

**COASTAL MANAGEMENT AND COMMUNITY  
MANAGEMENT IN MALAYSIA, VIETNAM, CAMBODIA  
AND THAILAND, WITH A CASE STUDY OF THAI  
FISHERIES MANAGEMENT**

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## **ABSTRACT**

This report reviews approaches to coastal management and community management in Malaysia, Vietnam, Cambodia and Thailand. It includes the case study on fisheries management in Thailand. The data source collected from journal articles, technical papers and website.

Malaysia is the only one country with administration of coastal zone management by the federal Government and is strongest in surveillance and enforcement but lacks community based management. Community management in Vietnam established from community needs that they want to protected their resource and also had community traditions to supported resource management. Cambodia is very young in coastal management and almost of aquatic policy is focused on fresh water because close to 75 percent of aquatic protein come from the Tonle Sap and Makhong rivers. Thailand has decentralized fiscal responsibility to the local level for the collection of taxes and administration of funds. Fisheries communities have the right to manage their resources; an approach which was promoted by the Department of Fisheries. With respect to fisheries management, Thailand faces challenges of overexploitation of the resources and a lack of real data on the number of fishing gears; both of which must be addressed so as to allow effective fisheries management.

## **SUMMARY**

### **WORKING TITLE:**

Coastal Management and Community Management in Malaysia, Vietnam, Cambodia and Thailand with a Case Study of Thai Fisheries Management

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## ACRONYMS

ADB	Asian Development Bank
ARNHP	Australian Regional Natural Heritage Programme
AusAID	Australian Agency for International Development
BOBP-LME	Bay of Bengal Project on Large Marine Ecosystem
CHARM	Coastal Habitats and Resource Management
CBFM	Community Based Fisheries Management
CBNRM	Community Based Natural Resource Management
CBRM	Community Based Resource Management
CEC	Coastal Engineering Center
CF	Community Fisheries
CIDA	Canadian International Development Agency
CMDEC	Chumphon Marine Fisheries Research and Development Center
CPUE	Catch Per Unit Effort
CZM	Coastal Zone Management
DANCED	Danish Co-operation for environment and development
DANIDA	Danish International Development Assistance
DFID	Department for International Development
DMCR	Department of Marine Coastal and Resource
DOF	Department of Fisheries
DSFRDT	Deep Sea Fisheries Research and Development Technology
EEZ	Exclusive Economic Zone
EU	European Union
FAO	Food and Agricultural Organization
FCG	Fisheries Consultative Group
FDAM	Fisheries Development Authority of Malaysia
FRMP	Fisheries Resource Management Plan
GDP	Gross Domestic Product
GEF	Global Environment Facility
GIS	Geographic Information System
GNI	Gross National Income
GOT	Gulf of Thailand

GTZ	Gesellschaft für Technische Zusammenarbeit (International Cooperation Enterprise for Sustainable Development)
ICM	Integrated Coastal Management
ICFM-PD	Integrated Coastal Fisheries Management-Pathew District
ICZM	Integrated Coastal Zone Management
IDRC	International Development Research Center
IMO	International Maritime Organization
JSPS	Japan Society for the Promotion of Science
LBCRM-PL	Locally Based Coastal Resource Management in Lungawi
LEU	Local Enforcement Unit
MEA	Malaysia Enforcement Agency
MFRDB	Marine Fisheries Research and Development Bureau
MFRDT	Marine Fisheries Research and Development Technology
MIS	Management Information System
MOFI	Ministry of Fisheries
MONRE	Ministry of Natural Resources and Environment
MOU	Memorandum of Understanding
NCECC	National Coastal Erosion Control Council
NCSC	National Coastal Steering Committee
NEB	National Environment Board
NGOs	Non Government Organizations
ONEB	Office of National Environment Board
PEMSEA	Partnership in Environment Management for the Seas of East Asia
PFG	Pakklong Fisherman Group
PMMR	Participatory Management of Mangrove Resources
RTG	Royal Thai Government
SEAFDEC-TD	Southeast Asia Fisheries Development Center – Training Department
SDC	Swiss Agency for Development and Co-operation
SIDA	Swedish International Development Agency
TAO	Tumbol Administrative Organization
UNDP	United Nation Department Programme
UNEP	United Nation Environment Programme
VNICZM	Vietnam-Netherlands Integrated Coastal Zone Management Project
WWF	World Wildlife Fund

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## **PART 1 INTRODUCTION**

The Gulf of Thailand is encompassed by four countries: Malaysia, Thailand, Cambodia, and southern part of Vietnam. This area has a highly exploited resource base as they respond to market demand. The FAO reported in 1950 that aquaculture production was around 603,941 tonnes and increased to 26.592 million tonnes in 1996, then rapidly increased to 45.924 million tonnes in 2004.<sup>1</sup> Four countries in Southeast Asia are top ten exporters of aquaculture products; these are Indonesia, Thailand, Vietnam and the Philippines.<sup>2</sup> According to market demand for food, year by year increases have caused use of marine resources have lead to resource over exploitation. As such, Thailand's trend of total yearly catch declined from 27,861,000 tonnes in 1996 to 26,256,000 tonnes in 2005.<sup>3</sup> In addition, coastal aquaculture is high developed and, as such, Thailand has a lost mangrove areas by about 64.3 percent to coastal aquaculture.<sup>4</sup> While Vietnam, rapidly increased its shrimp farms from 3,000 hectares in 1980 to 60,000 hectares in 1992.<sup>5</sup> Cambodia also has encroached on its mangrove areas for aquaculture in the past few years.<sup>6</sup>

In addition, to this expanding towns and economic development are both effecting coastal areas. The various industries that are springing up around coastal areas, such as fish processing plants (canning, fish sourced products, etc), coastal tourism, and shipping needs all affect change. More specifically, coastal tourism in Vietnam reached a growth rate of 400 percent by 2005.<sup>7</sup> These problems are not only regional, but coastal communities worldwide are faced with the same problems. Thus, worldwide coastal communities have had an interest in the problem and have seen witnessed, heard of or are seeking effective and highly successful methods behind sound management and effective approaches to sustainable national resource use.

