net	98	-	17	11	2	6	62
Indopacific Mackerel encircling net	2	-	-	1	-	-	1
Squid falling net	234	36	63	30	45	18	42
Push net	6	4	-	-	-	-	2
Shrimp trammel net	258	-	27	-	-	2	229
Squid trammel nets	107	-	77	-	28	2	-
Crab gill nets	171	2	9	-	-	1	159
Spanish mackerel gill nets	83	69	5	2	6	-	1
Other gill nets	47	9	13	5	-	9	11

Source: DOF, Excerpt of the 2000 intercensal survey of marine fisheries, Number of fishing boat registered by size total gross tonnage and by Province. Thai Fishing Vessel Statistics, Fishery Information Technology Center, Ministry of Agriculture and Cooperatives. Technical paper No. 1/2006. 112 p.

The size boats with fishing gear licensed by the DOF ranges from less than 14 meters to more than 25 meters in length. The boats can be categorized into non power boats, outboard power boats and inboard powered boats. Only inboard power boats are registered by the Department of Harbours, thus only 1,744 boats of a total of 2,254 boats with licensed fishing gear are registered. The highest number of non-power boats is in Trang and lowest in Phuket. Krabi has the highest number of out board

powerboats but the lowest number of inboard power boats while the highest number of inboard power boat is in Satun Province (Table 13).

However, the number of registered fishing gear and boat is not an actual number. The separately register boat and gear is the weak gap for the fishers to use the registered boat to fish with illegal fishing gear. Fishing gears like push netter[83] has a severe impact on sea bed and thus is classed as illegal fishing gear. The license will be not extended after expiration. But, in fact some fishers stilled fish without license. It means the registration number is underestimated and does not reflect the exact fishing effort.

The fisheries in Thailand are an open access resource, as noted previously, fishers exploited grounds that are not only in Province in which their boat or gear is registered. Fishers have freedom to fish all along the coast of Thailand. Trawlers that dominate in Phuket do not operate only in Phuket but also in the adjacent areas or Provinces such as Phang-Nga or Krabi, and they land their catch in the closest fishing port. In general, fishing vessels from the Andaman Sea rarely fish in the Gulf of Thailand. On the other hand, fishing vessels from the Gulf of Thailand often fish in the Andaman Sea, especially during the closed period in the Gulf. The movement of fishing boats induces more competition between fishers, particularly between the fisher from the Gulf of Thailand and the local fishers, as well as higher fishing efforts to exploit fisheries resources in the limited areas resulting in a decrease in CPUE. Furthermore, statistical data collection and stock assessments are complex and difficult to obtain due to the movement of boats. Marine fisheries resources management has never been effective without exact data on fishing effort or based on in-sufficient statistical data.

DOF freeze the number of fishing vessels by cooperating with the Department of Ports and Harbors to stop registration of new fishing boats. But as described above, the registered boats may be use to fish with illegal fishing gear. So, both the fishing boat and gear should be controlled together. In addition, freezing number of boats is not a sufficient measure because the present number of fishing boats is excessive and consistently overexploiting the resource. DOF also should decrease the number of fishing boats until the optimum capacity of fishing effort is reached for a sustainable population of fish.

[83] Push netter is the fishing gear that consists of a net and two poles to keep the net open. The net is pushed by an engine-driven boat which can be any size between long-tail boats and larger.

Table 13: Number of boats licensed fishing gear by length, number of fishing boat by engine and number of registered fishing boat by gross ton

Province	No. of boat licensed fishing gear [84]					No. of fishing boat by engine[85]				No. of registered fishing boat by gross ton [86]							
	Total	<14 (m)	14-18 (m)	19-25 (m)	>25 (m)	Total	Non-powered boat	Outboard powered boat	Inboard Powered boat	Total	<5	5 - 9	10 - 19	20 - 49	50 - 99	100 - 199	200 - 499
Total	2,254	966	510	759	19	21,156	1,458	17,954	1,744	2,254	483	172	396	680	473	45	5
Ranong	269	31	91	146	1	2,420	156	2,040	224	269	4	1	47	97	102	18	-
Phang-Nga	335	210	81	44	-	4,806	237	4,428	141	335	39	85	101	86	23	1	-
Phuket	301	49	110	140	2	964	28	691	245	301	7	10	54	147	77	6	-
Krabi	129	78	36	15	-	4,971	373	4,507	91	129	3	31	57	27	11	-	-
Trang	397	34	89	258	16	3,816	563	2,931	322	397	3	6	35	164	169	15	5
Satun	823	564	103	156	-	4,179	101	3,357	721	823	427	39	102	159	91	5	-

[84] DOF, Excerpt of the 2000 intercensal survey of marine fisheries, Number of fishing boat registered by size total gross tonnage and by Province. Thai Fishing Vessel Statistics, 80-80 pp. Fishery Information Technology Center, Ministry of Agriculture and Cooperatives. Technical paper No. 1/2006. 112 p.
[85] Ibid. 83-83 pp.
[86] Ibid. 85-85 pp.

Fishing in the Andaman Sea coast of Thailand can be divided into commercial fisheries and small scale fisheries. Commercial fishing refers to those using inboard power boats of over 10 gross tons. Small scale fishing refers to fishing without boats, or using non-power without engines, or outboard powered and inboard powered boats of less than 10 gross tons.

(a) Commercial fisheries

Commercial fishery refers to fishing activity using inboard power boats of over 10 gross tons. Commercial fishing utilizes highly efficient fishing gear and has the capacity to fish offshore and spend one or several days offshore during each fishing trip. It utilizes fishing ports and usually uses ice or freezers to preserve catches. There are various kinds of commercial fishing gear registered with the DOF as shown in Table 12. The common fishing gears are medium to large size trawls, purse seines, encircling gillnets and large driftnets. Among them, trawls and purse seines play an important role in fishing. Fishing techniques are developed and adapted including the use of light luring techniques, Fish Aggregating Devices (FADs) and modern gear equipped with sonar and echo sounders.

In general, commercial boat owners have more than one boat, and some also own a private fishing port and at the same time play the role of middle men[87] and investors. In Ranong, Phang-Nga, Phuket, Trang and Satun Thai fishing masters are hired for fishing operations and most of the crews are from Myanmar; in Krabi both fishing master and crews are Thai. The fishing boats from the Ranong Province operate both in Thai waters, Thai-Myanmar boundary waters and some of them have licenses to operate in Myanmar water concessions areas. Some of fishing boats from Satun Province have two flags of registration, that of Thailand and that of Malaysia, so they can operate in both States' waters.

Crew size varies depending on the size of the boat and range between 8-17 on an individual trawler, and approximately 18-40 on a purse seiner. The crews receive both salary and a percent of the profit. For the purse seine fisheries, the profit will be shared each moon cycle. For the trawler, a percent of profit will be shared after six months, one year or longer.

[87] Middle men refer to traders who buy fish directly from fishers at the landing site then sell it to fish markets or other buyers at a higher price. Some middle men also give loans to small fishers, the fishers who own only one boat or have a small amount of liquid capital, and then buy back catch from these fishers at a controlled price.

Most crews never know the exact total profit or how it is calculated. It absolutely depends on the owner. One thing is certain, if crew members quit early they will not get the share. This means the owners or investors take advantage of the crews for their own benefit.

Catches are sold to the port owner, investor, and middleman or by auction at landing sites which are private or semi-government fishing ports. Fishing costs are higher following the increasing of fuel prices while the catch is less and uncertain. For the smaller fishers, when they have no catch or during the monsoon season, they have to take a loan to maintain their business, to support the crews and to repair fishing gears and boats. Bigger fishers, who have many boats or related businesses such as fishmeal factories, ice processing plants and so on, may leverage cash flow to maintain fishing operations. Several types of commercial fisheries (otter board trawl, purse seine and push net) are operated at a financial loss. Fisheries operating budgets are balanced by loans or revolving funds from related business.[88]

(b) Small scale fisheries

Small scale fishery refer to fishing without boats or using non-power, outboard powered or inboard powered boat of less than ten gross tons. They use traditional or low efficient fishing gear, operating from fishing villages, rarely spending more than twelve hours at sea. Most small scale fishing villages are situated along the coast. The fishers generally fish inshore waters within three km from the shore. They typically employ small trawl nets, gillnets, push nets, lift nets, set bag nets, traps, hooks and lines and other stationary gear operating in estuaries, Phang-Nga Bay, Krabi bay and in nearshore waters along the cost. As previously noted, only the main fishing gears are registered with DOF, while many other fisheries remain unlicensed and virtually unrecorded, most of them making use of small scale fishing gears.

Most of the fishers own more than one type of fishing gear for alternative use in different fishing grounds and seasons. The crews are comprised of one to three family members and/or one to three hired crew members. The greatest cost (more than 50%) is for fuel. In most fishing villages situated along the coast in rural areas, the fuel prices are higher than in urban areas. The amount of catch and income is uncertain, especially in the monsoon season when the fishers

[88] M. Boonyaratpalin, 2002. New concept for Thai marine capture fisheries management. Department of Fisheries, Ministry of Agriculture and Cooperatives, Thailand. 108 p.

must suspend their activities for a long time. Some fishers find themselves in a situation where they must take a loan from a middleman to maintain their living, to invest or repair the boats and gears. Fish catch has to be sold back to the middleman who controls the price and as a result of this more than 70% of fishers are in debt.[89]

According to the Ministerial Notifications 2515 (1972), there are reserved zones within three km. from shoreline for nursing juvenile fish and invertebrate. Within the zone, only the small scale fishing can be operated, the commercial fisheries or fishing gear used with the motorized fishing boat are prohibited.[90] But there is continuing illegal encroachment by commercial fisheries. Small scale fishers have lost their traps, nets and other small scale fishing gears by illegal acts of commercial boat. So, there are conflicts between them. Some commercial boat owner lease the boats (only by document) to fishing masters, thus they can claim it back immediately when it is caught by patrols for fishing in prohibited areas or being involved in illegal fisheries. Because of limited budget, only limited inspection by patrol service vessel are possible, thus small scale fishers believe the regulation is not effective and that the Government is not committed to arresting the violators.

The production of fisheries resources by the small scale fisheries sector is important: small scale fisheries comprise on average about 16.5% of the marine fisheries production but are valued at about 26.6%. This means the majority of marine resources available to the small scale fisheries operating in inshore waters are economically important species.[91] However, the marine resources exploited by the small scale fishing gear operating inside three km from shore use a very small mesh size net. For example, in 2004, the size of banana prawn caught by small scale fisheries in Ranong Province was smaller than the mature size.[92]

---

[89] S. Panjarat, *et* al. Fishermen's Attitude on Management of Blue Swimming Crab Resources in The Andaman Sea. op. cit. 13-13 pp.

[90] DOF, Book of Fisheries Law, (in Thai). 2004. 111 p.

[91] S. Chullasorn. op. cit. 72-84 pp.

[92] P. Aosomboon, Keawnern U., and Rithisaman J. 2004. Coastal Fisheries in Ranong Province. Andaman Sea Fisheries Research and Development Center. Marine Fisheries Research and Development Bureau. DOF. Technical Paper no. 2/2004. 31 p.

2. Stress Factors and Problems

(a) Tsunami

The 2004 tsunami of 26 December 2004 affected hundreds of thousands of people. Nearly 500 fishing villages along the Andaman coast were seriously affected, about 30,000 households dependent on fisheries have lost their means of livelihood. The impact of the tsunami was amplified in fishing communities because it occurred during the moon period when many purse seiners and other light luring fishing boats had stopped fishing and were in port. Over 10,000 fishing boats and 7,000 fishing gears were destroyed or damaged.[93] Exact data on fishers, fishing boats and fishing gears is lacking because only main fishing gears and boats with inboard power engines are registered, as previously noted. There were many unregistered fishing boats and gears for which compensation was claimed.[94] The highest number of unregistered small boats, less than 10 m, was in Phang-Nga (1,585) followed by Phuket (671) and Krabi. The highest number of unregistered big boats, larger than 10 m, for which compensation was claimed were in Ranong (142) followed by Phang-Nga (43) and Phuket (28) (Table14). However, many larger scale fishers may not have reported losses because they do not require compensation, i.e. the amount offered is quite limited compared with their losses and therefore not worth the administrative paperwork to make the claim.

---

[93] AFRDEC, Data of Tsunami Recovery & Rehabilitation for Fisheries Sector in Thailand. Post Tsunami Assessment and Fisheries of Marine Resources along the Andaman Sea Coast of Thailand. Thailand Fisheries Journal. Vol. 58 No. 6. 519-531 pp.

[94] Typical documentary evidence required for compensation is the vessel registration document, or permission to fish document (in date). Since the majority of vessels that have been damaged or lost are in the small scale category, very few actually have registration documents. In this case alternative evidence of ownership may be considered or used as supporting evidence:

- Statement of ownership by the Provincial fisheries Office (stating the boat is repairable or beyond repair)
- Document of guarantee from a fishers association, farmers group, or fishery cooperative stating the owner is a member, or
- Sub-district headman (Gamnan)
- Guarantee document from the village headman may be accepted
- Record in the fishery survey, there are several categories of loss that are eligible for compensation:
  i) Support for the recovery of a vessel (i.e. refloatation, or movement of the vessel – since many have been swept some distance inland above the high tide mark).
  ii) Support for repairs to a damaged vessel
  iii) Compensation for vessel loss (or damaged beyond repair)

Table 14: Fisheries damage to fishing vessels, fishing gears, fishing ports caused by Tsunami and compensated by the DOF

Province	No. of damaged boats							No. of damaged gear			Fishing port
	Total	< 10 m			>= 10 m			Total	Registered gear	Unregistered gear	
		Total	Registered boat	Unregistered boat	Total	registered boat	unregistered boat				
Total	7,462	6,568	2,986	3,582	894	669	225	6,998	1,918	5,080	60
Ranong	840	536	218	318	304	162	142	97	-	97	25
Phang-Nga	2,564	2,195	610	1,585	369	326	43	1,150	313	837	24
Phuket	1,246	1,070	400	670	176	148	28	761	319	442	6
Krabi	1,264	1,246	611	635	18	11	7	1,694	1,286	408	-
Trang	870	869	540	329	1	0	1	1,646	-	1,646	-
Satun	678	652	607	45	26	22	4	1,650	-	1,650	5

Source: DOF, Summary of Fisheries Damages Caused by Tsunami. Fishery Information Technology Center, Ministry of Agriculture and Cooperatives. December 2005. 1-1 pp.

The tsunami damage in the fisheries sector was very substantial but the Government, semi-Government, private sector, NGOs and international organizations mobilized to help both in terms of funding and fishing materials. Even the exact change in the number of boats and gears before and after tsunami is not clarified yet but it shown increasing in many areas after tsunami.

For example, in Ranong Province the data showed 840 fishing vessels and 97 gears lost due to the tsunami, DOF paid cash compensation to all boat owners (Table 7). At the same time the private sector, NGOs and other donors have replaced 1,133 boats and provided fishing gear to 1,785 people. That means a replacement rate ratio of 1.35 boats for every boat lost and a gear replacement ratio of 2.125 per vessel lost.[95] Not all of the donated boats are used for fishing, some of them are used in the tourism or aquaculture sectors, but donated fishing gear is absolutely be used for fishing.

This new increase in fishing capacity has lead to concerns[96] because the increased number of fishers might induce more competition and severely impact both marine resources and fishers. Due to the overfished nature of the Andaman Sea Fisheries as described above, those fishers who were assisted in restarting their fishing livelihood, while benefiting by re-engaging in fishing, will in the long term earn less than they did before the tsunami.[97] So, the assistance given with good intentions will unintentionally harm the fisheries resources and have long term negative impacts on the sustainability on fisher livelihoods.

(b) Fuel crisis

Fuel is the main cost factor in the fishing business. The amount of fuel used depends on the kind of boats, engines and gears utilized. Since 2001, because of the fuel crisis, DOF has assisted the fishers by subsidizing fuel through two projects: The Green Fuel Program and the Purple Fuel program.

---

[95] B. Crawford, Trip Report January 7-19, 2006, Post tsunami Sustainable Coastal Livelihood Program. 1-11 pp.
[96] The Worldfish center stated with thoughtful concern the rehabilitation of area after tsunami that should be sustainable and long term basis. *In* "Rebuilding Boat may not Equal Rebuilding Livelihood" The WorldFish Center, Consortium to Restore Shattered Livelihoods in Tsunami-Devastated Nations, Policy Brief No. 1. 4 p.
[97] B. Crawford, op. cit. 1-11 pp.

The Green Fuel Program supplied fuel for the commercial boats since 2001. It is tax free and supplied by the companies' tankers which are licensed by Government and operate in the continuous zone (12-24 nm). There are about 10,000 boats participating in the program, with an average fuel supply over 1,700 million liters per year.[98] Another reason of supply the Green fuel to fisheries is to prevent the operation of illegal fuel suppliers at sea.