The Integrated Coastal Zone Management (ICZM) was started in Australia and Sweden in early 1970 but was not formally called as such. The USA was the first to introduced legislation in the form of the Coastal Management Act more than 20 years ago.<sup>8</sup> The global counts of at least 700 project initiatives for ICZM in about 100 countries taking several forms.<sup>9</sup> In 1987, the World Commission on Environment and Development started looking to the future, the Commission recognized sustainable life resources should be

managed for the oceans. They agreed to management in five zones: inland areas (river catchments), coastal lands, coastal waters, offshore waters and high sea.<sup>8</sup> The United Nations also held a conference in 1992, in Rio de Janeiro, during which states elaborated Agenda 21, within which Chapter 17 addresses the protection of the oceans, coastal zone, use and development of living resources.<sup>10</sup>

Thailand and neighboring countries started coastal management in 1947 but Thailand was the first country to establish management of fisheries resources as it was not defined as ICZM. ICZM started in Vietnam in 1994.<sup>11</sup> Then Thailand initiated a used concept of fishing rights around 1995 based on the Japanese system.<sup>12</sup> Malaysia has implemented ICZM in peninsular Malaysia and Sabah in 1996<sup>13</sup>, followed by Cambodia in 1997.<sup>14</sup> Then the concept of Community Based Management was significant and implemented in this region with the support of international agencies. It is not easy to produce successful results for these programs in poverty stricken countries. People need food and money for their livelihood and day to day survival, conservation of natural resources for the future becomes less important than the needs of today. However, these regions attempted to encourage the community to appreciate conservation and management of their resources. This region also examined at new techniques so as to understand their applicability with respect to their needs. Thus, the project Partnership in Environment Management for the Seas of East Asia (PEMSEA) was initiated in 1994. The pilot projects were demonstrated in Batangas (Philippines) and Xiamen (China). The experience and lessons learned through this ICM project were than applied in six more countries: Cambodia, DPR Korea, Indonesia, Malaysia, Thailand and Vietnam.<sup>15</sup>

All the countries involved in Community Based Management policies have implementation techniques that differ in their approach resulting in highly successful projects in some countries and project failures in others. The experience from many projects is provides good lessons for defining the weaknesses and recognizing strengths. This report will compare the ICZM techniques in four counties: Malaysia, Thailand, Cambodia and Vietnam. The four countries all border the Gulf of Thailand.



**Figure 1** Map of Malaysia, Vietnam, Cambodia and Thailand

Source: <http://images.google.com/>

## **PART 2 MULTIPLE USES OF COASTAL AREAS IN SOUTHEAST ASIA**

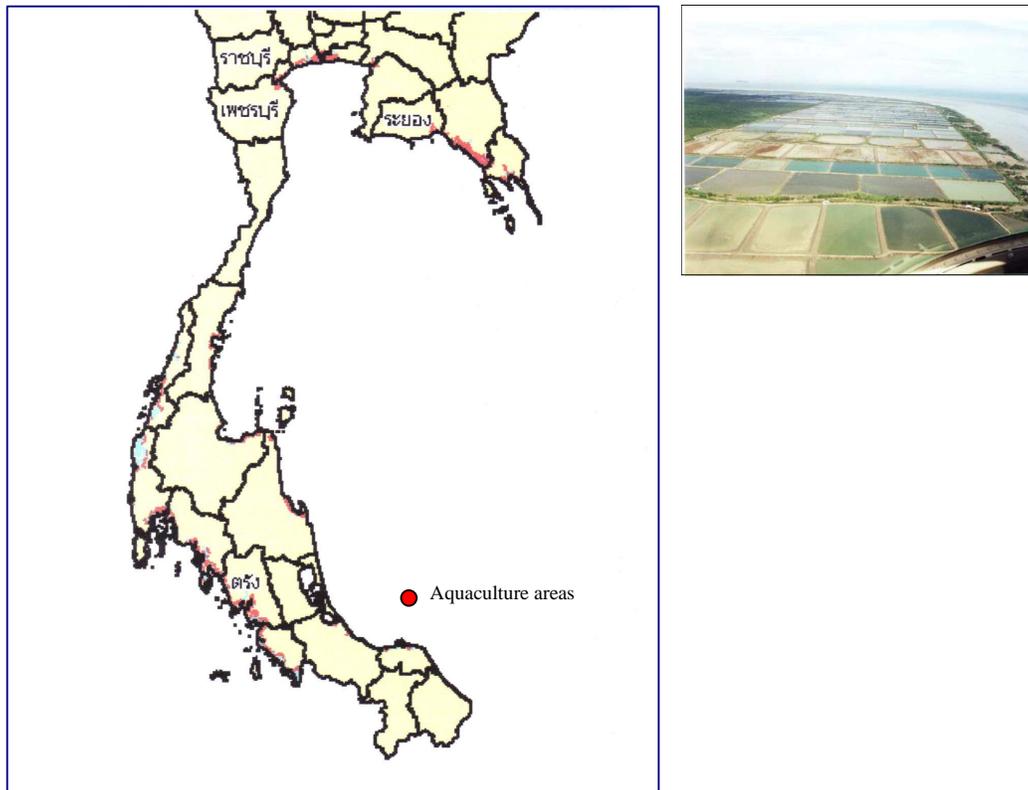
Several aspects of, coastal area were included in the coastal environment profile including physical setting and land use, natural resources and environment, fisheries and aquaculture, tourism, shipping and other economic factors.

### **2.1 Aquaculture and Fisheries**

The policies in the region fostered an increase in the exportation so as to meet the market demand for marine resources. Each country attempted to develop its economy while conserving their approach to the sustainable use of natural resources. It is not an easy balance to reach.

In Southeast Asia, shrimp farms were extensive along the coast. These intensive farms used antibiotics and chemical additives to increase production, even discharging waste water directly into the marine water. The number of ponds quickly increased, especially in Thailand and Vietnam. Department of Fisheries (Thailand) encouraged traditional ponds and semi-intensive shrimp aquaculture since 1973. Then more intensive farms were developed and so the number of shrimp farms increased. The coastal area used for aquaculture activities has caused the mangrove area of Thailand to be reduced by 64.3 percent especially shrimp farms shown in Figure 1 below. The total area of shrimp farm in 1973 was reported to be 71,889 hectares<sup>4</sup> with a tiny decrease to 71,825 hectares in 2004. In 2002, Thailand reportedly had a total of 37,531 households employed in aquaculture. There were 35,711 households engaged in just aquaculture and 1,820 households engaged in capture and aquaculture.<sup>16</sup>

For Vietnam, aquaculture is also very important for their economy. Vietnam exported around 315,000 tones of giant tiger prawn in 2004 and the total estimated area being utilized for aquaculture was 902,900 hectares.<sup>17</sup> Shrimp farms surrounding the Mekong Delta have increased by 3,500 percent between 1976 and 1992. Some examples include the Minh Hai Province in which during 1980 to 1987 of shrimp farms increased from 3,000 hectares to 40,000 hectares between 1980b and 1987 then rapidly increased to 60,000 hectares by 1992.<sup>5</sup>



**Figure 2** The shrimp farms encroachment of mangrove area in Thailand

Source: Mangrove conservation Bureau, Department of Marine and Coastal Resources

Some of the marine fisheries also increased rapidly the number of vessels engaged in fishing as well as gear capacity. In 2005, the reported number of fishing gear was 13,627.<sup>16</sup> In 1960, the Thai Government introduced trawl net for catching demersal fish, this gear has a high catch capacity and the quantity in use was growing. There were 99 trawlers in 1960 and 13,113 boats in 1989. A new, more reasonable fishing technique in the Gulf of Thailand (GOT) resulted in a strong decline in catch per unit effort (CPUC) from 300 kg/hour in 1961 to about 50 kg/hour in 1980, and steadied to 35.43 kg/hour in 2005.<sup>18</sup> Otherwise, the whole total catch of Thailand saw a tiny decline in each year from 27,861,000 tonnes in 1996 to 26,256,000 tonnes in 2005 as approximately 70 percent of the total catch from the GOT.<sup>3</sup>

Looking at the other countries of the region, Vietnam commercial fishing industry had around 85,430 fishing vessels in 2005<sup>19</sup> this includes small scale fishing vessels and large commercial vessels operating in four fishing grounds: North, Central, Southeast and Southwest. There are 75 fishing ports supporting commercial fishing operations in Vietnam, some of these ports are privately owned paid for by investment dollars so as to streamline the fishing industry. 1,700 species were found in Vietnam waters. Biologist forecast total marine production is between 3 and 4 million tonnes annually, while allowable catch is 1.2 to 1.4 million tonnes annually.<sup>20</sup> The total catch of 3.4 million tonnes in 2005 consisted of 2.0 million tonnes coming from capture fisheries (marine capture was 1.8 million tonnes and inland capture was 0.2 million tonnes) with the remaining from aquaculture. The fisheries export value is \$US 2.6 billion.<sup>21</sup> The number of Vietnamese people involved in the fisheries sector was about 730,000 people in 1996, and was estimated to reach 2-3 million people during the period 1995-2000.<sup>20</sup>

Cambodia has the smallest fishing area in the region but its gross domestic product (GDP) was the highest reaching 12 percent in 2003. Most of the fishing was done in the region of Sihanoukville and Koh Kong which produced 38,950 tonnes. The number of fishing vessels increased and the use of technology caused resources to be overexploited in the recent past. In 1992, Cambodia had less than 2,000 boats, and increased this number to 5,934 by 2001 (included non-motorized).<sup>22</sup> An estimated number of about 10,000 people are engaged in fisheries sectors which include fisheries, processing, gathering and marketing.<sup>23</sup>

In 2004, Malaysia had 36,136 licensed fishing vessels. Its 15,651 boats are small and are powered by outboard engines, 2,697 boats are non-motorized, and the remaining has inboard engines. Malaysia has a population of fisheries totaling approximately 89,453. There are 55,170 fishers in Peninsular Malaysia, 13,206 in Sarawak, 29,845 in Sabah and 232 in Labuan. Of these, 29,499 work with drift/gill nets, 25,018 are working on trawlers, 16,425 are work with purse seines, and 8,258 work with hooks and lines.<sup>24</sup>

## 2.2 Coastal tourism

In Southeast Asia, coastal areas are developing rapidly and national economic policies are promoting coastal tourism so as to generate income. The corresponding increase in hotels, resorts, restaurants and all activities related with the tourism industry can at times lead to water pollution. This pollution may originate from waste water from hotels, resorts and restaurant and also trash from tourism boats and ships, amongst others sources. Tourism becomes even more damaging as tourists prefer to visit natural scenic and cultural areas which are exceptionally delicate.<sup>25</sup>

Coastal tourism has grown rapidly in a short few years. For example, Do Son in Vietnam has grown by 64 percent from 1988 to 2000, and grew another 400 percent by 2005.<sup>7</sup> Also, Thailand saw the number of its visitors increase from 7.76 million in 1998 to 14.46 million in 2007, while revenue increased from 7.1 billion \$US to 15.9 billion \$US.<sup>26</sup> The number of visitors who visited Cambodia also increased year by year. In 1997, the total number of visitor arrivals was 218,843 and increased to 2,015,128 in 2007, while revenue increased from 103 million \$US to 1,400 million \$US.<sup>27</sup> Between 2000 and 2006, the number of foreign tourists increased in Malaysia from 10.2 to 17.5 million. While total number of hotel increased by about 30 percent (1,796 hotels in 1999 and 2,336 hotels in 2006). The revenue increased from 4.9 billion \$US in 2000 to 10.3 billion \$US in 2006.<sup>28</sup> The famous coastal destinations in this region are Ha Long, Da Nang, Nha Trang, Hue and Ho Chi Minh in Vietnam,<sup>29</sup> Trat, Rayong, Chonburi, Prachuab Khiri Khan, Chumphon, Surat Thani, Krabi, Phung Nga and Phuket Province in Thailand,<sup>30</sup> Kampong Som in Cambodia,<sup>31</sup> and Terengganu, Pahang, Langkawi, Sabah and Penang in Malaysia<sup>32</sup> (Figure 3).

The market demand is the main issue driving the overexploitation of natural resources. Otherwise, the countries' development is harmful to the environment, Government promoted activities for increasing the livelihoods and income for the citizens, for example fisheries, coastal aquaculture and tourism development. With tourism's high growth rate, the challenge is to balance development so as not to adversely affect the surrounding environment, or exceed sustainable resource use.



**Figure 3** The famous coastal tourism destination in Malaysia, Vietnam, Cambodia and Thailand

Source: Improved from Smart Draw 2008

### **PART 3 COASTAL MANAGEMENT IN MALAYSIA, VIETNAM, CAMBODIA AND THAILAND**

Various activities have traditionally driven development in the coast zone and in the oceans: fisheries, shipping, tourism, marine processing, gas and oil, etc. The ocean is the biggest food source and place for recreation in the world. The world is facing a great population increase which is leading to extensive urbanization and economic development causing forests and mangroves to be destroyed for housing, agriculture and industry. Each country is racing to increase its market share and to develop its economy. Economic development is likely to cause environment pollution and the decline of natural resource if not accompanied by sustainable practices and sound management.