The Purple Fuel Program provides a special grade of fuel that contains lower sulfur dioxide and is appropriate only for boat engines. It has been supplied to small scale fishers by tankers on land and available at a lower cost than the normal price of fuel at two baht per liter, instead of the normal fuel.[99]

In the current climate, fishers have to adapt fishing methods to reduce their cost. For the commercial fisheries, fishers select fishing areas more carefully and compare the value of worthwhile fishing in far away or nearby fishing grounds. They utilize more effort at each fishing area to make sure that they have enough catch. Purse seiners use more light luring and FADs. The individual light boats were set in the sea while the fishing boats only to fish at light boats sites. They operate more net sets on each trip, while the distances between settings areas are reduced. For trawlers, the fishers haul every hour instead of every three to four hours, and when there is less catch, they move to other fishing grounds. The fishing days are longer and the catches are carried by other boats which land before the fishing vessel.[100] In 2007, some commercial fishers from Krabi who could not maintain their business had resigned from fisheries.[101] Moreover, there are some more commercial fishers that proposed to resign, especially the fishers who have small amounts of liquid capital, but they could not sell their boat because nobody would by them during the fuel crisis. So, some fishers had to remain in fisheries because they were in debt.

In the small scale fisheries, the fishers select fishing areas more carefully and put in more effort on each trip to make sure that they have enough catch. For example, fishers increase net sets from three sets to six sets per trip, while the distances between sets are reduced. In addition, more than one type of fishing gear is used on each trip. For instance, they set blue swimming

[98] National Fisheries Association Thailand, Number of Vessels in the Green Fuel Project. Bangkok. 2007. 1 p.
[99] "DOF have arranged to provided fuel purple at landing site" Manager, 1 June 2550, sec. I, 5-5 pp.
[100] AFRDEC. The fuel crisis impact to fisheries along the Andaman Sea coast. Surveying during 31 August- 31 October 2006. Phuket. 11 p.
[101] Thumawadee Jaiyen, Fisheries Biologist, monthly fisheries survey, Andaman Sea Fisheries Research and Development Center, Phuket, personal communication. 15 July 2007.

crab traps then set shrimp gill nets and then return to haul the traps. Some fishers row their boats when setting gear or if there is supported wind so as to save fuel.[102] Recently, DOF succeed in designing a sail that can be used with long-tail boats and is accepted enthusiastically by fishers and boat owner.

Due to the fuel crisis, there are fishers who intend to resign from the fisheries. Some small scale fishers turned to tourism because it provides more certainty income than fisheries. It might be a good opportunity for DOF to established a capacity reduction program, such as fishing boat buy back program, soft loan or pawn for changing occupation (i.e. fisheries aquaculture, planting, tourism). In addition to this DOF must consider the most effective measures to prevent them from returning to fisheries at latest stages. The boats which have been bought backed might be destroyed or used in other sectors. Although the fishing boat buy back programs would come at a very high cost for the Government, they are a very direct and effective method of decreasing fishing capacity.

(c) Violation of regulations and illegal fishing

The violation of regulations by fishers involves both entering in prohibited areas and using illegal gear in Thai waters and the EEZs of other coastal States. As note previously (Table 6), fishers from Ranong Province encroach into waters of Myanmar to fish without licenses. From January 2004 to April 2007, 36 boats arrested by Myanmar.

In coastal waters, there are widespread violations of regulations, including fishing during closed periods, the use of illegal mesh sizes and the destruction of fish habitats such as mangroves, seagrass beds and coral reefs. The most common illegal fishing gear are push netters which push a scoop net in front of a vessel driven by a high-powered long-tail motor. The second common infringement is the encroachment of fishing by commercial trawler within reserve zones, three kilometers from the shoreline, by commercial trawlers. The third is by lift-net boats, or purse seiners, which mostly fish at night using light attraction.[103] More over the FADs of purse seiners have been set illegally in some areas thus causing obstacles in maritime transportation passages.

[102] Ibid.
[103] David B. Thomson, Post-Tsunami Rehabilitation of Small-Scale Fisheries, Experiences from Thailand: 19 p.

Direct losses occurred to the small scale fishers when their fishing gears were damaged or towed away by the encroachment of commercial boats within three km. Indirect losses result from the action of commercial boats taking fish out of these waters. Fish catches from one night's operation can amount to over a ton for a purse seiner, to half a ton or more for a trawler, down to 50 to 200 kg for a push netter. At present, there are no comprehensive records of illegal fishing incidents. Official records focus on vessels actually arrested and charged with offences. The patrols focus activities in close areas and during closed seasons because of limited budgets. The numerous incidents, in which illegal operations are not confronted by the authorities, go largely unrecorded: fishing gear losses, varied from USD 50-75 per incident. Losses from fish catches taken by the illegal operations could be 2,000 tons, worth over USD 1.2 million per year, based on a low estimate of 150 kg per illegal fishing encroachment (Table 15).

Table 15: Estimated losses value cause by illegal fishing in the Andaman Sea coast of Thailand

Type of Incident	Estimated Loss
Number of illegal incursions	1 to 6 incident/village/month
Fishing gear losses	USD 50 – 75 /incident
Total gear damaged or lost	14,000 units/year
Total value torn , lost gear	USD 1.2 million / year
Fish taken illegally in 3km	50 – 250 kg /incident
Fish taken illegally / year	over 2,000 tons/year
Value of fish taken illegally	over USD 1.2 million / year
Total cost of illegal fishing	over USD 2.5 million / year

Source: David B. Thomson, Post-Tsunami Rehabilitation of Small-Scale Fisheries, Experiences from Thailand: 19 p.

As explained above, there are several factors which have contributed to the decline of fishery resources. These include overfishing by an excessive number of boats, the use of destructive gear such as trawls and push nets, destructive fishing methods such as large-scale trawling in near-shore areas and the use of push nets near coral reefs. Furthermore, there are widespread violations of regulations, such as fishing during ban periods, the use of illegal mesh

sizes and the destruction of fish habitats such as mangroves, seagrass beds and coral reefs. The inappropriate or uncoordinated policies such as protecting the fishmeal industry at the expense of losing juvenile economic fish in the process of trash fish capture,[104] fuel price subsidies or the after tsunami rehabilitation without clear co-ordination and following a coherent strategy, all contribute to the failure of fisheries management.

It is clear that fisheries problems will continue, and even worsen, with significant impact to the economy of the country and the lives of the fishers along the Andaman Sea coast especially the small scale fishers if adequate counter measures for both marine resource conservation and their utilization are not developed and implemented.

[104] Thailand Development Research Institute (TDRI). *Background Report for the Thai Marine Rehabilitation Plan 1997–200*. Bangkok, 1998. 27 p.

Part IV Fisheries Law and Policy

A. The Global Framework

1. The 1982 United Nations Convention on the Law of the Sea

The 1982 United Nations Convention on the Law of the Sea (LOSC) was adopted by the Third United Nations Conference on the Law of the Sea (UNCLOS III) in New York on 30 April 1982. The Convention was opened for signature on 10 December 1982 in Montego Bay, Jamaica and came in to force on 16 November 1994,[105] currently a 155 States have ratified the LOSC.[106]

LOSC lays down a comprehensive regime of law and order in the world's oceans and seas by establishing rules governing all uses of the oceans and their resources.[107] The LOSC embodied in one instrument traditional rules for the uses of the oceans and at the same time introduced new legal concepts and regimes, addressing new concerns, and also provided the framework for further development of specific areas of the law of the sea. [108]

The LOSC contains 320 Articles and 9 Annexes.[109] The key provisions include the evolutionary features of EEZ, High Sea, Dispute Resolution, and International Tribunal for the Law of the Sea. Coastal States were granted sovereign rights over living and non living resources in their EEZs. With coastal State establishment of EEZs, the most important part of the ocean common was removed from the regime of the high sea and placed under the jurisdiction of the coastal State.[110] It is very important matter because more than 95 % of all

[105] United Nations, LOSC, Agreement Relating to the Implementation of Part XI of the LOSC, Division for Ocean Affairs and the Law of the Sea, Office of Legal Affairs. 2001. 1-6 pp.
[106] As at 7 August 2007 United Nations, Table recapitulating the status of the Convention and of the related Agreements (2007 [cited 7 August 2007]); available from <http://www.un.org/Depts/los/reference_files/status2007.pdf>.
[107] LOSC-preamble.
[108] Ibid.
[109] United Nations, LOSC, Agreement Relating to the Implementation of Part XI of the LOSC, op. cit. 2001. 294 p.
[110] L. Juda. Rio Plus Ten: The Evolution of International Marine Fisheries Governance. *Ocean Development & International Law*, 2002. 33:109-144 pp.

commercial stocks are caught within waters under the jurisdiction of coastal State.[111] These areas are now controlled by coastal States and fishers from other States desiring to fish in those waters now require coastal State consent.[112]

The EEZ is an area beyond and adjacent to the territorial sea[113] that is not to extend beyond 200 nm from the baseline from which the breadth of the territorial sea is measured.[114] The coastal State has sovereign rights in its EEZ for exploring and exploiting, conserving and managing the natural resources whether living or non living.[115] The coastal State has jurisdiction to establish and use artificial islands, installations and structures[116] and over marine science research and the protection and preservation of the marine environment.[117]

The LOSC calls on the coastal States and other States in the region, were there are transboundary or straddling stocks and highly migratory species both within the EEZ and in an area beyond and adjacent to it, to take appropriate measures necessary for the conservation of these stocks.[118] Transboundary and straddling fish stocks are stocks of fish which migrate between, or occur in both, EEZ of one or more States and the high seas.[119] Highly migratory fish stocks are those that generally roam over large distances and maybe found in numerous EEZ jurisdictions and the high seas. Highly migratory species are defined by a listing in Annex 1 of the LOSC.[120]

The LOSC authorizes coastal States to determine total allowable catch (TACs) of the living resources in its EEZ[121] and examine its harvesting capacity and give other States access to the surplus of the allowable catch where the coastal State lack the capacity to harvest.[122] The coastal State is to regulate fishing access through proper conservation and management

---

[111] Agenda 21, 17.69.
[112] United Nations, 1993. Some High Sea Fisheries Fishing Aspects Relating to Straddling fish Stock and Highly Migratory Fish Stock. United Nations Conference on Straddling fish Stock and Highly Migratory Fish Stock, New York, 12-13 July, 1993. 2-3 pp.
[113] LOSC, art 55.
[114] LOSC, art 57.
[115] LOSC, art 56, 1.(a).
[116] Ibid. (b)(i).
[117] Ibid. (ii) and (iii).
[118] LOSC, art 63. and art 64.
[119] UNEP, UN Atlas of the Ocean. Straddling Stock. 1-1 pp.
[120] LOSC, annex 1.
[121] LOSC, art 61, 1.
[122] LOSC, art 62, 2.

measures to maintain living resources and to ensure that they are not endangered by over-exploitation.[123] It is also to maintain or restore populations of living resources at levels which can produce the MSY.[124] The effects on species associated with, or dependent upon, harvesting should be considered by the coastal State, with a view to maintaining or restoring population of such associated or dependent species above levels at which their reproduction may become seriously threatened.[125] Management measures shall also be qualified by relevant environment and economic factors that include needs of coastal fishing communities and the particular need of the developing States,[126] such as making financial contributions, demonstrating value of better management of fish stocks, structured assistance programmes that included enhancing the ability of developing States to participate in catch documentation schemes and port States regimes, and to comply with obligations to supply statistical information.

Fishers from other States, should comply with the conservation measures and conditions established in the law and regulations of the coastal State which are consistent with the LOSC and may include

> "licensing, determining the species which will be caught, fixing quota, regulating season and area of fishing, type, size and amount of gear and the type, size and number of boat, fixing age and size of fish, specifying information required, requiring fisheries research, placing observer or trainee on board, the landing of catch in the port of coastal State, term and condition relating to joint venture or other cooperative arrangement"[127]

For the provision of cooperation, the LOSC states that the coastal State and competent international organizations whether regional, sub regional or global shall exchange scientific information, catch and fishing effort statistics, and other data relevant to fishing patterns and conservation of fish stocks. All States concerned, including States where nationals are allowed to fish in the EEZ comply with the established regime.[128]

---

[123] LOSC, art 61, 2.
[124] LOSC, art 61, 3.
[125] LOSC, art 61, 4.
[126] LOSC, art 61, 3.
[127] LOSC, art 62, 4.
[128] LOSC, art 61, 2.3.5.

The LOSC establishes alternative dispute resolution instruments for settlement of disputes that might occur among the coastal States.[129] These include the International Tribunal for the Law of the Sea (ITLOS), an arbitral tribunal,[130] and a special arbitral tribunal.[131] ITLOS is open to States party, and non States party as long as all parties accept the competence of Tribunal.[132]

Thailand has signed but not ratified the LOSC, thus is not a State party.[133] Thailand claimed geographic disadvantage due to extended jurisdiction of EEZ because Thailand is both a shelf-locked and zone locked State.[134] As a consequence of the establishment of EEZs, the Thai distant-water fishing grounds have come under Malaysian, Cambodian, Vietnamese, and Indonesian jurisdiction.[135] Thailand claimed the right to fish in the areas in which it had traditionally engaged in fishing: areas now within the EEZs of other States. However, Thailand was not accepted by the other land locked or geographical disadvantage States (LL/GDS) to participate in the LL/GDS group.[136] Given the above Thailand has not clarified its concerns regarding the LOSC.

2. Agenda 21 of the 1992 United Nations Conference on Environment and Development

The 1992 United Nations Conference on Environment and Development (1992 UNCED), also known as the Earth Summit, was held in Rio de Janeiro.[137] The consensus of principles addressing the concept of sustainable development is form in provisions of the comprehensive Agenda 21. This document is a wide-ranging assessment of social and economic sectors with

---

[129] LOSC, art 287, 1.
[130] LOSC, annex VII Arbitration.
[131] LOSC, annex VIII Special arbitration.
[132] LOSC, annex VI, art 20.
[133] LOSC, art 287, 1 state that "When signing, ratifying or acceding to this Convention or at any time thereafter, a State shall be free to choose, by means of a written declaration, one or more of the following means for the settlement of disputes concerning the interpretation or application of this Convention"
[134] United Nations, UNCLOS III, Official Records, Vol. 1, July 10, 1974. 147 p. And Vol. 2, August 1, 1974.
[135] J., Mark Valencia. International conflict over marine resources in south-east Asia: trends in politicization and Militarization. 1981. 302-355 pp.
[136] Ibid.
[137] United Nations, Report of the United Nations Conference on Environment and Development. Rio de Janeiro, 3-14 June 1992. A/CONF.151/26 (Vol. I). 1-6 pp.

goals for improving environmental and developmental impact.[138]Agenda 21 stated that humans confront with a perpetuation of disparities between and within nations, a worsening of poverty, hunger, ill health and illiteracy, and the continuing deterioration of the ecosystems on which humans depend for their well-being. The integration of environment and development concerns as well as an increase in the attention paid to then, should lead to the fulfillment of basic needs, improved living standards, protected and managed ecosystems and peace which is a precondition for the global partnership for sustainable development.[139] And the governance of the ocean's living resources in the high seas and in the areas under national jurisdiction is one of the main provisions in Agenda 21.[140]

Agenda 21 is comprised of 40 Chapters. Chapter 17 addresses the problems of ocean and coastal areas,[141] contains provisions for the sustainable utilization and conservation of oceans and their living resources. The implementation of these provisions by States will also require international cooperation and coordination, including through the United Nations System, and international development bodies. Furthermore such work should benefit from and regular consideration by the United Nations General Assembly and other UN bodies competent in marine and coastal issues[142] so as to assist in the development and sharing of analytical and predictive tools, such as stock assessments and bioeconomic models,[143] effective management and enforcement[144] and the protection of ecological systems that support fish stocks.[145]

Chapter 17 identifies the problems of the high seas fisheries, including *overutilization, unregulated fishing, overcapitalization, excessive fleet size, vessel reflagging to escape controls, insufficient selective gear, unreliable databases and lack of sufficient cooperation between States*. Chapter 17 called upon States to take effective action and to cooperate in enforcement of effective conservation measures, particularly for highly migratory species and transboundary

[138] L. Juda. Rio Plus Ten. 2002. op. cit. 109-144 pp.
[139] Agenda 21, Preamble.
[140] United Nations, Report of the United Nations Conference on Environment and Development, Chapter 17, Rio de Janeiro, 3-14 June 1992. A/CONF.121/26 (Vol. II). 1-1 pp.
[141] Agenda 21, Basis for Action.
[142] Agenda 21, 17.50.
[143] Agenda 21, 17.56 (c) and 17.86 (c)
[144] Agenda 21, 17.49
[145] Agenda 21, 17.72 and 17.85

stock that move between EEZs and straddling stock that move between EEZs and the high sea.[146] Such actions include:

- Ensure that fishing activities by vessels flying their flags on the high seas take place in a manner so as to minimize incidental catch;[147]
- Monitor and control fishing activities by vessels flying their flags on the high seas to ensure compliance with applicable conservation and management rules;[148]
- Deter reflagging of vessels by their nationals as a means of avoiding compliance with applicable conservation and management rules;[149]
- Prohibit dynamiting, poisoning and other comparable destructive fishing practices;[150]
- Fully implement General Assembly resolution 46/215 on large-scale pelagic drift-net fishing;[151] and
- Reducing wastage, post-harvest losses and discards.[152]

Chapter 17 also calls on States to cooperate within the regional and global fisheries bodies[153] and to join regional high seas fisheries organizations if they have an interest in a high seas fisheries regulated by that organization.[154]

Also address in Chapter 17 are the problems of fisheries in areas under national jurisdiction including *local overfishing, unauthorized incursions by foreign fleets, ecosystem degradation, overcapitalization and excessive fleet sizes, underevaluation of catch, insufficiently selective gear, unreliable databases, and increasing competition between artisanal and large-scale fishing, and between fishing and other types of activities*.[155] Chapter 17 indicates States should:

---

[146] Agenda 21, 17.45
[147] Agenda 21, 17.50
[148] Agenda 21, 17.52
[149] Agenda 21, 17.53
[150] Agenda 21, 17.54
[151] Agenda 21, 17.55
[152] Agenda 21, 17.56
[153] Agenda 21, 17.57-17.59
[154] Agenda 21, 17.60
[155] Agenda 21, 17.71

- Develop and increase the potential of marine living resources to meet human nutritional needs, as well as social, economic and development goals;
- Take into account traditional knowledge and interests of local communities, small-scale artisanal fisheries and indigenous people in development and management programmes;
- Maintain or restore populations of marine species at levels that can produce the maximum sustainable yield as qualified by relevant environmental and economic factors, taking into consideration relationships among species;
- Promote the development and use of selective fishing gear and practices that minimize waste in the catch of target species and minimize by-catch of non-target species;
- Protect and restore endangered marine species; and
- Preserve rare or fragile ecosystems, as well as habitats and other ecologically sensitive areas.[156]

Agenda 21 makes recommendations for the future conduct and management of world fisheries. It is supplemented by global fisheries agreements such as the FAO Compliance Agreement and the United Nations Fish Stock Agreement, in the work of international fisheries bodies such as the FAO Committee on Fisheries (COFI), and in the efforts of a number of regional fisheries commissions.[157]

3. The 1993 Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas

The Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas (FAO Compliance Agreement) was adopted by the FAO in 1993 and entered in force as from 24 April 2003.[158] Currently, there are 35 parties to this agreement.[159]

---

[156] Agenda 21, 17.74

[157] L. Juda. Rio Plus Ten. 2002. op. cit. 109-144 pp.

[158] FAO, Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas - Status (November 2006 [cited 27 November 2006]); available from <http://www.fao.org/Legal/treaties/012s-e.htm>.

[159] Ibid.

The agreement is composed of 16 articles and imposes upon all States party whose fishing vessels operate on the high seas, a responsibility in respect of fishing vessels entitled to fly their flags. States are to ensure that flag State vessels are authorized to fish on the high seas and thus they operate in accordance with international conservation and management measures[160] as well and exchange information on high seas fishing and their activities.[161] It reaffirms the provisions of Agenda 21 that flag States must exercise effective control over their vessels fishing on the high seas.[162] It elaborates this obligation by requiring that all such vessels be licensed to conduct such fishing, that the licenses be conditioned on the vessel abiding by internationally agreed conservation and management measures,[163] and establishes the FAO as an archive and clearing house for information on such fishing vessels,[164] particularly those that have broken applicable rules and have been punished for it.[165] The most groundbreaking aspects of the agreement are three new rules regarding high seas fishing operations:

- Each flag State must ensure that its vessels do not engage in any activity that undermines the effectiveness of international fishery conservation and management measures, whether or not the flag State is a member of the regional fishery organization that adopted such measures;
- No vessel is to be used for fishing on the high seas without specific flag State authorization; and
- No flag State shall grant such authority to a vessel unless the flag State is able to control the fishing activities of that vessel.[166]

These three rules represent a new vision for high-seas fisheries. To abide by these rules, flag States must actively oversee the high-seas fishing operations of their vessels. They must decide on a case by case whether to authorize any vessel to fish on the high seas. Most

[160] Ibid. art III.
[161] Ibid. art VI.
[162] Agenda 21, 17.52.
[163] The FAO Compliance Agreement. art III.
[164] Ibid. art VI.
[165] Ibid. art III, 8.
[166] D. Balton. International Instrument for International Fisheries. Office of Marine Conservation U.S. Department of State. 2002. 5 p.

importantly, they may not permit any vessel to fish on the high seas at all unless they are able to prevent the vessel from undermining agreed high-seas conservation rules.[167]

The FAO Compliance Agreement is an international convention that responds directly to the recommendation made in Agenda 21[168] for action to ensure effective monitoring and enforcement of high seas fishing activities. It contains both of regulations and punishments. All States have the duty to take, or to cooperate with other States in taking the measures for their respective nationals as may be necessary for the conservation of the living resources of the high seas.[169]

4. The 1995 the United Nations Convention Agreement on Straddling Fish Stocks and Highly Migratory Fish Stocks

The 1995 Agreement on Straddling Stocks and Highly Migratory Stocks (UNSFA) was one of the concrete results to UNCED. It was adopted on 4 December 1995 in New York and entered in force on 11 December 2001.[170] Currently, there are 67 parties to their convention.[171] UNSFA contains 50 articles and 2 annexes,[172] incorporates the concept of precaution, strengthens the role of regional organizations in the management of straddling fish stocks, and encourages consideration of fisheries in a wider ecosystem context.[173] It also elaborates on the fundamental principle, established in the LOSC that States should cooperate to ensure conservation and promote the objective of the optimum utilization of straddling and highly migratory fish stock both within and beyond the EEZ.[174] The provision of UNSFA regarding these stocks can be summarized as follows:

---

[167] The FAO Compliance Agreement. art III.
[168] Ibid.
[169] Ibid
[170] United Nations, General Assembly. UNFSA. New York, 1995. A/CONF. 164/37. 1-1 pp.
[171] As at 7 August 2007 United Nations, Table recapitulating the status of the Convention and of the related Agreements (2007 [cited 7 August 2007]); available from <http://www.un.org/Depts/los/reference_files/status2007.pdf>.
[172] United Nations, UNFSA. New York, 1995. A/CONF. 164/37. 40 p.
[173] L. Juda. The 1995 the United Nations Convention Agreement on Straddling Fish Stocks and Highly Migratory Fish Stocks: A Critique. *Ocean Development & International Law*. 1997. 28: 147-166 pp.
[174] LOSC. art 63- 64

- Apply the precautionary approach;[175]
- Adopt, where necessary, measures for the conservation and management of "species belonging to the same ecosystem or associated with or dependent upon the target stock";[176]
- Minimize catch of non target species and utilize selective, environmentally safe and cost effective-fishing gear and techniques;[177]
- Protect the biodiversity in the marine environment;[178]
- Utilize regional and sub regional organizations and arrangements;[179]
- Take in to account interest of artisanal and subsistence fishermen;[180]
- Collect and share complete and accurate data concerning fishing activities including vessel location and catch of target and non target species;[181] and
- Implement and enforce conservation and management effort through effective monitoring control and surveillance.[182]

UNSFA represents a significant attempt to develop a coherent management regime for fish stocks through out their migratory range. As such it may be seen as an important part of the broader historic trend toward a more managed ocean environment, one in which coastal State interests increasingly predominate with respect to the allocation and conservation of marine living resources, and in which the traditional concept of the freedom of the seas is limited.[183]

On 22-26 May 2006, the UNSFA Review Conference was held in New York.[184] The principle outcome of the Review Conference included:

---

[175] UNSFA, Part II art 5 (c) and art 6, 1.
[176] UNSFA, Part II art 5 (e)
[177] UNSFA, Part II art 5 (f)
[178] UNSFA, Part II art 5 (g)
[179] UNSFA, Part III art 1 and 3
[180] UNSFA, Part II art 5 (i)
[181] UNSFA, Part II art 5 (j)
[182] UNSFA, Part II art 5 (l)
[183] L. Juda. The 1995 the United Nations Convention Agreement on Straddling Fish Stocks and Highly Migratory Fish Stocks. 1997. op. cit. 147-166 pp.
[184] United Nation, General Assembly, Review Conference on the Agreement for the Implementation of the Provisions of the United Nation Convention on the Law of the Sea of 10 December 1982 relating to the conservation and management of Straddling Fish Stocks and Highly Migratory Fish Stocks, New York, 22-26 May 2006. A/CONF.210/2006/15. 43 p.

- Conservation and management of fish stocks and highly migratory fish stocks:

The Conference adopted the measures to ensure the long term sustainability of straddling fish stocks and highly migratory fish stocks and addressed over fishing, overcapacity and effects of fishing on marine environment; cooperation to manage fisheries not regulated by a regional fisheries management organization and the collection and sharing of data. The Review Conference recommended that States individually and collectively through Regional Fisheries Management Organizations (RFMOs) to: strengthen the commitment to adopt and fully implement, improve cooperation between flag state whose vessel fish on high sea or the areas under national jurisdiction, implement the ecosystem approach to fisheries approach, closed areas to manage fisheries and to protect habitat and biodiversity, conservation and management of discrete stocks.[185]

- Mechanism for international cooperation and non members:

The Conference reviewed that even a significant number of States whose vessels fish for stocks regulated by RFMOs have become members and promote nonmember adherence to adopted conservation and management measure including data collection and monitoring control and surveillance measures, however problems of non compliance by members and cooperative members and fishing by nonmembers, continue to undermine the effectiveness of adoption. The Review Conference urged to strengthen the mandates of RFMOs to implement modern approach to fisheries management, cooperate among existing and developing organizations, encourage nonmembers to join the RMFOs, improve transparency of RFMOs and criteria for allocating fishing opportunities, develop best practice guide line for RFMOs,[186] to ensure the opting –out parties is constrained by rule to prevent undermining conservation.[187]

---

[185] Ibid. 31-33 pp.

[186] See Chatham House, The Royal Institute of International Affairs. 2007. Recommended Best Practices for Regional Fisheries Management Organizations Executive Summary. Report of an independent panel to develop a model for improved governance by Regional Fisheries Management Organization. 20 p.

[187] United Nation, General Assembly, Review Conference on the Agreement for the Implementation of the Provisions of the United Nation Convention on the Law of the Sea of 10 December 1982 relating to the conservation and management of Straddling Fish Stocks and Highly Migratory Fish Stocks, New York, 22-26 May 2006. op. cit. 36-37 pp.

- Monitoring, control and surveillance and compliance and enforcement:

The Review Conference addressed significant levels of illegal, unregulated and unreported (IUU) fishing which continue to occur in many fisheries for straddling fish stocks and highly migratory species. The Review Conference underlined the critical important of the effective control by flag States over fishing vessels flying their flag. It needed more effort, particularly the expeditious investigation of suspected violation and follow-up actions as well as further steps to combat and deter IUU. The measures or schemes need to be developed more so as to regulate the landing and transshipment in particular at-sea transshipment to prevent illegal caught fish. A coordinated approach among States and RFMOs is required. The Review Conference recommended that States individually and collectively through RFMOs, adopt necessary port States measures, especially the 2005 FAO Model Scheme on Port States Measures to Combat IUU Fishing, and legally binding instruments with International Plan of Action (IPOA) to prevent Deter and Eliminate IUU fishing, the International Monitoring, Control and Surveillance, trade measure. In addition, the Review Conference recommended strengthening domestic mechanisms to deter national and beneficial owners from engaging in IUU fishing activities.[188]

- The assistant to developing state and non parties:

During the Review Conference, a number of developing States noted that an increase in assistance would encourage further ratification. The Conference recognized the need to provide assistance to developing States in areas such as data collection, scientific research, monitoring, control and surveillance, human resource and development and information sharing, as well as technical training and assistance as it relates to conservation and management of straddling fish stocks and highly migratory fish stock.[189]

The UNSFA is classified as one of hard law implementation instrument of the LOSC and established many RFMOs and implementation Agreements.[190] It aims at completing sustainable fisheries in 2012.[191]

---

[188] Ibid. 38-40 pp.
[189] Ibid. 41-43 pp.
[190] E. Meltzer, Global Overview of Straddling and Highly migratory Fish Stocks. Figure C: The figure of International Fisheries and Related Instruments Pertain to Straddling and Highly Migratory. 1-1 pp.

Thailand is a non-State party to the UNSFA, it has however implemented some provisions of UNSFA concerning the conservation and management of stocks by regional fisheries management organizations. However, Thailand should consider without delay the ratification of the UNSFA for complete cooperation in implementation.

5. The 1995 Code of Conduct for Responsible Fisheries

The 1995 Code of Conduct for Responsible Fisheries (CCRF) was adopted at the 28 session of the FAO Conference on 31 October 1995[192] by 170 members.[193] COFI defined the concept of the responsible fisheries as:

> This concept encompasses the sustainable utilization of fisheries resources in harmony with the environment; the use of capture and aquaculture practices which are not harmful to ecosystem resources or their quality; the incorporation of added value to such product through transformation meeting the required sanitary standards; the conduct of commercial practices so as to provide consumers access to good quality products.[194]

The CCRF sets out principles and international standards of behaviors for responsible practices with a view to ensuring the effective conservation, management and development of living aquatic resources, with due respect for the ecosystem and biodiversity. It recognizes the nutritional, economic, social, environmental and cultural importance of fisheries and the interests of all those concerned within the fishery sector. The CCRF takes into account the biological characteristics of the resources and their environment and the interests of consumers and other users.[195]

---

[191] United Nation, General Assembly, Review Conference on the Agreement for the Implementation of the Provisions of the United Nation Convention on the Law of the Sea of 10 December 1982 relating to the conservation and management of Straddling Fish Stocks and Highly Migratory Fish Stocks, New York, 22-26 May 2006. op. cit. 43 p.

[192] FAO. Code of Conduct for Responsible Fisheries. Rome. 1995. 41 p.

[193] FAO, What is the Code of Conduct for Responsible Fisheries? About CCRF. 2003. 1-1 pp.

[194] FAO, CCRF- annex 1.

[195] FAO, CCRF, Introduction. 1-1 pp.

The CCRF is voluntary rather than mandatory,[196] global in scope,[197] and based on relevant rules of international law, including those reflected in the LOSC, the FAO Compliance Agreement, Agenda 21, in particular Chapter 17, and other relevant declarations and international instruments.[198]

The CCRF is comprised of 12 articles and 2 Annexes.[199] The two annexes provide background to the origin and elaboration of the CCRF, and its adoption.[200] Article 1 to 4 of the CCRF addresses the nature and scope of the CCRF, the objective, the relationship with other international instruments and implementation,[201] respectively.

The principle objects of the CCRF include fisheries management, fishing operations, aquaculture development and integration of fisheries into coastal area management.[202] The CCRF lays on the post-harvest practices and trade that contain responsible fish utilization and international trade, law and regulation relating to fish trade.[203]

The CCRF recognizes the importance of fisheries research and States that ‘‘responsible fisheries require the availability of a sound scientific basis to assist fisheries managers and other interested parties in making decisions.”[204] The appropriate research is needed in all aspects of fisheries including biology, ecology, technology, environmental science, economics, social science, aquaculture and nutritional science.[205] The CCRF emphasize the need for assistance to developing States to implement the CCRF, especially in the areas of financial and technical assistance, technology transfer, training and scientific cooperation that would allow developing States to develop their own fisheries and to participate in high seas fisheries.[206]

---

[196] FAO, What is the Code of Conduct for Responsible Fisheries? About CCRF, 2003. 41 p.
[197] FAO, CCRF, art 1.2.
[198] FAO, CFRF, Relationship with other International Instruments. 2001. 41 p.
[199] FAO, CCRF. 41 p.
[200] Ibid. annex 1-2. 35-41 pp.
[201] Ibid. art 1-4.
[202] Ibid, objectives.
[203] FAO, Code of Conduct, art 11.
[204] Ibid. art 12.1.
[205] Ibid.
[206] Ibid. art 5.

6. FAO International Plans of Actions addressing specific key issues of the 1995 Code of Conduct for Responsible Fisheries

There are four International Plans of Actions (IPOAs) which are voluntary instruments within the framework of the CCRF.[207] Three IPOAs were adopted by COFI at its 23rd session in February 1999[208] and include the IPOA on SEABIRDS which concerns the reduction of incidental catch of seabirds in longline fisheries, the IPOA on SHARK which concerns conservation and management of sharks, and IPOA on capacity which concern the management of fishing capacity the subject of management of fishing capacity. The fourth IPOA, addressing IUU fishing was adopted at COFI's the 24 session in 2001.[209] Four IPOAs may be summarized as follows:

(a) IPOA-SEABIRDS

The objective of the IPOA-SEABIRDS is to reduce incidental catch of seabirds in longline fisheries.[210] The species of seabirds most frequently victims of such catches are albatrosses and petrels in the Southern Ocean, northern fulmars in the North Atlantic and albatrosses, gulls and fulmars in the North Pacific fisheries. The elaboration of this IPOA was due to an increased awareness about the incidental catch of seabirds in longline fisheries and its potential negative impacts on seabird populations.[211]

IPOA asked States with longline fisheries to conduct an assessment of these fisheries to determine if a problem exists with respect to incidental catch of seabirds. If a problem exists, States should then adopt accordingly a National Plan of Action for reducing the incidental catch of seabirds in longline fisheries (NPOA-SEABIRDS).

---

[207] FAO, International Plan of Action (May 2001 [cited 2007]); available from <http://www.fao.org/docrep/006/Y5260E/y5260e0l.htm#fn11>.
[208] FAO, Report of the 23rd Session of the Committee on Fisheries. Rome, 15-19 February 1999 (May 2001(cited 2007); available from <http://www.fao.org/docrep/meeting/x0911e.htm>.
[209] FAO, Report of the 24 Session of the Committee on Fisheries. Rome, 26 February-2 March 2001. ; available from <http://www.fao.org/docrep/meeting/003/y0220e/y0220e00.htm>.
[210] FAO, International Plan of Action, IPOA-Seabirds (May 2007(cited 2001) available from; <http://www.fao.org/fi/website/FIRetrieveAction.do?dom=org&xml=ipoa_seabirds.xml>.
[211] Ibid.

The NPOA-SEABIRDS is a plan that a State designs, implements and monitors to reduce the incidental catch of seabirds in longline fisheries that should include raising awareness among fishers, fishing associations and other relevant groups.