In response, Southeast Asian countries are implementing a system called Integrated Coastal Management (ICM). This region tried to establish an appropriate ICM model for East Asia. Hence, a regional programme was established in 1994 under the project

Partnership in Environment Management for the Seas of East Asia (PEMSEA).<sup>33</sup> The pilot projects were demonstrated in Batangas (Philippines) and Xiamen (China). The experience and lessons learned of ICM extending to six more countries: Cambodia, DPR Korea, Indonesia, Malaysia, Thailand and Vietnam. The PEMSEA outline eight guidelines guidance on coastal management for East Asia as follows:

1. Local Government commitments to project management and implementation are indispensable for project success. Commitments could take the form of financial/manpower resources in cash or in kind.
2. Adopting ICM requires a corresponding change in attitude. Managers should look beyond sectoral concerns and deal more with approaches to trans-boundary issues and their inter-connectivity. Scientists should look beyond their disciplinary boundaries. They should also look into the implications of research results in terms of changes in environmental and resource status.
3. ICM is geared towards partnership arrangements. It requires a good working relationship, tolerance, and cultural sensitivity among core project staff and their counterparts in ICM demonstration sites.
4. For proper project design, it is essential that the staff in planning be familiar with implementation requirements and operational modalities. All relevant stakeholders should be involved in the planning process and program implementation.
5. For building indigenous management capacity, local expertise should be fully tapped. External consultants will be called and/or hired when local expertise is lacking, and provided that the needed knowledge and technology can be transferred and absorbed locally.
6. To sustain capacity building efforts, working relationship and operational linkages should be developed between project management and universities/research institutions.
7. To the extent possible, the management boundary should be defined in terms of ecosystem features and impacts, e.g., watershed, catchments areas and impact zones. In view of information uncertainties, the operational boundary may be determined according to existing coastal administrative zone. The operational boundaries can be subsequently readjusted towards ecosystem-based boundaries with increased knowledge and management experience.
8. The Project should use the best available information to address urgent management issues. Research and studies should be clearly linked with the information requirements of the SEMP, action plans and other management activities.<sup>34</sup>

Moreover, the Southeast Asia Fisheries Development Center (SEAFDEC) Fisheries Consultative Group (FCG) has promoted capacity of building human resource and participation in Integrated Coastal Resource Management to member countries. Thus, the pilot project under collaboration between SEAFDEC-TD and DOF (Thailand) launched in Chumphon Province in 2001 with the title “Locally Based Coastal Fisheries Management in Pathew District (LBCFM-PD). They then pass on this experience and knowledge in to Langkawi, Malaysia in 2003 and Sihanoukville, Cambodia in 2005. Others countries such

as Brunei Darussalam, Indonesia and Myanmar had already expressed their intentions to initiate similar projects in their countries.<sup>35</sup>

### 3.1 Malaysia

Malaysia has 13 states covering an area approximately 329,758 km<sup>2</sup>: Eleven states are in Malaysia peninsular and two states are Sabah and Sarawak part of the northern Borneo. The coastline covers 4,675 km, the peninsular of Malaysia 2,068 km and East Malaysia 2,607 km. Malaysia's Exclusive Economic Zone (EEZ) covered 475,600 km<sup>2</sup>, or 1.5 times as large as its total land. The border distance with Brunei, Indonesia, and Thailand is 381, 1,782, and 506 km respectively. The total population is approximately 25,274,133 persons in July 2008, comprised of Malay 50.4 percent, Chinese 23.7 percent, Indigenous 11.0 percent, Indian 7.1 percent and others 7.8 percent. The multi-religions country consists of Islam (60.4 percent), Buddhism (19.2 percent), Christian (9.1 percent), Hinduism (6.3 percent), others and unknown 4.1 percent, and none 0.8 percent. The agricultural GDP is 9.9 percent of the whole country that the main exports are rubber and palm oil.<sup>36</sup> Gross National Income per capital was 25,010 RM in 2007.<sup>37</sup>



**Figure 4** Malaysia

Source: <http://images.google.com/>

Malaysia faces the problems of deforestation, pollution of inland and marine waters, soil and coastal erosion, over fishing and coral reef destruction, air pollution, water pollution and waste discharge.<sup>38</sup> Malaysia loses at least 100,000 hectares of mangrove area from land development and aquaculture activities. These developments include construction of coastal towns and roads, airport runway and shrimp farms.<sup>39</sup>

Malaysia is the only country implementing Coastal Zone Management (CZM) through the Federal system (1957) as Malaysia has three levels of Government: federal, state and local. There are three territories, namely Kuala Lumpur, Putrajaya and Labuan\*, governed directly by the Federal Government of Malaysia. They are administrated under the jurisdiction of the Ministry of the Federal Territories that was formed by the Prime Minister of Malaysia.<sup>40</sup>

Malaysia is driving CZM under the Ninth Malaysian Plan (2006-2010)<sup>†</sup>. The environmental and natural resource plan focuses on sustaining a clean and healthy living resource approach as well as meeting the economic development needs. The implementation of CZM is achieved via four objectives:

1. Encouragement and strengthened participation of stakeholders and cooperation between planning and implementation agencies.
2. It is important to embrace the conservation and sustainability of natural resources including the rehabilitation of forest and the reduction of pressures on flora and fauna. This second objective aims to protect the biodiversity watershed and creates a destination for eco-tourism, both of the Central Forest Spine in Peninsular Malaysia and the Heart of Borneo in Sabah and Sarawak.
3. CZM requires the reduction of pollution, especially air and water contamination from illegal discharges of solid waste, toxic materials and hazardous substances. Pollution reduction can be enforced with environmental standards, particularly by the industries.
4. Establishment of a master plan for land-use planning, zoning and storm water management to reduce the impact of floods and to develop emergency responses to floods.<sup>41</sup>

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\* Territory of Kuala Lumpur is a state's Capital, territory of Putrajaya is the administrative center of Malaysian's Administrative Capital and territory of Labuan is an offshore financial center and free trade zone.

<sup>†</sup> Ninth Malaysian Plan is a comprehensive blueprint prepared by the Economic Planning Unit of the Prime Minister's Department and the Finance Ministry of Malaysia with approval by the Cabinet of Malaysia to allocate the national budget from the year 2006 to 2010 to all economic sectors in Malaysia.