(b) IPOA-SHARKS

The objective of the IPOA-SHARKS is to ensure the conservation and management of sharks and their long-term sustainable use.[212] IPOA requests States to implement a national program for the conservation and management of shark stocks if their vessels conduct directed or non-directed fisheries for sharks and call upon States to be responsible for developing, implementing and monitoring its Shark-plan. The national shark plan should contain regular assessments of the status of shark stocks, effective measures to ensure that shark fisheries are sustainable and should seek to minimize unutilized incidental catches, minimize waste and discards and encourage full use of dead sharks. And where transboundary, straddling, highly migratory and high seas stocks of sharks are exploited by two or more States, the States concerned should strive to ensure effective conservation and management of the stocks.[213]

(c) IPOA-CAPACITY

The IPOA stated that overcapacity and overfishing are really symptoms of the same underlying management problem as well as being biologically unsustainable, among others, contributes substantially to the degradation of marine fisheries resources, the decline of food production potential, and significant economic waste. The level of overcapacity observed in the mid-1990s was also economically unsustainable.[214] Thus, IPOA seek to address the management of fisheries capacity in the framework of the CCRF,[215] States should take measures to prevent or

[212] Ibid.
[213] Ibid.
[214] FAO, International Plan of Action, IPOA-Capacity (2007 [cited May 2007]); available from <http://www.fao.org/fi/website/FIRetrieveAction.do?dom=org&xml=ipoa_capacity.xml&xp_nav=1>.
[215] FAO, International Plan of Action, IPOA-Capacity, legal foundation. (2007 [cited May 2007]); available from <http://www.fao.org/fi/website/FIRetrieveAction.do?dom=org&xml=ipoa_capacity.xml&xp_nav=2

eliminate excess fishing capacity and should ensure that levels of fishing effort are commensurate with sustainable use of fishery resources.[216]

IPOA-CAPACITY specifies a number of actions to be urgently taken with regards to the main section of the document including assessment and monitoring of fishing capacity, preparation and implementation of national plans, international consideration, and immediate actions for major international fisheries requiring urgent attention.[217]

The immediate objective of the IPOA-Capacity is to urge States and RFMOs to achieve a worldwide, efficient, equitable and transparent management of fishing capacity, preferably by 2003 but no later than 2005.[218]

(d) IPOA-IUU

Regarding to the issue of IUU fishing in world fisheries is of serious and increasing concern. IUU fishing undermines efforts to conserve and manage fish stocks in all capture fisheries. When confronted with IUU fishing, national and regional fisheries management organizations can fail to achieve management goals. This situation leads to the loss of both short and long-term social and economic opportunities and to negative effects on food security and environmental protection. IUU fishing can lead to the collapse of a fishery or seriously impair efforts to rebuild stocks that have already been depleted. Existing international instruments addressing IUU fishing have not been effective due to a lack of political will, priority, capacity and resources to ratify or accede and to implement them.[219]

The objective of the IPOA-IUU is to prevent, deter and eliminate IUU fishing by providing all States with comprehensive, effective and transparent measures by which to act, including through appropriate regional fisheries management organizations established in accordance with international law.[220]

---

[216] FAO, International Plan of Action, IPOA-Capacity (2007 [cited May 2007]); available from <http://www.fao.org/fi/website/FIRetrieveAction.do?dom=org&xml=ipoa_capacity.xml&xp_nav=1>.
[217] Ibid.
[218] FAO, International Plan of Action, IPOA-Capacity, Mission. (2007 [cited May 2007]); available from <http://www.fao.org/fi/website/FIRetrieveAction.do?dom=org&xml=ipoa_capacity.xml&xp_nav=2>
[219] FAO, International Plan of Action, IPOA-IUU (2007 [cited May 2007]); available from <http://www.fao.org/fi/website/FIRetrieveAction.do?dom=org&xml=ipoa_IUU.xml>.
[220] Ibid.

It should be note that not all voluntary IPOAs are universally applicable, as the issues they seek to address are not global in nature, For example, the States which have no longliners do not have to implement IPOA-SEABIRDS, and longline fisheries in tropical areas are unlikely to interact with seabirds since such interactions are normally confined to temperate areas. Each State should thus take appropriate action to develop and implement NPOAs for the IPOAs which are of relevance of their situation.[221]

The IPOAs focusing on the management of fishing capacity and IUU fishing have implications for most States in both small-scale and industrial fisheries. Assessments are needed to determine the extent and gravity of capacity and IUU fishing problems and the development of NPOAs. Each IPOA sets a target date for States to implement their NPOAs. These dates, plus the severity of the problems associated with fishing capacity and IUU fishing, should facilitate priorities for action in implementing the NPOAs.[222]

Thailand adopted the CCRF as one of its major tools for fisheries management throughout the State and has take action to implement the IPOA-SHARKs through the collection of statistics, the undertaking of biological studies and the development of a national plan of action.[223]

Thailand endorsed the IPOA-IUU and is in the process of establishing the IPOA-IUU through a national committee to supervise and provide guidance and policy to implement NPOA-IUU in order to ensure that Thailand is a responsible fishing nation.[224]

Thailand has also begun to work on the implementation of the IPOA-CAPACITY. A National Seminar on the Reduction and Management of Commercial Fishing Capacity in Thailand was held in Cha-Am, Thailand, on 11–14 May 2004. The Seminar was organized in collaboration with the DOF Thailand. Technical and financial support for the seminar was provided by the FAO Fisheries Department and the Fish Code Programme, through the Fish Code Trust. The Seminar succeeded in providing the Government of Thailand with a valuable opportunity to consult widely with stakeholders and provided specific guidelines for further

[221] FAO, FAO fisheries Report, Report of the Workshop on the Implementation of the 1995 FAO Code of Conduct for Responsible Fisheries in the Pacific Islands: a Call to Action. Nadi, Fiji, 27-31 October 2003. 2004. 150 p.
[222] Ibid.
[223] DOF of Thailand, Ministry of Agriculture and Cooperative "Fishery Policy Directions of Thailand" August 2006. 8 p.
[224] P. Saikliang, Managing fishing capacity and IUU fishing in Thailand. Poster presented on 13-15 June 2007 Regional Workshop on Managing Fisheries Capacity and IUU Fishing in Asia, Phuket, Thailand. 1 p.

development of a strategy for reducing commercial fishing capacity in Thailand. Participants recognized that it was essential to undertake certain preliminary actions be undertaken before it would be possible to actually reduce Thailand's fleet capacity. These included recording details of all vessels, whether fishing legally or not, and then clamping down on all unlicensed fishing. Preliminary actions have been undertaken by the Government of Thailand to reduce Thailand's fleet capacity.[225] In June 2007, the regional workshop on managing fishing capacity and IUU fishing in Asia convened in Phuket, Thailand, organized by APFIC. It is another initiated step of examining and hearing from the stakeholders and related Government officers before developing national action plan to address the issue.[226]

B. Regional Framework

RFMOs are intergovernmental fisheries organizations or arrangements that have the authority to establish fisheries conservation and management plans. RFMOs play a critical role in the global system of fisheries governance. They are the primary ways to achieve cooperation between and among fishing nations which is essential for the conservation and effective management of international fisheries. RFMOs may focus on certain species of fish or have a wider remit related to living marine resources in general within a region.[227]

Thailand affiliates with a number of RFMOs, and co-ordinate efforts to manage fisheries both with respect to a particular species of fish and also under a framework within the particular region as described below.

1. Indian Ocean Tuna Commission

The Indian Ocean Tuna Commission (IOTC) is an intergovernmental organization established under Article XIV of the FAO constitution. The Agreement establishing the IOTC

[225] FAO, Report of the National Seminar on the Reduction and Management of Commercial Fishing Capacity in Thailand, FAO/FishCode Review. No. 13. Rome, FAO. 2005. 59 p.
[226] APFIC, the Regional Workshop on Managing Fishing Capacity and IUU Fishing in Asia, June 2007, Phuket, Thailand. 1-1 pp.
[227] Chatham House, The Royal Institute of International Affairs. 2007. Recommended Best Practices for Regional Fisheries Management Organizations Executive Summary. Report of an independent panel to develop a model for improved governance by Regional Fisheries Management Organization. 1-1 pp.

was adopted by the FAO Council at its the 105 Session in Rome on 25 November 1993, and entered into force on the accession of the tenth Member on 27 March 1996.[228] The IOTC is mandated to manage tuna and tuna-like species in the Indian Ocean and adjacent seas.[229] Currently, there are 16 species[230] that are under the management mandate.[231] In addition, data on non-target, associated and dependent species affected by tuna fishing operations has be collated.[232] The objectives of IOTC are to promote cooperation among its Members with a view to ensuring, through appropriate management, the conservation and optimum utilization of stocks of tuna and tuna like species and to encourage sustainable development of fisheries based on such stocks.[233]

The IOTC agreement consists of 24 articles[234] and establishes functions, responsibilities in accordance with the principles expressed in the relevant provisions of the LOSC, the Compliance Agreement, UNSFA and the CCRF, particularly the IPOAs. The key provisions of the Agreement address the need to:

- Keep under review the conditions and trends of the stocks, analyse and disseminate scientific information, catch and effort statistics and other data relevant to the conservation and management and fisheries based on the stocks covered by the Agreement;
- Encourage, recommend, and coordinate research and development activities in respect of the stocks and fisheries, and such other activities, including connecting with transfer of technology, training and enhancement, having due regard to the need to ensure the equitable participation of Members of the Commission in the fisheries and the special interests and needs of Members in the region that are developing countries;

---

[228] IOTC, about IOTC-history (14 July 2006 [cited May 2007]); available from <http://www.iotc.org/English/info/mission.php>.
[229] IOTC, Agreement for the Establishment of the Indian Ocean Tuna Commission, ANNEX 1. 10 pp. (14 July 2006 [cited May 2007]); available from <http://www.iotc.org/English/info/basictext.php>.
[230] Ibid.
[231] IOTC, about IOTC-species under IOTC management. (14 July 2006 [cited May 2007]); available from <http://www.iotc.org/English/info/mission.php>.
[232] Ibid.
[233] Ibid. objective.
[234] IOTC, Agreement for the Establishment of the Indian Ocean Tuna Commission. 10 p. (14 July 2006 [cited May 2007]); available from <http://www.iotc.org/English/info/basictext.php>.

- Adopt, on the basis of scientific evidence, conservation and management measures to ensure the conservation of the stocks covered by this Agreement and to promote the objective of their optimum utilization throughout the Area; and
- Keep under review the economic and social aspects of the fisheries based on the stocks covered by this Agreement bearing in mind, in particular, the interests of developing coastal States.[235]

The IOTC currently has 27 Member States and three States which are cooperating non-contracting parties.[236] The responsibility of Members is to ensure that action is taken under national legislation to implement conservation and management measures.[237] And States Party are also expected to cooperate in the exchange of information regarding any fishing for the tuna stocks,[238] to provide to the IOTC copies of laws, regulations and administrative instructions in force or, where appropriate, summaries thereof, relating to the conservation and management of stocks covered by this Agreement. And States Party are also to inform the IOCT of any amendment or repeal of such laws, regulations and administrative instructions.[239]

Conservation and management measures binding on Members of the IOTC must be adopted by a two-thirds majority of Members present and voting.[240] Recommendations concerning conservation and management of the stocks for furthering the objectives of the Agreement need only be adopted by a simple majority of its Members present and voting.[241]

Thailand has been an IOTC Member since 17 March 1997[242] and has made a commitment to report data related to tuna landings in Thailand by foreign and Thai fishers.[243] IOTC emphasize the need to the collect quality fisheries statistics in developing countries as an important prerequisite for further development of their fisheries. The collection of data by national activities greatly assists in the

---

[235] IOTC, Agreement for the Establishment of the Indian Ocean Tuna Commission: art V. (14 July 2006[cited May 2007]); available from <http://www.iotc.org/English/info/basictext.php>.
[236] H. Miguel. IOTC Data Manager. Personal communication. 20 July 2007.
[237] IOTC, Agreement for the Establishment of the Indian Ocean Tuna Commission. art X
[238] Ibid. art XI, 1.
[239] Ibid. art XI, 2.
[240] Ibid. art IX, 1.
[241] Ibid. art IX, 8.
[242] IOTC, structure of the commission (14 July 2006 [cited May 2007]); available from <http://www.iotc.org/English/info/comstruct.php>.
[243] IOTC, Agreement for the Establishment of the Indian Ocean Tuna Commission. art XI.

assessment of the status of tuna stocks by regional bodies.[244] There are two research programs under the DOF entitled "The Fisheries Information and Statistics (for purse seiners)" and "Data collection on oceanic tuna for longliners and purse seiners at Phuket, Thailand". Another two cooperative projects have been executed under the DOF/IOTC-Oversea Fisheries Cooperation Foundation (OFCF); one entitled "Enhancement of the data collection and processing system for tuna fisheries in Thailand" and the other named "Enhancement of the data collection and processing system for neritic tuna fisheries in Thailand". These two projects under DOF/IOTC-OFCF operated April 2005 to 31st March 2006 and 1st October 2005 to 31st March 2006, respectively.[245] The projects were successful and it has laid the basis of tuna's data collection in Thailand. Presently, as flag State who authorizes fishing in the Indian Ocean, and as a port State for landing tuna of foreign vessels, Thailand has the commitment to report statistics, scientific or relevant data to IOTC. Through the assistance of those projects, the quality of tuna statistics collected in Thailand then becomes useful for tuna assessments in the Indian Ocean.

2. Bay of Bengal Large Marine Ecosystem Program

The Bay of Bengal Large Marine Ecosystem (BOBLME) is established to recognize the need for integrated and co-ordinated management of the coastal and near-shore living marine resources. The program involves eight member States bordering the Bay of Bengal: Bangladesh, India, Indonesia, Malaysia, Maldives, Myanmar, Sri Lanka and Thailand (Figure 7).[246]

BOBLME was submission by FAO to the Global Environment Facility (GEF) under the International Waters portfolio of a proposal for a project to pursue an LMEs approach. There are many organizations involved the program. The World Bank plays the role as Implementing Agency and FAO plays the role as Executing Agency. The Swedish International Development Agency (SIDA) also strongly endorsed the BOBLME Program and allocated substantial funds to support. Co-funding and in-kind contributions are offered by Governments of the States and by the US National Oceanic and Atmospheric Administration (NOAA).[247] Under the LME approach, the BOBLM program deals with global, regional and sub regional marine related instruments.

---

[244] IOTC, Ninth Session of the Scientific Committee, Progress Report on the IOTC-OFCF project to improve statistical systems in Indian Ocean Coastal Countries. Proceedings IOTC-2006-SC-08[EN]. 2006. 3-3 pp.
[245] IOTC, Report of the Eighth Session of the Scientific Committee: 'Thailand'. Victoria, Seychelles, 7-11 November 2005. IOTC-2005-SC-R[EN]. 2006. 82 p.
[246] BOBLME, member (cited May 2007); available from <http://www.fao.org/fi/boblme/website/pscmembers.htm>.
[247] BOBLME, prospectus (cited May 2007); available from <http://www.fao.org/fi/boblme/website/prospectus.htm>.

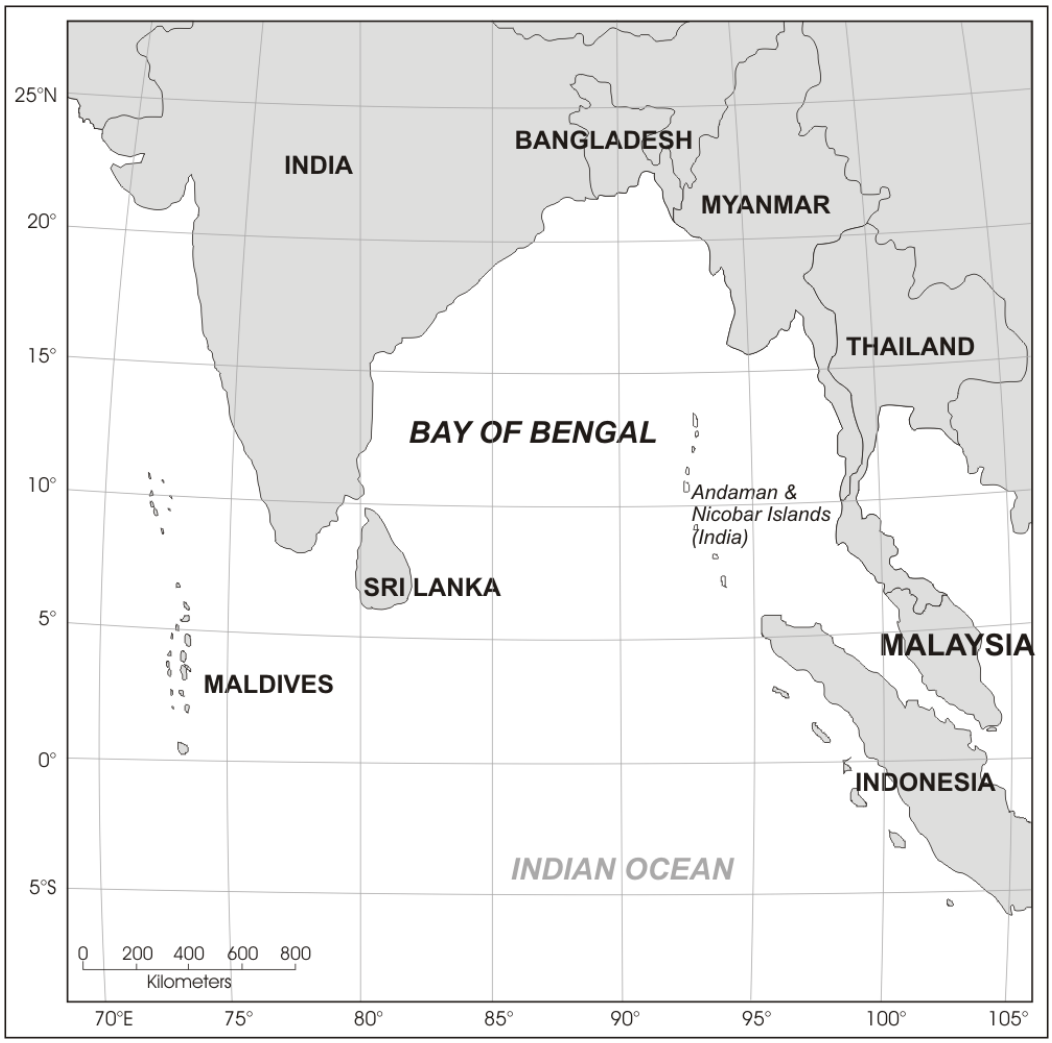

Figure 7: The Bay of Bengal Region

Source: Adapted from Map of Asia (continent). World Atlas-MSN Encarta, Microsoft Corporation. 2007 (cited December 2007); available from <http://encarta.msn.com/map_701510269/Asia.html>

In recent years, the management of LMEs has become a focus of international ocean governance, because the status or condition of the LMEs has significant effects not only on the LMEs themselves, but also on the human communities that rely on them especially in terms of their fisheries production. The current world wide practice of establishing LMEs projects aims to adopt an integrated ecosystem based approach to the assessment and management of the

marine environment and its resources.[248] The approach makes use of five link modules to monitor, assess, and manage marine ecosystems, including productivity and carrying capacity, fish and fisheries, pollution and ecosystem health, socioeconomic condition, and pertinent governance regimes.[249]

The Bay of Bengal is one of the LMEs (BOBLME) in which changing environmental conditions are influencing currents, productivity and coastal pollution. Some coastal areas serving as nursery grounds for commercially valuable species are polluted. It can be concluded that certain activities are causing serious local and cumulative environmental degradation that threatens the sustainable management and health of the BOBLME as a whole. Fisheries concerns must also include the critically important areas of biological diversity, fish spawning and nursery areas, coral reefs, mangroves and estuaries in the Bay of Bengal. The Bay of Bengal is under increasing stress due to habitat loss and degradation with certain species being already or becoming endangered. The concentration of shrimp aquaculture farms in certain coastal areas has raised environmental concerns for estuarine and coastal habitats and other user groups.[250]

An alarming increase in cyanide fishing in the coral reefs of the region for the lucrative live food fish markets has been seen. There are other destructive methods of fishing which threaten living resources and the fragile ecosystems on which they depend. The fishery resources are heavily exploited due to unregulated fishing activities, open access, unauthorized incursions by foreign fleets and the encroachment of nationals into the territorial waters of their neighbors. This is further complicated by poor national resource management strategies, conflicts between artisanal and large-scale fisheries, unaddressed transboundary environmental issues and insufficient knowledge and data on the functioning of the ecosystem as a whole.[251]

The core of the LMEs management approach is the application of a module assessment and management methodology to the process of formulation and implementation of the transboundary diagnostic analysis (TDA), strategic action program (SAP), and national action plan (NAP). TDA is the collecting or gathering of information on relevant issues and problems,

---

[248] H. Wang. "Ecosystem Management and its Application to large Marine Ecosystem Management: Science Law and Politics," *Ocean Development and International Law*, 35 (2004), 41-74 pp.
[249] K. Sherman. "Modular Approach to the Monitoring and Assessment of Large Marine Ecosystem," *In* The Gulf Mexico Large Marine Ecosystem: Assessment, Sustainability, and Management, (eds.) H. Kumpf, K. Sreidinger, and K. Sherman. Malden, MA: Blackwell Science, 1999. 34 p.
[250] Ibid.
[251] Ibid.

SAP is the setting out of priorities, reflected in the output of TDA, and specific action needed for resolving priority transboundary environmental concerns. It also provides mechanisms for long term preservation protection and restoration of the LMEs. The NAPs is the implementation of the SAP at the national level. Each Member State has to adjust, modify and improve its NAP in accordance with the SAP and take necessary enforcement and compliance-enhancing measures at the national, subnational, and local levels.

The BOBLME program is now operational and is now preparing a Transboundary Diagnostic Analysis (TDA),[252] the main components of TDA are:

- The establishment of national and regional co-ordination mechanisms;
- The synthesis and assessment of existing information on the status of living marine resources in general, and fisheries in particular, and of the environment in the BOBLME, identification of transboundary issues that threaten these resources and the health of the ecosystem, and recommendations to address and mitigate these problems through co-ordinated action; and
- Regional and national workshops involving a wide range of stakeholders to identify, discuss and reach consensus on transboundary (marine) water-related issues, constraints and priorities to be addressed.

After TDA generating, a SAP will be prepared. That means the actions related to fisheries management in BOBLME will be taken, and that enforced at both the regional and national levels will be pursued.

3. Asia-Pacific Fisheries Commission

The Asia-Pacific Fisheries Commission (APFIC) was established within the framework of the FAO.[253] The APFIC Agreement was created at Baguio, Philippines, on 26th February

[252] See more detail about the definition and process of TDA, SAP and NAP in H. Wang. An Evaluation of the Modular Approach to the Assessment and Management of Large Marine Ecosystems. *Ocean Development and International Law*, 35 (2004), 267-286 pp.

[253] APFIC, Agreement at last amended at the twenty-fifth session of the commission (Seoul, Republic of Korea, 15-24 October 1996) Rome, Italy, 2-7 June 1997. art I.

1948,[254] and amended from time to time. It was last amended at the 25th Session of the APFIC in Seoul, Republic of Korea, at 15-24 October 1996 and then approved by the FAO Council at its 112th Session in Rome, at 2-7 June 1997.[255]

There are 20 Member States of the APFIC, namely: Australia, Bangladesh, Cambodia, People's Republic of China, France, India, Indonesia, Japan, Republic of Korea, Malaysia, Myanmar, Nepal, New Zealand, Pakistan, Philippines, Socialist Republic of Vietnam, Sri Lanka, Thailand, United Kingdom and the United States of America.[256] The APFIC secretariat is based at the FAO Regional Office for Asia and the Pacific, in Bangkok, Thailand.

The main function of the APFIC is to promote the full and proper utilization of living aquatic resources[257] in the Asia Pacific area.[258] It seeks to encourage the development and management of fishing and culture operations, and that related to the processing and marketing activities in conformity with the objectives of the Member States.[259] The functions respect resources including aquaculture, social and economic, research and training and also disseminate information regarding living aquatic resources and fisheries.[260]

With respect to resources, Members are to formulate and recommend measures and to initiate and carry out programs or projects to increase the efficiency and sustainable productivity of fisheries and aquaculture; and conserve, manage and protect the resources from pollution.[261]

With respect to economic and social matters, Members are to keep under review the economic and social aspects of fishing and aquaculture industries and to recommend measures aimed at improving the living and working conditions of fishers and other workers in these industries, and otherwise at improving the contribution of each fishery to national social and economic goals.[262]

---

[254] Ibid. Rules of Procedure.
[255] Ibid.
[256] APFIC, Sessions Document (cited May 2007); available from <http://www.apfic.org/modules/xfsection/index.php?category=7>.
[257] APFIC, Agreement. op. cit. art IV Function.
[258] Ibid. art VI Area.
[259] Ibid. art IV Function.
[260] Ibid. art IV Function (g).
[261] Ibid. art IV Function (b).
[262] Ibid. art IV Function (c).

4. Coordinating Body in the Sea of East Asia

The Coordinating Body in the Sea of East Asia (COBSEA) has ten Member States: Australia, Cambodia, People's Republic of China, Republic of Korea, Indonesia, Malaysia, Philippines, Singapore, Thailand and Vietnam.[263] The East Asian Seas Regional Coordinating Unit (EAS/RCU), the lead agency of the United Nations for marine environmental matters in East Asia, serves as Secretariat for COBSEA, and responsible for co-ordinating activities of governments, NGOs, UN and donor agencies, and individuals in caring for the region's marine environment. There is no regional convention; instead the programme promotes compliance with existing environmental treaties and is based on Member States goodwill.[264]

The Action Plan established for *Protection and Development of the Marine Environment and Coastal Areas of the East Asian Seas Region* known as *the East Asian Seas Action Plan*. It was approved in 1981, stimulated by concerns on the effects and sources of marine pollution.[265] In 1994, the Action Plan was reviewed to "the Protection and *Sustainable* Development of the Marine and Coastal Areas of the East Asian Region."[266]

Initially, the Action Plan involved five States; Indonesia, Malaysia, Philippines, Singapore and Thailand. In 1994, it was revised to involve another five States; Australia, Cambodia, People's Republic of China, Republic of Korea and Vietnam.[267] The main components of East Asian Seas Action Plan are assessment of the effects of human activities on the marine environment, control of coastal pollution, protection of mangroves, seagrasses and coral reefs, and waste management.

The COBSEA, complies with international framework such as agenda 21 and LOSC, promotes the sustainable coastal and ocean development, as well as in term of fisheries resources. It promotes policy, legal, organizational reform, relate to coastal and ocean governance in local and national level. Strengthen the local capacity to plan manage the costal fisheries resources.[268]

---

[263] COBSEA, member countries (cited May 2007); available from <http://www.cobsea.org/aboutcobsea/membercountries.html>.
[264] COBSEA, about COBSEA (cited May 2007); available from <http://www.cobsea.org/aboutcobsea/background.html>.
[265] Ibid.
[266] Ibid.
[267] Ibid
[268] United Nations, United Nations Environment program. First Regional Partner Workshop on Regional Coordination Mechanisms in the East Asian Seas Region. Bangkok, Thailand, 9-10 May 2005. UNEP (DEC) /EAS 1.WS annex III. 3-4 pp.

COBSEA focus, not only fisheries management, but toward the integrated coastal management[269] practice in local levels and subregion seas and also creating a self sustaining regional mechanism for long term management of seas of East Asia.

5. Southeast Asian Fishery Development Centre

Southeast Asian Fishery Development Centre (SEAFDEC) is an autonomous intergovernmental body established as a regional treaty organization in 1967 to promote fisheries development in Southeast Asia. SEAFDEC aims specifically to develop fishery potential in the region through training, research and information services. It seeks to improve the food supply by rational utilization and development of fisheries resources.[270] Its services cover the broad areas of fishing gear technology, marine engineering, fishing ground surveys and stock assessments, post-harvest technology as well as development and improvement of aquaculture techniques.[271]

SEAFDEC currently has 11 Member States, namely Brunei Darussalam, Cambodia, Indonesia, Japan, Loa PDR, Malaysia, Myanmar, the Philippines, Singapore, Thailand and Vietnam. It also has a Council of Directors composed of nominees from Member States, as policy-making body to provide directives and guidance on activities of SEAFDEC.[272] SEAFDEC has a Secretariat as its administrative arm, based in Bangkok, Thailand, and four technical Departments, namely the Training Department (TD) in Thailand, the Marine Fisheries Research Department (MFRD) in Singapore, the Aquaculture Department (AQD) in the Philippines, and the Marine Fishery Resources Development and Management Department (MFRDMD) in Malaysia.[273]

At the regional level, SEAFDEC has been formulating and implementing activities under the programs/projects relating to fishery statistics; data and information; and indicators to support planning and management of fisheries of the member States.

As the premier fisheries organization in the region, with a long-term commitment to sustainable development and management of the region's fisheries and coastal resources, SEAFDEC has initiated a comprehensive program known as the Regionalization of the Code of Conduct for

---

[269] United Nations, United Nations Environment program. Report of the brainstorming meeting of the national focal points on new strategic of COBSEA. Bangkok, Thailand, 11 May 2005. UNEP (DEC) /EAS 1.NFP. 1-1 pp.
[270] SEAFDEC, About SEAFDEC (cited 12 June 2007); available from <http://www.seafdec.org/seafdec_n/about.htm>.
[271] Ibid.
[272] Ibid.
[273] Ibid.

Responsible Fisheries. It encourages the implementation of regional guidelines for responsible fisheries in Southeast Asia and considers regional specificities of fisheries structure, ecosystem, cultural, social, economic factors, as well as other issues of importance in the region. It also has developed supplementary guidelines on Co-Management using Group User Rights, Fisheries Statistics, Indicators and Fisheries Refugia. The program aims to effectively implement CCRF and to develop supporting activities/materials focusing on increasing human capacity for supporting the implementation of CCRF at the national level.[274]

SEAFDEC has also initiated programs that concern the sustainable use of marine resources in the region. Thailand has played an important role as a lead country in those programmes concerned with capacity improvement of fisheries community for fisheries management and alleviation of poverty, strengthening small-scale fisheries management through the promotion of rights-based fisheries and co-management, responsible fishing technologies and practices (fishing in harmony with nature), rehabilitation of fisheries resources and habitats/fishing grounds through resource enhancement, and sustainable utilization of potential fisheries resources and reduction of post-harvest losses.[275]

During the last decades, the international framework for the management of fisheries resources has made great advances, starting with the adoption of the LOSC, the 1992 UNCED, the 1993 FAO Compliance Agreement, the 1995 UNSFA, the 1995 CCRF and the related IPOAs. These international instruments and commitments lead to the creation of solid foundation for regional fisheries bodies to improve fisheries management which allows for the sustainable use.

The increase of globalize fisheries society means increasing of effort mechanism to manage or regulate fisheries resource, they are all multi scale instruments that should be effective for fisheries management in Thailand. However, the challenge for Thailand is not only to consider ratification and adoption those Agreements, but also their implementation through effective national legislation, policy and practices which are harmonize with global and regional level approaches.

---

[274] SEAFDEC, ASEAN-SEAFDEC FCG Program (cited 12 June 2007); available from <http://www.seafdec.org/seafdec_n/program/html/10.htm>.

[275] SEAFDEC, SEAFDEC programs *(*cited 12 June 2007); available from <http://www.seafdec.org/seafdec_n/program/program.asp?offset=15>.

C. The Thai National Framework

The fisheries framework of Thailand presented here is composed of law and policy. The laws which are addressed include: the EEZ proclamation, directed enforcement fisheries law, and legislation indirectly impacting fisheries. The policy is outlined and missions of the department of fisheries of Thailand are described in term of development of fisheries and relevance organizations, management of fisheries resources and environment, aquaculture development, overseas fisheries development, and fisheries industry development.

1. The Fisheries Law of Thailand

(a) The EEZ Proclamation

Thailand has sovereignty claims on the islands, cays, and reefs in the Gulf of Thailand and controls most of these features. It is also preparing on extended continental shelf delimitation in the Gulf of Thailand as established by the Royal Proclamation in 1959; it is a historic right claim. The extent of Thailand's claims in the Gulf of Thailand has gradually been defined since the early 1970s. Thailand argues in terms of historic rights and the 1958 Geneva Convention on the Continental Shelf to support its claims.[276] Even thought Thailand is not a party to the LOSC, this has not prevented Thailand from using the LOSC to support its claims in necessary cases.

Thailand proclaimed the establishment of its EEZ on 23 February 1981.[277] The legislation provides for the use of straight baselines, 12 nautical mile territorial seas, a continuous zone out to 24 nm and 200 nm and an EEZ expanding to 200 mile from the baselines used to measure the territorial sea.[278]

In its EEZ, Thailand has sovereign right for the purpose of exploring and exploiting, conserving and managing the natural resources, whether living or non living, of the seabed and

---

[276] United Nations, International Legislation and treaties: Thailand (27 April 2007 [cited 12 July 2007]); available from <http://www.un.org/Depts/los/LEGISLATIONANDTREATIES/STATEFILES/THA.htm>.
[277] Ibid.
[278] As at 29 December 2006, United Nations, Table of claim to maritime jurisdiction Document A/56/58 (2006 [cited 12 July 2007]); available from <http://www.un.org/Depts/los/LEGISLATIONANDTREATIES/PDFFILES/claims_2005.pdf>.

subsfuel and the superjacent water, and with regard to other activities for the economic exploration of energy from the water, current and wind.[279] In its EEZ, Thailand has jurisdiction with regard to establishment and use of artificial islands, installations and structures, marine scientific research, the preservation of the marine environment and others right as may exist under the international law.[280] In the EEZs of Thailand, freedom of navigation and overflight and of the laying of submarine cables and pipelines is to be governed by international law.[281]

Thailand Stated that in any case where the EEZ of Thailand is adjacent or opposite to the EEZ of another coastal State, the government of Thailand is prepared to enter into negotiations with the coastal State concerned with a view to delimiting their respective EEZs.[282] Thailand has signed maritime boundary agreements with a number of other coastal States as shown in Table 16.

[279] United Nations, International Legislation and Treaties: Thailand (27 April 2007 [cited 12 July 2007]); available from <http://www.un.org/Depts/los/LEGISLATIONANDTREATIES/PDFFILES/THA_1981_Proclamation.pdf>.
[280] Ibid. 2 (a).
[281] Ibid. 3.
[282] Ibid. 4.