The CZM in Malaysia was established in response to problems experienced in the coastal areas such as coastal erosion, beach pollution, fisheries overexploitation, mangrove decreases, etc. Malaysia's national regulations related to coastal management are as follows:

1. Merchant Shipping Ordinance of 1952 for Peninsular Malaysia,
2. Merchant Shipping Ordinance No. 11 of 1960 for Sabah,
3. Merchant Shipping Ordinance No. 2 of 1969 for Sarawak.
4. Land Conservation Act of 1960 (Act No.385) related to conservation of hill lands and the protection from soil erosion and the encroachment of silt. It also addresses the role of the landlord/owner for responsibility to control erosion and related silt problems.<sup>42</sup>
5. National Land Code of 1965 (Act No.56) has been effective since 1 January 1966 and controls and/or guides land development in the country. It addresses issue related to land tenure, registration of land titles, transfers, leases and changes in respect of land, easements and others rights and interests in land.<sup>43</sup>
6. Environment Quality Act of 1974 (Act No. 127) relates to the prevention, abatement, and control of pollution and enhancement of the environment that covers all water discharge, atmosphere, noise pollution, soil, inland waters pollution, oil spill and waste.<sup>44</sup>
7. Street, Drainage and Building Act of 1974 (Act No.133) seeks to control the building of new streets, houses, and plants near streets.<sup>45</sup>
8. Town and Country Planning Act of 1976 (Act No.172) relates to the control and regulation of town and country planning in peninsular Malaysia.<sup>46</sup>
9. National Forestry Act (1984) was adopted for the administration, management and conservation of forests and forestry development within the States of Malaysia and for connected purposes.<sup>47</sup>
10. Fisheries Act 1985 (Act No. 317) and amended in 1993 that addressed administrative and management of fisheries, including conservation and development of both maritime and fresh water fisheries, protection of aquatic mammals and turtles.<sup>48</sup>
11. General Administrative Circular No.5 of 1987: Guidelines for the Approval and/or Implementation of Development Projects within the Coastal Zone.<sup>49</sup>
12. Merchant Shipping (Oil Pollution) Act of 1994 (Act No.515) relates to oil pollution by merchant ships in the Malaysia territory.<sup>50</sup>

From November 1984 to January 1986, the Malaysian Government began a campaign called the National Coastal Erosion Study along 4,809 km of coastline. This study concluded that 1,390 km (864 miles) of coastline were eroded and that there was a need to implement appropriate plans to prevent coastal erosion. Following the recommendations of this project, two important institutions were established in 1987: the Coastal Engineering Center (CEC)\* and the National Coastal Erosion Control Council (NCECC).<sup>51</sup>

The NCECC is composed of various agencies that deal in part with erosion protection. These agencies are the Ministry of Finance, The Ministry of Science, Technology and Environment, the Department of Drainage and Irrigation, the Public Works Department, Governor of Sabah, Sarawak and two other states on a rotating basis, and professionals from various institutions and universities. The coastal program created by the NCECC must be approved and recommended by the CEC before processing.<sup>52</sup>

The CEC is responsible for performing coastal erosion control, engineering works for critical erosion areas, providing technical support to the NCECC and other Government agencies and collecting erosion data.<sup>52</sup>

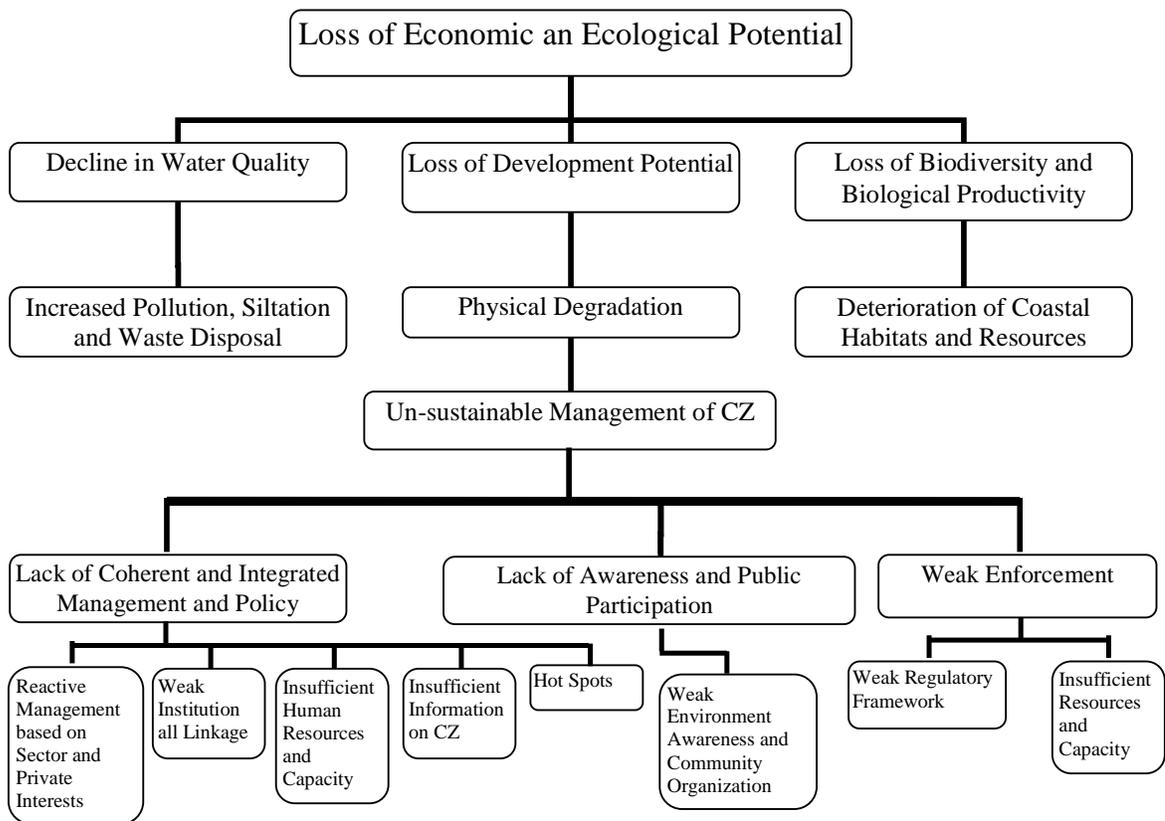
Between 1980 and 1996 Malaysia continued the development of Integrated Coastal Zone Management (ICZM). However, in the beginning was not ICZM that activities carried out from late 1980 to early 1990. The ICZM implementation was initiated in 1996 in peninsular Malaysia and Sabah.<sup>13</sup> The project was jointly funded by with the Danish Co-operation for Environment and Development (DANCED) and the Sabah State Government, and designed to prepare an ICZM system for Sabah, Sarawak and Pulau Pinang. The objective of the project is sustainable management of the coastal zone of Sabah which includes 4 tasks:

1. determination of coastal zone in Sabah;
2. environment management;
3. Management Information System (MIS) and Geographic Information System (GIS);  
and
4. application of environment and computerized tools for spatial planning.”<sup>53</sup>

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\* The Coastal Engineering Center (CEC) is belong the Department of Irrigation and drainage, Ministry of Natural Resources and Environment, Malaysia

The unsustainable use in the coastal zone of Sabah is a result of mis-management of significant proportions affecting the project area. The project area is still declining in water quality resulting from increased pollution. The physical degradation, loss of biodiversity and reduced biological productivity caused by deterioration of coastal habitats and resources. The project considers environmental problems as the main cause with a lack of coherent and integrated management policy, a lack of public awareness and participation along with weak enforcement that can be seen in the problem tree in Figure 5.<sup>54</sup>



**Figure 5** Problem tree of ICZM Sabah project

Source: Sabah ICZM project; available from <http://www.townplanning.sabah.gov.my/iczm/>

The ICZM in Malaysia seems like a recipe for success, but indeed there have been conflicts and problems with,

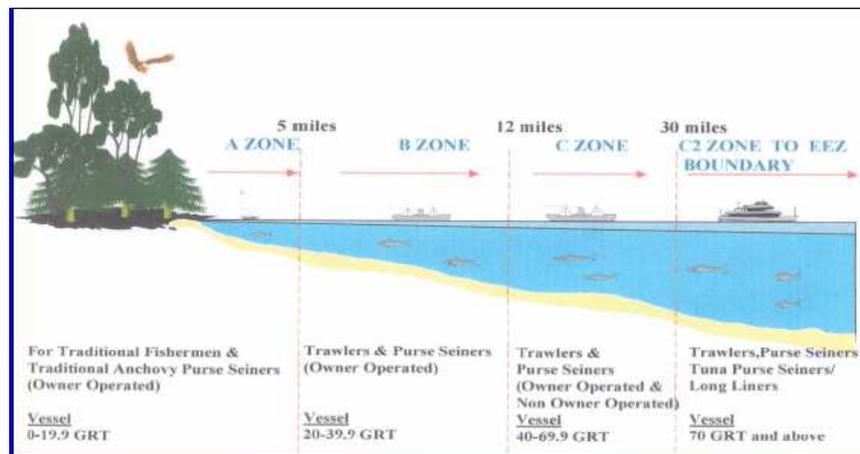
1. similar jurisdictional area for surveillance and enforcement;
2. shipping with policy option that have become unclear;
3. overlapping of function between several federal ministries and state Governments in managing the coastal area; and
4. no agency which has authority to deal with the full scale of marine pollution problems and the incapacity of the Department of Environment to handle incidents in the EEZ areas.<sup>55</sup>

Financing is also the barriers to implementing Malaysia's coastal management approach and achievement of goals. Malaysian Government invests only 1 percent of GDP in environment management.<sup>56</sup> Furthermore, there is a significant difference in the allocation of Government revenues is the Federal Government obtains between 84 percent and 88 percent of these, while the thirteen states obtain only 12 percent.<sup>51</sup>

Management of the fisheries is overseen by four departments: there are the Department of Fisheries (DOF), Fisheries Development Authority of Malaysia (FDAM), Navy Coast Guard and Marine police. The DOF is the lead agency that is responsible for the overall management planning and implementation including marine parks. The FDAM is responsible for the enhancement of livelihood of the fishers, value added processing and marketing. The other two agencies are coordinate surveillance and enforcement operations, especially off shore fisheries.<sup>57</sup> However, the fisheries law must follow the Fisheries Act of 1985 as it addresses the administration and management, including the conservation and development of maritime and estuarine fishing and fisheries in Malaysian waters, and the protection of marine mammals and turtles. In addition, the law relates to the establishment of marine parks and marine reserves.<sup>58</sup>

The policies of marine fisheries management divided the area available for fishing into four zones according to distances from the shoreline:

1. Zone A: less than 5 nautical miles (nm) reserved for small scale fishermen using traditional gear;
2. Zone B: between 5-12 nm for fishing vessels less than 40 horse power;
3. Zone C: greater than 12 nm for commercial vessels more than 40 tonnes gross; and
4. Zone C<sub>2</sub>: beyond 30 nm for deep sea vessels greater than 70 tonnes gross.<sup>58</sup>



**Figure 6** Fisheries management in Malaysia

Source: Department of Fisheries Malaysia

According to the National Agricultural Plan of 1992 to 2010, to encourage deep sea fishing, aquaculture and inland fishing. Part of the fishery industry should be increasing the production of fresh and processed products while working to support the development of integrated and viable fishery resource based manufacturing activities. These products, while expanding to local and foreign markets, must not exceed sustainable resource production and must refrain from overexploitation.<sup>59</sup> The fisheries policy calls for an increase in fish production for 2010 to 1.93 with 900,000 tonnes coming from coastal fisheries, 430,000 from offshore, and 600,000 million tones from aquaculture industry.<sup>60</sup> Certainly, The Malaysian Government will be taking various actions to reach this large yield level. Malaysian uses policy to control the increase in fisheries capacity, to promote off-shore fisheries, to place a moratorium on coastal fishing licenses, to enhance monitoring and research on stock near maximum exploitation levels, and concentrate surveillance and enforcement in coastal zones. They are seriously seeking to control non-

traditional fishing gear in zone A for conservation of the nursery grounds. Moreover the Malaysian Government promoted stakeholder participation in fisheries management.<sup>57</sup>

The latest program in community based management is poverty prevention practices in Malaysia. Although, the Government has encouraged communities to further participate in enforcement activities: monitoring, control and surveillance (MCS). The result is a strong centralist policy in CZM and a lack of agency capacity to support and integrated cooperation.<sup>61</sup>

Two Departments responsible for enhancing marine productivity, rehabilitate conservation and coastal habitat. DOF and Fisheries Department Authority had launched Artificial Reefs (ARs) and Fish Aggregating Devices (FADs). Also under collaboration among Government agencies and Reef Ball Development Groups Limited, Florida, USA 1,500 Reef Balls of various sizes were sunk off the coast of Talang Talang, Sarawak in 1998. The aim of the project is to protected turtles from trawlers.<sup>62</sup>

The ICZM policy as shown in the Ninth Malaysia Plan is good for conservation and sustainability of natural resources. Otherwise, the necessity of country development can cause natural resources to decline as shown by Malaysia's loss of mangrove forest in order to build an airport and establish aquaculture. Also, some of the regulations are not utilized for example the Merchant Shipping Ordinance adopted in three items for Peninsular Malaysia, Sabah and Sarawak. The Federal Government of Malaysia implements all the programs as they relate to sustainable resource use as a result community management is virtually non existent. However, fisheries management in Malaysia uses zoned fishing areas for conservation of marine resource and is strong on enforcement and controls.