Table 16: Maritime Boundary Agreements between Thailand and other coastal States

Coastal State	Agreement/Material	Signing Date	Entry into force
India	Agreement on the delimitation of sea-bed boundary between two countries in the Andaman Sea.	22 June 1978	15 December 1978
India and Indonesia	Agreement concerning the determination of the trijunction point and the delimitation of the related boundaries of the three countries in the Andaman Sea.	22 June 1978	2 March 1979
India and Myanmar	Agreement on the determination of the trijunction point between the three countries in the Andaman Sea.	27 October 1993	24 May 1995
Indonesia	• Agreement relating to the delimitation of a continental shelf boundary between the two countries in the northern part of the Straits of Malacca and in the Andaman Sea.	17 December 1971	7 April 1973
	• Agreement relating to the Delimitation of the Seabed Boundary between the two Countries in the Andaman Sea.	11 December 1975	18 February 1978
Indonesia and Malaysia	Agreement Relating to the Delimitation of the Continental Shelf Boundaries in the Northern Part of the Strait of Malacca.	21 December 1971	
Malaysia	• Treaty relating to the delimitation of the territorial seas of the two countries.	24 October 1979	5 July 1982
	• Memorandum of Understanding on the delimitation of the continental shelf boundary between the two countries in the Gulf of Thailand.	24 October 1979	15 July 1982
Myanmar	Agreement on the delimitation of the maritime boundary between the two countries in the Andaman Sea.	25 July 1980	12 April 1982
Vietnam	Agreement on the delimitation of the maritime boundary between the two countries in the Gulf of Thailand.	9 August 1997	7 February 1998

Source: United Nations, International Legislations and treaties: Thailand (27 April 2007 [cited 12 July 2007]); available from <http://www.un.org/Depts/los/LEGISLATIONANDTREATIES/STATEFILES/THA.htm>.

Thailand enacted the Act Governing the Right to Fish in Thai Fishery Waters B.E., 2482 (1939) to enforce the fishing operation in its EEZ. [283] The main provision is that foreign vessels cannot be used for fishing in the EEZ of Thailand without specific authorization.

In 1989, DOF adopted the *Regulation of the Department of Fisheries on the Application for a License for Overseas Fisheries B.E. 2532 (1989)* which came into force on 1st August 1989. It prescribes the procedures for the application for a license for overseas fisheries. Thai fishing vessels must apply for an authorization to be issued a license for overseas operations.[284] However, presently, there is no national legislation that includes punishment for Thais fishing illegally in the EEZs of other coastal States.

(b) Directed Enforcement Fisheries Law

In relation to fisheries within the EEZ of Thailand by Thai fishing vessels, there are four pieces of legislation with respect to enforcement, they are:

(i) Fisheries Act B.E. 2490 (1947)

The Fisheries Act, B.E. 2490 (1947)[285] is the principle piece of legislation in national fisheries management. It has amended many times and is still in effect.

The first fisheries law in Thailand was enacted in B.E. 2444 (1901). At that time, marine fisheries had not been developed; the people used only simple traditional fishing gear and caught mainly fresh water fish. Thus, the main purpose of the fisheries Act, B.E. 2444 (1901) was to collect taxes from fishermen and it includes some fisheries conservation measures, prohibiting fishing during the spawning season of fresh water fishes. This act was in effect for 46 years, before it was repealed and replaced by three pieces of legislation namely, the Fisheries Act, B.E. 2490 (1947), Act Governing the Right to Fish within Thai Waters B.E., 2482 of 1939 and Thai Vessel Act, B.E. 2481 (1938).[286]

---

[283] Thailand: The Act Governing the Right to Fish in Thai Fishery Waters B.E. 2482.

[284] Thailand: Regulation of the Fisheries Department on the application for a license for overseas fisheries B.E. 2532. August B. E. 2532.

[285] Thailand: Fisheries Act B.E. 2490. Government Gazette Vol. 64 No. 3. 14 January 1947.

[286] C. Karnjanakesorn, and Yen-Eng, S. 1998. Revision to Thai Fisheries Law and Opportunities for Communities-Based Management. *In* Nickerson DJ (ed.) 1998: Communities Based fishery management in the Phang –Nga Bay. Thailand. Proceeding of the National Workshop on Communities Based management organized by the Department of Fisheries of Thailand. FAO and the Bay of Bengal Programme, Phuket, Thailand, 14-16 February 1996. FAO Bangkok. RAP Publication 1998/3(BOBP Report No. 78: 159-168 pp.

The Fisheries Act, B.E. 2490 (1947) is currently divided into Chapters and Schedules as outlined below:

- Chapter 1 Fisheries;
- Chapter 2 Cultivation Pond;
- Chapter 3 Registration and Application for Permission;
- Chapter 4 Fisheries Statistics;
- Chapter 5 Control;
- Chapter 6 Penalties;
- Chapter 7 Transitory Provisions.
- Schedule 1 Rate of Fishery Tax on Reserved Fisheries;
- Schedule 2 Rate of Fishery Tax on Licensed Fishing Implements;
- Schedule 3 Rate of Fishery Tax on Permit for Catch Fisherman on Reserved Fisheries; and
- Schedule 4 Rate of Fee. [287]

Chapter 1 divided fisheries areas into four categories:

- Preservation fisheries areas for full protection as fish sanctuaries;
- Leasable fisheries areas for fixed or stationary gears;
- Reserved fisheries areas for special purposes, e.g., coral reef, seagrass beds and mangroves; and
- Public fisheries areas.[288]

The Provincial Council with the approval of the Minister of Agriculture is empowered to determine which categories of areas lay within its Province. Areas which are not included in such notifications should be regarded as public fisheries areas.

The Fisheries Act, B.E. 2490 (1947) has been amended twice, in 1953 and 1984.[289] And some provisions have been revised periodically instead of being rewritten, so as to avoid

[287] Thailand: Fisheries Act B.E. 2490. op. cit.
[288] Ibid.
[289] Ibid.

rewriting the Act which would be a lengthy process involving drafting by a committee and parliament approval.[290] The process would take many years to complete.

The Fisheries Act, B.E. 2490 (1947) empowers the Provincial Governor or Minister of Agriculture and Cooperatives[291] to regulate and enforce the activities of individuals or companies involved in fisheries through administrative power, i.e. issuing regulations and decrees.[292] Regulations that apply to all coastal Provinces in Thailand include measures:

- Prohibiting any kind of turtle, tortoises and their eggs fisheries (14 April 1947);
- Prohibiting any kind of sea cow fisheries (9 August 1961);
- Prohibiting the use of trawl nets of various types (such as trawler, push net, shrimp push net) used with the motorized fishing boat within 3000 meters from the shoreline and within 400 meters from stationary gear licensed by DOF (20 July 1972);
- Prohibiting of clamp dredges used with motorized vessel with in 3000 meters from the shore line (18 February 1974);
- Prohibiting any kind of coral fisheries in any Provinces (10 January 1978);
- Control the number of the trawl and push net (26 March 1980);
- Prohibiting a use of a net mesh size smaller than 3.2 with light luring method (5 November 1981);
- Prohibiting any kind of porpoises fisheries (18 June 1990); and
- Prohibiting the crab fisheries in spawning season, during October-December yearly (11 July 1993). [293]

In addition, for the six Provinces along the Andaman Sea coast, there are Ministerial Notifications for management and conservation of marine fisheries resources that have been issued periodically providing for the:

---

[290] Thailand: Constitution Law 2540 (1997). section 92.

[291] Department of Fisheries of Thailand is the organization under Ministry of Agricultural and Cooperatives (MOAC). The MOAC has mission to administer the agriculture, forestry, water resources provision, irrigation, promotion and development of farmers and cooperatives system, including manufacturing process and agricultural products as well as other issues, as required by law to be under the responsibility of the MOAC or other governmental agencies in the MOAC.

[292] Thailand: Fisheries act, B.E. 2490. op. cit. section 5.

[293] DOF, Thailand. Book of Fisheries Law (in Thai). 2004. 111 p.

- Prohibition of horseshoe crab fisheries in the spawning season in certain areas (5 Jan 1982);
- Establishment of a closed spawning and nursery season in certain marine areas which would prohibit the use of curtain types of fishing gear during the season and within the area (11 April 1985); and
- Prohibition trawl and push net in the Phang Nga Bay (14 December 1998).[294]

Most marine fisheries capture regulations and measures were established from time to time by the procedure described above. However the provisions of the Fisheries Act, B.E. 2490 (1947) are believed inadequate to cope with the present capture fisheries situation in Thailand. DOF and many concerned organizations accept that the Fisheries Act is dated and that there are many loopholes.[295] Notably, FAO has suggested that rewriting the law would be preferable to the current piecemeal amendment approach.[296] Certain loopholes exploited by the Fisheries Act, B.E. 2490 that are believed to reduce the effectiveness of fisheries management in Thailand are described below.

First, the law is not in harmony with the constitution of Thailand, with international conventions such as the LOSC, the FAO Compliance Agreement and the CCRF, and with present Thailand national fisheries policy.

There are four sections of the constitution, B.E. 2540 (1997) that apply to the natural resources and stakeholder:

- Section 46 and 56 State that a person or community has the right to participate with State or community management, conservation and sustainable utilization of natural resources, biodiversity and the environment;
- Section 59 states that a person has the right to access information and reasons explanation before any projects or activities would be established by any organizations that may impact the environment, health, life quality of individual or

[294] Ibid.
[295] C. Karnjanakesorn, and Yen-Eng, S. 1998. op. cit. 159-168 pp.
[296] Asian Development Bank, 1985. Thailand fisheries sector study. Asian Development Bank Report. Manila, April 1985: 232 p.

local communities. A person also has the right to express their opinion through a processes that comply with the constitution;

- Section 79 states that the State has to encourage and support the people to participate in the conservation and sustainable utilization of natural resources and biodiversity; and
- Section 290 empowers the local Government to manage, maintain and use the natural resources in their jurisdiction. It also provided for its participation in the management of natural resources and the evaluation of programs or activities with respect to area outside its jurisdiction if these have the potential to negatively impact livelihoods and the environment within its jurisdiction.[297]

The Fisheries Act, B.E. 2490 is not harmonized with the new concepts of fisheries management that propose to integrate management and sustainable development so as to sustain utilization of fisheries resources in harmony with ecosystems.[298] The management mechanisms should be carried out at both local and national levels and in cooperation with local fisheries officers and stakeholders which include consultations with the academic and private sectors, non-governmental organizations, local communities, resource user groups, and indigenous people.[299]

The CCRF calls on States to develop clear and well-organized fishing policies in order to manage their fisheries. These policies should be developed with the cooperation of all groups that have an interest in fisheries, including the fishing industry, fish workers, environmental groups and other interested organizations.[300]

The fisheries policy of aims to have fishers and relevant organizations participate in fisheries administration, management, and development.[301] One of the current problems facing the sustainable management of marine resources in Thailand is believed to be an open access.

---

[297] Thailand: Constitution Law 2540 (1997).

[298] See FAO, Code of Conduct for Responsible Fisheries, annex 1. Background to the Origin and Elaboration of the Code.

[299] Agenda 21, Chapter 17.6.

[300] FAO, Code of Conduct for Responsible Fisheries: Fisheries Management (cited at 6 September 2007]); available from <(http://www.fao.org/docrep/003/x9066e/x9066e01.htm)>.

[301] S. Piumsombun, Marine Fisheries Resource Management for Sustainable Development in Thailand. National Policy and Planning for Management of Fishing Capacity in Thailand. The presentation at the Stock Assessment Workshop, Kasetsart University, Bangkok, Thailand. 1-11 August 2006.

Thus, to solve the problem, a rights system has to be implemented (instead open access) by DOF.[302] But the Fisheries Act does not support a system of fishing rights.

It's become clear that the Fisheries Act does not have any provisions that empower the local government and support the people to participate in fisheries resources management, thus it does not support Thai fisheries policy implementation. The fisheries legislation does not define fisheries management and the enforcement of Fisheries Act remains with the central authority as it has not yet been delegated to the regional or local levels. Furthermore, stakeholders and communities are not yet formally mandated to be involved in the decision-making processes. The fisheries management strategies are to considered sound scientific information provided by the department as a first step. The decision-making process at the DOF will be the second step, followed by the drafting of regulatory measures, publication of management strategies and new regulatory measures for discussions with stakeholders, and implementation and enforcement.

However, presently, DOF has increased the scope of its consultation processes to the stakeholders or fishers, this in accordance with the provisions of the Thai Constitution B.E. 2540 (1997) whereby, although centralized in authority, all fisheries management decisions are publicized prior to implementation.

Second, the Fisheries Act, B. E. 2490 was drawn up in 1947 before the development of marine fisheries. The Act is drafted primarily with inland fisheries in mind, and the main purpose was to collect taxes from fishermen.[303] All kinds of fishing gears and methods are divided into two categories:

- Those that required a fishing license as specified in the Ministerial Regulations; and
- Those that do not required a license.

[302] Ibid.

[303] C. Karnjanakesorn, and Yen-Eng, S. 1998. Revision to Thai Fisheries Law and Opportunities for Communities-Based Management. In Nickerson DJ (ed.) 1998: Communities Based fishery management in the Phang –Nga Bay. Thailand. Proceeding of the National Workshop on Communities Based management organized by the Department of Fisheries of Thailand. FAO and the Bay of Bengal Programme, Phuket, Thailand, 14-16 February 1996. FAO Bangkok. RAP Publication 1998/3 (BOBP) Report No. 78: 159-168 pp.

Gear requiring licenses are indicated in Table 17. Licensing fishing gear is the responsibility of DOF[304] while vessel registration and licensing is under the mandate of the Harbor Department.[305] This separation of competencies has lead to some mismatch of data on fishing gear and fishing boats that have negative effects on the control fishing effort and management. Gear licensing is required only for highly destructive gear, so the exact fishing effort by others gear, especially the small scale fishing gear is never reported. Moreover, some fishing gear which did not require license in the past has become more efficient and thus has a higher impact on marine resources.

Some fishers who own non-license fishing gear (such as giant traps) but register with DOF as license fishing gear (such as squid falling net) because the Harbor Department does not believe that this fishing gear (such as giant trap) does not require a license because of the capacity of non-licenses gear. If fishers have no fishing gear license to identify they would not permitted. The incorrect licensing requirement is also significantly reinforced as the Harbor Department may not license a fishing boat if it has no licensed gear. So fishers just require gear licenses for their convenient, they accept to pay taxes or fees because they are small.[306] That means fishing gears recorded by DOF is not coincident with the exact fishing gear belonging to fishers.

Taxes and fees are small when compared with the present currency[307] and first and foremost, the taxes for fishing gear license are not dependent on capacity of that gear. Some of fishing gear has disappeared completely and some of the fishing gear has been adapted for more fishing potential but the tax or fees have remained (Table 17-19).

[304] Thailand: Fisheries Act, B.E. 2490. op. cit.
[305] Thailand: Thai Vessel Act, B.E. 2481 (1938)
[306] S. Panjarat. Interviewed by author with 20 fishers, Ban Namkem Village, Takuapa District, Phang-Nga Province, Thailand. January 2005.
[307] One of living cost index for Thai is a cost of egg; in October 2007, price of a dozen eggs is 25-35 baht.

Table 17: Fishing gear requiring licensees and rate of fishery tax

Name of Fishing Implements	Rate of Fishery Tax (Annual Fee) Baht/unit*
1. Simple lift net (4 types)	20
2. Stow net(Set bag net)	20
3. Bag of barm	15
4. White board catching	10
5. Cast net more than 4 m. in length	10
6. Scoop net more than 3.5 m. in width	10
7. Long line more than 40 m. in length	5
8. Barrage	1
9. Push net	150
10. Net, Gill net, Purse seine and Trawler	
(i) gill net/purse seine, mesh size more than 7 cm.	1
(ii) gill net/purse seine, mesh size less than 7 cm.	2
(iii) trawl net	5
(iv) other nets	
-the width from 1 to 4 meters	0.5
-the width from 4 to 8 meters	1
-the width from 8 to 24 meters	2
-the width more than 24 meters	3

The average currency baht per 1 US dollar in 2006 was 35.83.

Source: Thailand: Fisheries Act B.E. 2490. Government Gazette Vol. 64 No. 3. 14 January 1947.

Table 18: Rate of fishery tax on permit for catch fishermen on reserved fisheries

Name of Fishing Implements	Rate of Fishery Tax (Annual Fee) (Baht)
1. Permit for a fishermen using a non-licenses fishing implement in reserved fisheries	15
2. Permit for collecting sea mussel	15
3. Permit for collecting pearl shell	15

The average currency baht per 1 US dollar in 2006 was 35.83.

Source: Thailand: Fisheries Act B.E. 2490. Government Gazette Vol. 64 No. 3. 14 January 1947.

Table 19: Rate of fee

Description	Rate of Fee (Baht)
1. Permit for trading in aquatic animal products and fisheries industry per year	150/unit
2. Transfer of concession	20/each
3. Transfer of permit or licenses	20/each
4. Substitute of permit, licenses or concession	20/each
5. Fishermen's permit	10/year
6. Endorsement license for alternating and inserting name of person entitle to use licenses fishing implement	5/each time

The average currency baht per 1 US dollar in 2006 was 35.83.

Source: Thailand: Fisheries Act B.E. 2490. Government Gazette Vol. 64 No. 3. 14 January 1947.

(ii) Thai Vessel Act, B.E. 2481 (1938) (as amend by the Act B.E. 2540)

The Thai Vessel Act includes 9 chapters, namely: the registration method and register document, transference of registered boats, mortgaging and preferential right of the registered boat, name and changing or renewing registration of the registered boat, the right and special duty of Thai boats, miscellaneous chapter, and a penalties and provisional chapter. Under the Thai Vessel Act, all vessels with inboard power engines or the vessel more than 6 ton gross without power engine engaging in domestic fisheries must be register under Thai flag at Harbor Department. [308]

The Thai Vessel Act, B.E. 2481 (1938) effect to Thai vessels in Thailand include fishing vessel. Because of fishery is restriction for foreigners, foreigners are prohibited from participating in the fishery for marine animals within Thailand's EEZ. For the domestic fishing vessels, the owner must be either by a natural person of Thai nationality or juristic person incorporated under the Thai Civil and Commercial Code with at least 70% Thai is shareholders in that juristic person.

The Thai Vessel Act does not relate to fisheries management, it directly regulates all kinds of boats. Thus, controlling or reducing the number of fishing boats requires the operation between the DOF and Harbor Department. However, for more effectiveness, the Thai Government should control fishing boats separately from other boats this system should be integrated with the fishing gear licensing system. The specified organization or unity of action to regulate fishing boats and their gear would allow for effective control and management.

(iii) Fish Market Act B.E. 2496 (1953)

The main provision in Fish Market Act B.E. 2469 (1938) are establishment the Fishing Marketing Organization as the juristic person and its regulation that aims to:

- carry on and bring about prosperity to the fish wholesale market, the market for fisheries merchandise and fisheries industry;

[308] Thailand: Thai Vessel Act, B.E. 2481. Government Gazette Vol. 56. 10 April 1939.

- carry on or control and direct the services concerning the activities the market for fish agent, transportation and other activities in connection with the activities of fish agent;
- promote the welfare or occupation of fisherman and to improve fishing village and
- promote fishing cooperative society or associations.[309]

In order to implement this mandate the Fish Marketing Organization of Thailand is established as a semi-governmental organization and one of the State enterprises which is attached to MOAC. It plays a prominent role concentrate in catch production at the landing sites, fishing port organization and marketing service. It rarely participates in fisheries management or provides loans to fishers, and does not work with small scale fishers in rural villages who do not use fishing ports for landing.

The Fish Marketing Organization should promote fishing cooperative societies or associations and should implement fishing cooperatives in rural areas as provided in its mandate. The cooperatives system would effectively eliminate the need for middle men.

(c) Legislation indirectly impacting fisheries

There are legislations that indirectly impact fisheries, including the legislation that was enacted after the tsunami event of 2004.Thease include:

(i) National Parks Act B.E. 2504 (1961)

The provisions in the National Pak Act B.E. 2535 (1992) relate to fisheries that impact MNPs and their licensing of or management of these parks.[310] Under this Act, all kind fisheries in the MNPs are prohibited. There are 16 MNPs on the Andaman coast of Thailand.[311] They are protected, managed and operated by the Department of National Park, Wild Life and Plant Conservation, Ministry of National Resources.

[309] Thailand, The Act Organizing the Activities of Fish Market B.E. 2496. 9 January 1953.
[310] Thailand, National Parks Act B.E. 2504. Government Gazette Vol. 78, Part 80, October B.E.2504 (1961).
[311] T. Sethapun, op. cit. 18 p.

Fishery activities are considered a central problem in many MNPs, especially for the coastal parks which incorporate traditional fishing grounds. The conflict between conservation and marine resources utilization is currently increasing in Thailand. According to existing legislation, fishing within parks is prohibited. It is noted that when it comes to enforcement, this issue is treated in a flexible way, with some MNPs allowing fishing. However, local fishermen in general feel that the MNPs put unnecessary constrains on local fishing activities. The use of illegal and inappropriate fishing gear has negatively impacted the MNPs environment. Trawling has also had a very negative impact on marine resources both in the Andaman Sea and the Gulf of Thailand. In particular, the use of push nets and explosives along the shallow coast of Thailand has resulted in a severe decline in fish resources.

Although fishing within the marine parks remains an important issue, the problem is addressed in a relatively effective way. Illegal fishing has been reduced during the last five years. Various local NGOs and local people have in particular played a significant role in increasing awareness as well as cooperating with park staff for protection. Another factor contributing to the decrease of illegal fishing is the increase in tourism activities in park areas. This will automatically repel the illegal fishing activities from the park areas.[312]

(ii) Wild Animal Reservation and Protection Act, B.E. 2535 (1992)

The provisions in the Wild Animal Reservation and Protection Act B.E. 2535 (1992) cover marine animals which are listed as wild animal in the Reservation and Protection lists.[313] The Act prohibits hunting,[314] breeding,[315] possessing,[316] trading[317] importing or exporting[318] wild animals. Furthermore, the Act provides a mechanism for establishing wild animal reserve areas.[319] However, the Act allows the survey, study, research, of wildlife protection, breeding, or for the interest of public zoological garden enterprises carried out by the Government sectors

[312] Ibid.
[313] Thailand, Wild Animal Reservation and Protection Act, B.E. 2535. Government Gazette Vol. 109, Part 15. 28 February 1992.
[314] Ibid. section 16.
[315] Ibid. section 18.
[316] Ibid. section 19.
[317] Ibid. section 20.
[318] Ibid. section 23.
[319] Ibid. chapter 6.

under permission, rules and conditions set by Government. [320] The degree of restriction is based on a listing system, which consist of three categories of progressively increasing protection;

- Catagory 1: Protected wild animals, there are 15 species in the list including *dugong dugon* or sea cow;
- Catagory 2: Reserve wild animals, there are seven groups of animals covering various species. The important marine animals in this category including porpoises and whales, giant clams, corals and sea flowers, turtles; and
- Catagory 3: The animals on the list of the Convention on International Trade in Endangered Species of wild fauna and flora (CITES).[321]

The Act prohibits activities including fisheries that impact marine animals in the list, and prohibits fishing in wild animal reserve areas. In general, the fishers do not intend to catch whales, dolphins, or sea cow unless these animals are caught in the nets or gear by accident. Nonetheless, the high fishing effort and the use of destructive fishing gear impacts the habitat and life cycles of these endangered and rare marine species. Presently, there is no legislation concern by-catch of fisheries.

(iii) Notification of Environment Protection in the Impact Area of Tsunami in Krabi, Trang, Phang-Nga, Phuket, Ranong and Satun Province, 12 April 2549 (2006)

The Notification of Environment Protection the Impact Area of Tsunami in Krabi, Trang, Phang-Nga, Phuket, Ranong and Satun Province, 2549 (2006 the Notification) was established by the Ministry of National Resources and Environment with propose to rehabilitate the coast and its environment impacted by the tsunami.[322] It covers four issues, including; natural resources, ecology system, nature condition, and environment.[323] The key provisions of the Notification are as follows;

---

[320] Ibid.
[321] Ibid.
[322] Thailand, The Notification of Environment Protection the Impact Area of Tsunami in Krabi, Trang, Phang-Nga, Phuket, Ranong and Satun Province, 2549. Government Gazette Vol. 123 No. 52, April 12, 2006.
[323] Ibid.

- Protecting the environment in the radius area of 3,000 meters from the shoreline both in land and seaward;
- Protecting and rehabilitating marine natural resources and the marine environment with a focus on coral reefs and marine ornamental fish. There are 110 families of marine ornamental fish list on the schedule list of protection;
- Managing, controlling, and reducing the pollution in the area; and
- Managing land use along the coast, especially sand beaches and bar beaches.[324]

Before the 2006 Notification was legislated there were some opposition from DOF, who did not agree to include the ornamental fish (especially Pomacentridae family) in the protection list of the 2006 Notification. The DOF view these species as part of culture fisheries which could be developed into alternative fisheries for fishers. On the other side of the issue the Department of Marine and Coastal Resources (DMCR) took the position that such species should be protected through the listing process so as to prevent the harvesting of ornamental fish for trading. This position was taken because of the increase in such practices due to the rising popularity of the aquarium trade which could lead to the extinction of certain species if no regulations are put in place. In the end, DMCR position prevailed because even the ornamental fish can be cultured but at present there are no instruments to identify the culture fish from the wild fish, thus it will be a channel for illegal fishing. And as outline above, ornamental fish became listed under the 2006 Notification.

2. National Fisheries Policy

DOF is the lead national agency in policy development for fisheries in Thailand. The responsibilities of DOF are to research, develop, and manage fisheries resources and aquatic animal production so as to meet domestic consumption and provide for export of high-quality products. Including so, it must ensure sustainable utilization of fisheries resources and protection of the environment.[325] DOF divides fisheries policy into five categories, each of which has specific missions to guide the policy implementation. The Thai fisheries policy categories and their respective missions are summarized below in Table 20.

[324] Ibid.
[325] DOF, Thailand. Fishery Policy Directions of Thailand. Ministry of Agriculture and Cooperatives. 2006. 19 p.

Table 20: The fisheries policy and missions of the Department of Fisheries of Thailand

Policy	Mission
(a) Development of Fisheries and Involved Organizations	• To have fishers and involved organizations participate in fisheries administration, management, and development. • To increase knowledge and skill of fishers for their self-reliance and increase their capability in managing organizations. • To improve the efficiency of organization and the departmental human resource development.
(b) Management of Fisheries Resources and Environment	• To maintain fisheries resources in harmony with sustainable utilization and without negative impact to the environment, under joint administration and management by Thai people, community, local organizations, and Government. • To research and develop fisheries technology to secure the occupation of fishers and farmers. • To conserve and manage fisheries resources and environment for sustainable development and protection of biodiversity. • To rehabilitate fisheries resources and create public awareness in fisheries resource conservation for sustainable utilization.
(c) Aquaculture Development	• To increase fish production from aquaculture sufficiently for domestic consumption. • To increase fish production in both quantity and quality for domestic trade and export. • To accelerate research in supporting commercial aquaculture for increased trade volume, quality standard and reducing cost. • To develop sustainable marine shrimp culture system for domestic trade as well as for export. • To develop production and marketing of fresh ornamental fish and aquatic plants for export in order to raise income of aqua-culturist.
(d) Oversea Fisheries Development	• To develop capacity and technology of the Thai overseas fishing fleet to meet proper standards for fishing operation in international waters. • To control and regulate fishing operations in compliance with agreements with other coastal States or joint-venture partners. • To expand fishing operations towards the high seas and deep seas. • To develop personnel engaged in the overseas fisheries sub-sector.
(e) Fisheries Industry Development	• To maintain the status of Thailand as an important fish producing and exporting State. • To strengthen the competitiveness of fisheries products for export. • To support fishermen, farmers, entrepreneurs and relevant agencies in using technology for occupational development in fishing, aquaculture and fish-processing.[326]

[326] Ibid.

As noted above, DOF is responsible for Thai fisheries management. However, in 2002, a new department was established within new Ministry, the Ministry of Natural Resources and Environment: The Department of Marine and Coastal Resources (DMCR) aim at conserving resources in the coastal ecosystem that included both living and non-living in the areas. Since then, the responsibilities for the fish and ecosystem management have to be shared with DMCR which responsible for the coastal area.[327] Thus, it made the overlapping mandate of the responsibility for example, the implementation of the concern legislation which is responsibility by the both department that lead to some argument as noted previously. Although, it is expected that the DCMR will be joint the responsible for the fish and ecosystem that aim for conservation while the DOF responsible for the fisheries resources management for sustainable use. The relationship between the responsibilities and mandate of DOF and DCMR for fisheries is still being negotiated.

The national framework on fisheries in Thailand is currently undergoing considerable change to meet international agreements and principles for sustainable and responsible fisheries. Presently, there is a draft bill for a new Fisheries Law before Parliament which addresses many of the current fisheries concerns. However, even with the new Fisheries Act, it will be difficult to avoid overlapping mandates between DOF and DCMR because both have a mandate regarding the same resources and concerning the same group of stakeholders. The overlapping mandates of both Departments, such as the establishment of measures and regulations establishment, artificial reef installations, causes confusion amongst fishers and stakeholders. Cooperation and negotiation between organizations would be an effective solution, as both have the same objective to maintain the resources for the long term.

The draft bill for a new Fisheries Law includes nine main provisions: fisheries management, fisheries zoning, aquaculture, hygiene of catch after fishing and import-export fisheries production, fisheries outside Thai EEZ, fisheries development and extension trust fund, authorization of employee, and penalties. The new content of the bill is fisheries zoning that aims to divide the inshore (approximately three miles from the shore line) and offshore fishing zone within Thai waters. The fishers have to be authorized to fish in each zone. The Bill includes new provisions related to fisheries outside the Thai EEZ, and also with regard to the

[327] Office of Civil Service Commission, The Government Department in General Reform Act, B.E. 2545 (2002) (cited May 2007); available from <http://www.ocsc.go.th/upload_files/lawcommand/PrbOverhaul2545_15Mar46.pdf>.

regulation of joint venture fisheries. Furthermore, the bill introduces participatory and consultative processes for stakeholders in fisheries management through two mechanisms: firstly through the establishment of a national fisheries policy committee, and secondly through the establishment of the local fisheries committees.[328] When the new fisheries law is issued, it is expected to be a more effective instrument for fisheries resources management.

[328] See DOF, Fisheries Draft Bill, the Law under Fisheries Law Development Plan. (in Thai). 2006. 39 pp.

Part V Conclusion and Recommendations for Sustainable Fisheries Managements

Thailand's capture fisheries involves fishing in the EEZ of Thailand, fishing in the EEZs of other coastal States by joint venture fisheries or other types of cooperation, and fishing on the high seas, a recent development for the fisheries sector of Thailand.

Although the Thai fishing industry is one of the ten largest in the world, fisheries resources within the Thai EEZ are in a state of crisis and have been for some time. Thailand is faced with a decline in fisheries resources, over capacity in fishing fleets and the use of destructive fishing gear, overexploitation, fuel crisis, severe violations of laws and regulations, conflicts among the fishers and so on.

Some of the production that maintains Thailand among the top ten largest States in fisheries comes from the EEZ of other coastal States. Fishing in EEZs of other coastal States is limited by those States and some Thai fishers fish without licenses, often creating disputes between Thailand and others coastal States.

In regard to the Andaman Sea coast of Thailand, it has become clear that it is in the same situation as the other coast of Thailand. The Andaman Sea coast has seen a substantial decline in fisheries resources. The tsunami event of December 2004, the fuel crisis, the violation of regulations and illegal fishing all have impacted fisheries negatively. This situation will create an increasing problem not only for the fishers but it will also lead to serious degradation of all marine resources, thus threatening the sustainable management and health of the Andaman Sea as a whole. As noted previously, the fisheries problems in the Andaman Sea involve the fisheries within the Thai EEZ and those beyond the Thai water. Thus, it is not enough to address only the problems of fishers and fisheries resources only in the Andaman Sea area. A comprehensive management regime at the national level needs to be further developed and implemented.

First, at the international level, Thailand has to clarify its position with respect to various international conventions. Second, Thailand should implement regional instruments for effective efforts in fisheries management. Third, a reform of national fisheries laws and regulations is needed so that Thailand can have a coordinated and integrated policy that will allow it to take a responsible role in protecting for marine resources and their environment for generations to come.

A. The ratification and implementation of International Instruments

Thailand should ratify or accept and effectively implement international fishery instruments, including: the LOSC, the 1995 UN Fish Stocks Agreement, the FAO Compliance Agreements, and the 1995 CCRF.

1. The LOSC

As enumerated above, the LOSC is one of the most comprehensive international treaties and often called the Constitution of the Ocean. It provides the legal framework and basis for the other international agreements. Even Thailand still inactive to the LOSC, but can not refuse its legislation power. It is difficult for Thailand to avoid ratification the LOSC.

As outline above, Thailand has always maintained that it is a LL/GDS State but this position was not accepted by the other States participating in the LL/GDS group during the third LOS conference. Since this time, Thailand has not expressed or clarified its position on the LOSC. Even if Thailand was accepted in the LL/GDS group, it did not benefit from its participation. Because, presently the LOSC is ratified by 155 States, the power of the LL/GDS may not be enough to force to secure rights to fish in the EEZs of other coastal States. Thus even if Thailand was accepted in the LL/GDS, access surplus stocks in the EEZs of other coastal States remains the decision of those coastal States.[329] Given the above, access to surplus stocks is never base on "free access", but takes the form of joint venture fisheries or licenses fisheries.

If Thailand ratifies the LOSC, under the LOSC, Thailand could have joint ventures or other co-operative fisheries with other coastal States to access the surplus of the allowable catch in their EEZs where those coastal States do not have capacity to harvest the entire allowable catch.[330] As a State party, the power of Thailand to negotiate would increase, at the same time other coastal States would feel more security to negotiate with another State party. If Thailand aims to maintain access to the fisheries in the EEZs of other coastal State for the long term, then Thailand could benefit from these LOSC provisions.

[329] LOSC, art 62, art 69 and 70.
[330] LOSC, art 61 and 62.

Being a non-party works to the disadvantage of Thailand, not only in issues of marine fisheries, but also with respect to navigational rights, freedom of navigation is ensured to all States, even non-parties, such as freedom of passage in the EEZs of States party and make it more difficult to negotiate. For example, Thai fishing vessels that fish outside Malaysia's EEZ but pass through Malaysia's EEZ were suspected by Malaysia to be fishing. Although these vessels had simply been exercising their right of innocent passage, they were arrested as they had fish on board.[331] In this case, Thailand cannot submit disputes with Malaysia regarding the freedom of navigation for Thai fishing vessels in Malaysia's EEZ to ITLOS because ITLOS only available to State parties.[332] This has seriously disadvantaged Thailand in its negotiations with Malaysia.[333]

As a consequence, the urgent challenge to Thailand is the ratification LOSC without delay, and the use of negotiation channels provided by LOSC to solve these problems.