### **3.2 Vietnam**

The Socialist Republic of Vietnam is a one-party communist State. A narrow S-shaped strip along the coast on the eastern side of the Indochina peninsula between latitude 23°23' and 08°02' north and longitude 102°08' to 109°28' east. Vietnam is divided into 58 provinces. The State area is approximately 329,560 km<sup>2</sup> components land 325,360 km<sup>2</sup> and water 4,200 km<sup>2</sup>. The coastline from the north to the south is approximately 3,444 km (includes islands). The total boundary is 4,639 km in length, including borders with

Cambodia (1,228 km), Laos (2,130 km), and China (1281 km). The population was 86.1 million in July 2008 with a growth rate of 0.99 percent. The religions include Buddhist 9.3 percent, Catholic 6.7 percent, Hoa Hao 1.5 percent, Cao Dai 1.1 percent, Protestant 0.5 percent, Islam 0.1 percent and none 80.8 percent. The main exports are petroleum, marine products, rice, coffee, rubber, tea, garments and shoes. The GDP/PPP in 2007 was \$US 221.1 billion; GNI per capita was \$US 2600.<sup>63</sup>



**Figure 7** Vietnam

Source: <http://images.google.com/>

Current national marine policies focus on marine economic development, sustainable development, scientific research, environmental protection, biodiversity conservation, marine protected area management, management of habitat management, habitat, population, and species, coastal wetland conservation and management, oil spill emergency response plans, soil plans, and legal frameworks for various legal sectors, e.g., fisheries, maritime transport, and oil and gas development.<sup>64</sup>

The environment protection regulation of Vietnam was established in 1989 by two Ordinances: the Ordinance on Aquatic Resource Protection that replaced the Law on Fisheries in 2001<sup>65</sup> and the Ordinance of Resource Tax that addresses collection of taxes from resource users, including Vietnamese fishers and foreigners.<sup>66</sup> After that, the Law of Forest Protection and Development was adopted so as to control and manage forest land and forest resources in 1991.<sup>67</sup> In 1993, four regulations were established: the Environment Protection Law, this Law provided for the protection of the environment for health of the people and serving the cause of sustainable development of the country,<sup>68</sup> the Law of Oil and Petrol addresses how to effectively conserve, exploit and utilize petroleum resources for the development of the country's economy.<sup>69</sup> The Land Use Law specifies the land administration and land use system, the rights and roles of land users,<sup>70</sup> and Ordinance of Vegetation Protection and Quarantine.<sup>71</sup> The Mineral Resource Law provides management and protection of mineral resources in terms of geological exploration, mineral exploration and protection of untapped resources.<sup>72</sup> The Ordinance of Radiation Safety and Control were established in 1996 to control activities related to ionized radiation.<sup>73</sup> In 1998, the Water Resource Law was enacted and came into effect in January 1999, it signified that water is property of the nation and provided management of water quality and quantity both surface and underground.<sup>74</sup> Lastly, the Criminal Affair Law entered into in 1999.<sup>71</sup>

As such, the legislation system in Vietnam has significantly improved through the many provisions regarding the protection of the environment contained in the above mentioned legislation. In addition, Vietnam has implemented the National Plan of Environment and Sustainable Development in 1991, National Biodiversity Action Plan in 1995, and has currently put in place a plan regarding a national strategy on environmental protection from 2001 to 2010.<sup>75</sup> For international law, Vietnam has signed 5 conventions: the Ramsar Convention on the Protection of Wetlands (1971), United Nations Convention on the Law of the Sea (1982), Movement of Hazardous Wastes and their Disposal (1989), Basel Convention on the Control of Transboundary (1992), and International Convention for the

Protection of Pollution by oil from Ship (1997) in the MARPOL Convention. However, the provisions of these instruments do not address enforcement measures which are often left to the States to implement according to their means. Also, Vietnam has neither an environmental fee system nor a plan for oil spills.<sup>76</sup> In 2002, a new Ministry was established: the Ministry of Natural Resource and Environment (MONER), with the responsibility for water resources, the assessment of mineral volumes, a clean water supply and environment sanitization.<sup>11</sup>

The coastal zone of Vietnam faced a long difficult period due to the Vietnam War of the 1970s. The chemical sprayed during warfare were widely spread across the country, affecting the forests, soil and coast water. The rapidly increasing population also had negative effects on the environment as well. In 1999, the total estimated populations inhabiting the coastal area was 19 million and will reach upwards of a 35 percent growth by 2020.<sup>77</sup> The population density was approximately 253.48 persons/km<sup>2</sup> in 2005.<sup>78</sup> Meanwhile coastal areas experienced quick development industrial areas, tourist areas and urban expansion, especially Ha Long, Hai Phong, Nha Trong, Danang and Vung Tau. The Vietnam Government needed to develop an economy as well as conserve the environment. As such, the tourism grows each year as well as the number of hotels and resorts. The waste water discharges to the sea without treatment, and the oil and gas industries of Vietnam face oil spills, big and small, many times each year and the number of these only increases. It was shown in 1997, oil spilled in Vietnam 4 times and extended to 6 and 10 in 1998 and 1999, respectively. Usually a spill is a moderate 2-3 tonnes on average.<sup>7</sup> All the above causes pollution in coastal areas.