2. The 1995 the United Nations Convention Agreement on Straddling Fish Stocks and Highly Migratory Fish Stocks

The LOSC established the general framework for high sea fishing rights, but did not codify specific operational provisions.[334] A more detailed management regime for straddling fish stocks and highly migratory fish stocks was thus developed to through the UNSFA.[335] The UNSFA encourages States to cooperate to ensure: conservation, promote optimum utilization of straddling and highly migratory fish stocks both within and beyond the EEZ and emphasize the importance of regional fishery management bodies. Thailand should ratify the Agreement and become fully involved in regional fishery organizations.

---

[331] See J. Saisoontorn. The effect of EEZ proclamation of other coastal States on Thai fisheries. 13 pp.; Act 311 of 184 on the Malaysian Exclusive Economic Zone, section 16. Malaysia Government Gazette, 31 December 1984. The Act specified fishing boat pass through Malaysian EEZ with only right of innocent passage, although the LOSC art 58 and art 87 state that all kinds of boats have right of freedom navigation.
[332] LOSC, art. 291, 1; Statue of the Tribunal, art 20, 1.
[333] P. Kemakorn. op. cit.
[334] L. Juda. Rio Plus Ten. 2002. op. cit. 109-144 pp.
[335] Ibid.

3. The FAO Compliance Agreement

Thailand has not become a party to the Compliance Agreement because in the past it did not have any fishing vessels operating on the high seas. Presently, Thailand has developed a high seas fisheries and therefore should consider becoming a party to the Compliance Agreement. The FAO Compliance Agreement has both the principle of practices and punishments for States which violate applicable rules, most importantly of all, a State is not allowed to use its flag unless it can effectively control the fishing activities of their vessels. Thus, the FAO Compliance Agreement is classified as one of hard law.[336] If Thailand became a State party and implemented the agreement's provisions, it would be in a stronger position to develop sustainable and profitable a high seas fisheries.

4. The 1995 Code of Conduct for responsible fisheries

The present fisheries problems addresses by the CCRF are all present in the Thai fisheries. The CCRF provides guidelines for fisheries management that will maintain the sustainability of the resources within a comprehensive and balance system under the concept of responsible fishing which is applicable globally. The implementation of the CCRF with other States in the area of technical assistance, technology transfer, training and scientific research, and data exchange[337] will fulfill and enhance Thailand's ability to implement effectively instruments for fisheries management in Thailand.

The code of conduct is voluntary which mean it will be effective in long term when accepted and practiced by stakeholders. However the code is a global standard applicable, it should be adapted to implement in Thailand for the most effective.

[336] L. Juda. Rio Plus Ten. op. cit. 121-121 pp.
[337] FAO, Code of Conduct- art 5: Special Requirement for Developing Countries.

B. Implement the regional instruments

Thailand can cooperate directly with the States of the regions as well as through appropriate regional organizations. The nature of cooperation may be scientific research and training, sampling programs and so on. There are lessons to learn from the experience of outside States in the region that have similar problems. Some of the measures taken by other States might be useful to improve and adapt for implementation in Thailand.

The BOBLME program, the APFIC, the COBSEA and the SEAFDEC are all regional organizations that play an important role in the implementation of effective guidelines for responsible fisheries by considering regional specificities of fisheries structure, ecosystem, cultural, social, economic factors, as well as other issues of importance in the region. The IOTC is an organization that plays an important role in tuna resources management in the Indian Ocean, and Thailand is membership as allow it to be fully involved in tuna resources management. Thailand can be assisted in term of research and development activities in respect of the tuna stocks and fisheries, and such other activities, including the transfer of technology, training and enhancement.[338]

In addition, closer international cooperation fasters closer relationships and reduces disputes between Thailand and other coastal States.

C. National Fisheries Law and regulation reform

The national fisheries law is the most important instrument for the achievement of sustainable management. It should be the immediate objectives of the Government to increase support for the sustainable management and to bring Thailand up to date with respect to international principles for responsible fisheries and marine resources management. New law and regulations should be compatible with international law and agreements and address many of the current fisheries concerns. Furthermore, it should introduce participatory and consultative processes for stakeholders into fisheries management. The challenge for the Government will then be implementating and supporting full enforcement of the new law.

[338] IOTC, Agreement for the Establishment of the Indian Ocean Tuna Commission: art V. 2-2 pp.

D. The potential approaches for sustainable management and recommended measures

Due to the diversity of fisheries in terms of resources, local conditions and the capacity of the local Government and stakeholders, it is difficult to successfully promote a single approach to fisheries management. The priority for Thai fisheries management reform is thus to strengthen and develop legally enforceable decentralized management coupled with appropriate rights-based incentives to the fishing community. This should be accompanied by the strengthening of collection of data on gear and boats so as to have a clear understanding of the fisheries sector and its capacity. Thailand should promote the participation of local communities and the public in the development of the fisheries. Recommended potential approaches for sustainable management are described below.

1. Centralized to Decentralized Management

Traditionally, the management of coastal fisheries in Thailand has been centralized. DOF is the sole agency with the mandate for the management of coastal fisheries and all management measures have been established by DOF without consulting fishers or other stakeholders. The central management authorities delegate only very limited management functions and responsibilities to the local level. Thus, DOF has difficulty in obtaining positive results in coastal fishery resources conservation and management and the fishers do not accepted or have negative attitudes regarding fisheries measures established by DOF. [339] The United Nations defined decentralization as

The transfer of authority on a geographic basis whether by de-concentration (i.e., delegation) of administrative authority to field units of the same department or level of Government or by the political devolution of authority to local Government units or special statutory bodies.[340]

---

[339] S. Panjarat, *et* al. 2005. Fishermen's Attitude on Conservation Measure of Phang-Nga Bay during Spawning Season. op. cit. 52 p.; S. Panjarat, 2005. Fishermen's Attitude on Management of Blue Swimming Crab Resources in the Andaman Sea. op cit. 52 p.; S. Panjarat, *et* al. Fishermen's Attitude on Management of Blue Swimming Crab Resources in The Andaman Sea. op. cit. 37 p.

[340] United Nations, *Decentralization for national and local development. ST/TAO/M/19 United Nations*, New York. 1962. 246 p.

The decentralization of fisheries Management is a generic term that describes the delegation of selected fisheries management responsibilities and functions to local government, community organizations or institutions.[341]

Decentralization is especially applicable in the Andaman Sea coast where over 20,000 fisher households operate and depend on fishing. The proposed management law and strategies will facilitate closer contact and interaction with fishers and stakeholders, and will make Government support services more effective. To support the decentralization approach, a Provincial Fishery Management Committee should be established in every coastal Province with the mandate of managing the fishery in Provincial fishing grounds. The Members of Provincial committee should include small-scale fishers, commercial fishers, and the chairman of Tumbon (Sub-district) Administrative Organization (TAO).[342] At present, Thai Fisheries Cooperatives are not active in fishery management due to the constraints of the legal framework and fisheries cooperatives management.

Furthermore, the decentralization process can not be effective unless human resources are present at the central and local levels including stakeholders.[343] Thailand has to prepare and develop human resources capacity, especially the local community and institutions in order to take up additional responsibilities and strengthen their capacity for decentralization. Promotion and training for decentralization should be provided to both the Government and fishers, starting with each level simultaneously and continuing.

2. Rights-based Fisheries management strategy

Rights based fishery has been defined as "a fisheries in which the right to fish or use fisheries resources is granted to resources user and regulated by the competent authority."[344] In return, the holder of the fishing rights has the obligation to comply with rules and regulations of the right based management system. Under this system, fisheries

[341] P. Wongsawang, 2003. Innovative Fisheries Management for the ASEAN Region: Is Decentralization the Right Answer? Fish for the People. Vol. 1. 17-22 pp.
[342] K. Juntarashote, 2004. Decentralized management the new approach of Thai coastal fishery management. International Institute of Fisheries Economics & Trade. Corvallis, Oregon, (USA).
[343] P. Wongsawang, 2003. Innovative Fisheries Management for the ASEAN Region: Is Decentralization the Right Answer? Fish for the People. Vol. No. 1. 17-22 pp.
[344] Ibid.

input, such as number of fishing vessel or fishers, the type of fishing gear, the fishing season and fishing grounds, will be effectively controlled as locally agreed in a transparent manner and with full stakeholders participation.[345] This participatory approach, with local stakeholder's involvement is the key to rights based fisheries. And to effectively define and allocate fishing rights, right-based fishery management regimes must be based on accurate information for each fishery.

To implement a rights based fisheries management strategy in Thailand, all fishing boats must be registered where they are intended to operate. All types of fishing gears must also be registered for the fishing ground in which they are intended to be used. Vessel markings will be imposed so that fishing boats are easily identifiable at a distance. Commercial fishing boats may be required to install a tracking device. The Coastal radio stations may also be used to monitor and assist fishing boats. This approach would be an effective instrument to replace open access in Thailand. One of the present problems is that there is not enough funding for the Government to support a patrol service to inspect illegal fishing in all areas, so this approach will reduce costs through share inspections with the local stakeholders. In addition, it will stop the movement of the vessels between fishing grounds thereby contributing to the resolution of conflict between fishers.

3. Ecosystem-based Management Strategy

The Ecosystem-based management has been defined by the FAO:

> An ecosystem approach to fisheries strives to balance diverse societal objectives, by taking into account the knowledge and uncertainties about biotic, abiotic and human components of ecosystems and their interactions and applying an integrated approach to fisheries within ecologically meaningful boundaries.[346]

---

[345] Ibid.

[346] FAO, Ecosystem-based Approach to Management (Fisheries Management), Definition used by others. 2003. 5-5 pp. *In* Strengthening Scientific input and Ecosystem-Based fisheries management for the Pacific and North Pacific Fisheries Management Councils. Suggestions from a panel discussion July 19-20, 2005 Seattle, Washington. Pacific States Marine Fisheries Commission. 2005. 42 p.

In ecosystem based management, the associated human population and economic or social system are seen as integral part of the ecosystem with multiple scales (Table 21). Most importantly, ecosystem based management is concerned with the processes of change within the living system.[347] Ecosystem based management therefore is designed and executed as an adaptive, learning based process that applies the principle of the scientific method to the processes of management.[348]

Table 21: Ecosystem-Based Management as a paradigm Shift

From	To
• Individual species • Small spatial scale • Short-term perspective • Human independent of ecosystem • Management divorced from research • Managing commodities	• Ecosystem • Multiple scales • Long term perspective • Human as integral part of Ecosystem • Adaptive management • Sustainable production potential for ecosystem goods and services

Source: Lubchenco (1994) in Stephen B., Olsen, Jon G. Sutinen, Lawrence Juda, Timothy M. Hennessey and Thomas A. Grigalunas. 2006. A handbook on Governance and Socioeconomics of Large Marine Ecosystem. 3-3 pp.

4. Community Based Management Strategy

Community Based Management (CBFM) is a system in which fishers and their communities exercise primary responsibility for stewardship and management, including taking part in decision making on all aspects of management, such as harvesting, access, compliance, research and marketing. Other features of CBFM include local control, a focus on the ecosystem rather than on specific species, power sharing, and a common interest in and responsibility for, common resources.[349]

For several reasons, CBFM would be an appropriate strategy for the management of Thailand fisheries. In 1995, CBFM initiative projects were implemented in Phang-Nga Bay

[347] B., Stephen Olsen, Jon G. Sutinen, Juda Lawrence, Timothy M. Hennessey and Thomas A. Grigalunas. 2006. A handbook on Governance and Socioeconomics of Large Marine Ecosystem. 96 p.
[348] Ibid.
[349] Michael L. Waber and Suzanne Iudicello. Obstacles and Opportunities for Communities Based Management in the United States. September 2005. 101 p.

of Andaman Sea coast.[350] The results of the programs have created better overall outcomes and success, especially in terms of participation and equity. The project established a central market for the auction of fish catch that cut out the middle men. The central market is a cooperative and administrated by the members of the village. The economic security leads the fishers who were seriously concerned about the degradation of the fishery resources and coastal ecosystems, to fully participate in the management of fisheries resources and their traditional fisheries for sustainable use.[351] The project sites became local study points for other fisheries management plans. The lessons learned from Phang-Nga Bay projects could be applied in other coastal areas of Thailand.

The key conditions for the success of CBFM have been identified as: socioeconomic status of communities such as homogeneity of community and dependence on fisheries, active participation cooperation and coordination of stakeholders and follow-up and evaluation by the responsible organization.[352]

5. Co-management Strategy

Co-management can be defined as a partnership arrangement in which the fishers and Government share the responsibility and authority for the management of fisheries (Figure 8). Through consultation and negotiation the partners develop a formal agreement on their respective roles responsibilities and management rights.[353]

[350] Nickerson, D.J.Community-based Fisheries Management in Phang-nga Bay, Thailand - BOBP/REP/78 Phuket, Thailand; 14-16 February 1996 Series title: Non serial publications - REP78 1998. 227 p.
[351] J. Pimoljinda, Boonraksa V. Community-Based fisheries Co-management, Case-Study: Phang-Nga Bay, Thailand. Proceedings of the International Workshop on Fisheries Co- management. 34 p.
[352] Ibid.
[353] R. Pomeroy. Fisheries Co-Management. A fact sheet for Connecticut Fishermen. Sea Grant Connecticut. Publication number CTSG-04-01. 2 p.

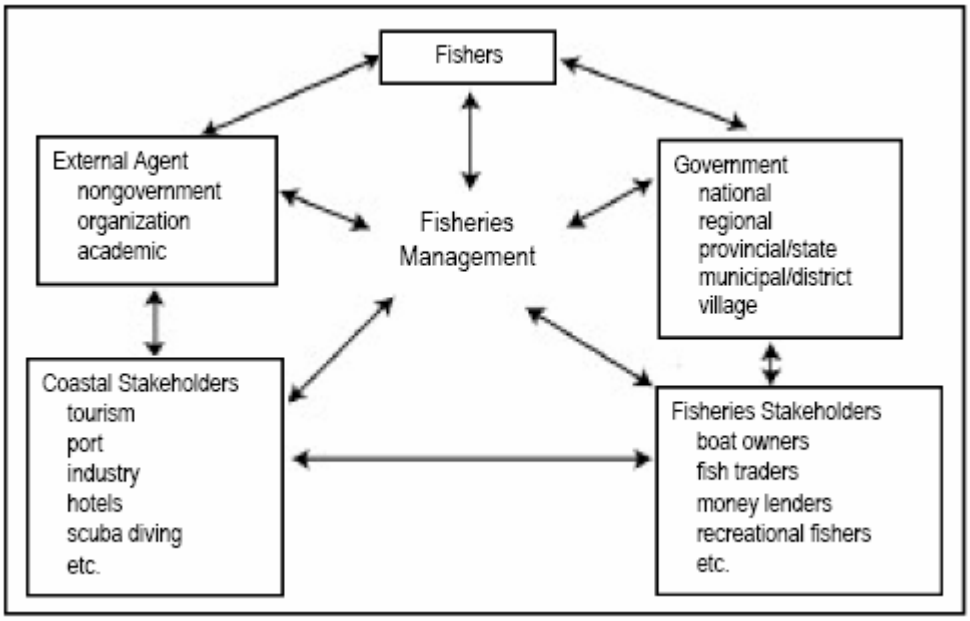

Figure 8: Fisheries management is a partnership

Source: R. Pomeroy. Fisheries Co-Management. A fact sheet for Connecticut Fishermen. Sea Grant Connecticut. Publication number CTSG-04-01. 2 p.

Many experts suggest that a co-management strategy is appropriate for the Andaman Sea coast of Thailand[354] due to the nature of fishing conduct, range of fishers in the area that lack of territoriality of fishing location and overlapping fishing range between communities and based on the species targets by fishery.[355]And any co-management scheme for the area will need to be widely implemented.

As Stated previously, it is difficult to successfully promote a single approach to fisheries management. Alternative approaches should be use as a basis for fisheries in Thailand The strategies should be adapted, adjusted or mixed together for the most appropriate in each area. For evaluating the integrated management regimes, it should contain the recover of the fisheries resources either in term of CPUE or income of fishers and reduce the conflict among the resources user. And first of the most it should be balancing between the utilization and economic need of fishing community and recruitment or the producing of the sea at the sustainable level.

[354] Yves Henocque and Sanchai Tandavanitj. 2004. From community-based management to Co-management, Thailand's Experience. Fish for the People. Vol. 2. No. 1. 17-22 pp.; B. Crawford, Trip Report January 7-19, 2006, Post tsunami Sustainable Coastal Livelihood Program. 1-11 pp.

[355] B. Crawford, Trip Report January 7-19, 2006, Post tsunami Sustainable Coastal Livelihood Program. 1-11 pp.

Nowadays fisheries resources management is more complex, dynamic and multifaceted. For Thailand, to overcome the problems and ensure sustainable fisheries, effective instruments should be harmoniously implemented all levels: global, regional, national and local. However all measure must also respect the capacity of the fisheries resources. The success of sustainable fisheries management in Thailand will be gainful not only for Thai people but it also for the security and sustainability of food resources for many other people in the World.