In 2000, Danang's project adopted the ICM Programme of PEMSEA. This model addresses economic and environmental problems, and then gives a management and implementation framework to solve conflicting issues so as to promote economic well-being. It improved appropriate strategies and action programs that were important for addressing the priority of environment issues and managing coastal user conflict. After four years of implementation the project was successful and acceptable in environment.<sup>78</sup>

In addition to ICZM projects, Vietnam has also undertaken area-based management initiatives, for example the pilot project of Marine Protected Area (2000 to 2010). This ten years project is designed to protect the living environment of fisheries species in 15 marine areas\* throughout the country: six marine nature reserves, three marine national parks, and six marine species/habitat conservation areas. These areas are categorized based on three levels:

1. Biodiversity richness and wildness level of every area;
2. Severity of the threats to biodiversity conservation in each area; and
3. Feasibility; including assessment of the economic sectors outside the protected areas; issues relating to the socio-economic conditions of local communities who continue to rely on the protected areas.<sup>79</sup>

It is the responsibility of the central Government under the Fisheries Resources and Environment Conservation Department, the Ministry of Fisheries and the Fisheries Resources and Environment Conservation branch under the provincial Department of Fisheries or Department of Agriculture and Rural Development.<sup>79</sup>

Furthermore, between 2000 and 2005, the Vietnam-Netherlands Integrated Coastal Zone Management Project (VNICZM) was undertaken in Thua Thien Hue, Nam Dinh and Baria Vung Tau. Each area had its own set of problems: Thua Thien Hue was faced with water flood, over-fishing and quality of water; while Ba-Ria Vung Tau experienced dike erosion from tourism and industrial growth; and Nam Dinh also had a problem with sea dike erosion.<sup>80</sup> The project assisted in the establishment of the required institutional structures at the national and Provincial levels for ICZM, expanding institutional and professional capacity to apply ICZM, develop long term strategy and action plans, and initiate short term application of ICZM in three Provinces through practical problem solving approaches.<sup>81</sup> Vietnam, weak of authority, decentralized the district and lower levels to show that they are near to the community. However, this appears flawed as Provincial

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\* In the period from 2000 to 2010, 15 marine protected areas will be designated. These include:

- a) 6 areas in the North of Vietnam: Tran island, Co To island, Cat Ba island, Bach Long Vi island, Hon Me island and Con Co island.
- b) 6 areas in the central region: Hon-Son-Tra (Hai Van area), Cu-Lao-Cham, Ly Son island, Hon Mun (Bich Dam), Hon Cau (Vinh Hao), Phu Quy;
- c) 1 area in Southeast Vietnam: Con Dao;
- d) 1 area in Southwest Vietnam: Phu Quoc;
- e) 1 area in the Truong Sa-Hoang Sa sea: Truong Sa.

Government overrules community and local Government decisions. All of these activities were arranged at the Provincial level.<sup>82</sup>

In the fisheries sector, Vietnam is faced with a large number of small fishing vessels and fishermen which leads to overexploitation of marine resource. The total number of fishing vessels in 1981 was 28,021 and increased to more than 90,000 vessels in 2007. (Nguyen, 2005) 80 percent of them are small vessels using power lower than 40 HP. (Pho, 2007) In addition to this large increase in vessels, Vietnam data on fisheries to support fisheries management. Otherwise, Vietnam has had an ordinance regarding the protection and development of fisheries by the State Council since 1989.

This ordinance lacks regulations relating to fishing operation, aquaculture, management of fishing vessels, fishing ports, wholesale markets, preservation, processing, hygiene and safety of fisheries products, import and export of fisheries products, state management over the fisheries activities, and specialized fisheries inspection force. Moreover, it is not in accordance with international law, bilateral and others Memorandum of Understanding (MOU).<sup>83</sup>

Because of the above problems, the Vietnamese Government had approved the Ordinance in 2001, amended it in 2003 and it became effective as of July 1, 2004.<sup>84</sup> Vietnamese fisheries operate under an open assessment system.<sup>85</sup> The strategy of fisheries management has been provided by the Ministry of Fisheries (MOFI). It address the development of the well-being of fisheries communities, seeks to improve nutrition standards by increasing the supply of fish and aquatic products, aim to increase fisheries exports, and strengthen sustainable fisheries management.<sup>17</sup> The Vietnamese Government provided regulations and outlined the implementation of the fisheries protected area as well as aquaculture allocation and leases by Decree No 27/2005/ND-CP that was signed on 8 March 2005. The fisheries protected area protects the fauna and flora system of national and international significance for science, tourism, education, recreation and management. Areas of significance can be classified into one of three categories: national park, habitat/species sanctuary or aquatic natural resource reserve. For the aquaculture allocation and lease, Vietnam permits national and international investment in aquaculture as should be done in accordance with the land law:

The area of marine allocated for aquaculture shall not be more than one hectare and for leased area shall not be more than 30 hectare for the area from 3 nautical miles landward

or not more than 100 hectare for the area from 3 nautical miles seaward. The duration of the lease is no more than 20 years.<sup>84</sup>

The resource conservation regulation was established by the national Government. Provincial Councils respond to fisheries administrations in their Province. The lower levels, such as the district People's Committee and Commune People's Committee, will report via to the Provincial People's Committee. Eligibility for annual entry licenses of boats is based on crew size, engine capacity and gear type. For the commercial boats that want to operate in other Provinces, they must request permission to be able to operate in that Province's water. The fishing effort in each fishing ground is limited by the Ministry of Fisheries, as revised every 5 years.<sup>85</sup>

Vietnam has received assistance in funding from various donor countries for developing coastal management.

1. During 1998-1999:

1.1 Vietnam Environment and Investment Project was supported by the Danish International Development Assistance (DANIDA), Swiss Agency for Development and Cooperation (SDC) and the United Nations Development Programme (UNDP) between 1996 and 2001. This has provided the principle technical advice to Vietnam's Ministry of Planning and Investment so as to expedite implementation of the Environment and Investment Project.

1.2 Study on Aid to the Environment Sector in Vietnam was supported by the Canadian International Development Agency (CIDA), DANIDA, Royal Netherlands Government, Swedish International Development Agency (SIDA) and SDC between 1998 and 1999.

2. During 2000 - present:

2.1 The Effective Management of World Heritage Sites and Capacity-Building for Protected Areas in the Marshall Islands was supported by the Australian Regional Natural Heritage Programme (RNHP) between 2006 and 2007.

2.2 Asian Development Bank (ADB) assisted two projects: the Hydropower Sector which provided technical assistance and training to support capacity building for Strategic Environment Assessment between 2006 and 2007, and the Greater Mekong Subregion Core Environment program which provided technical consultancies and facilitation between 2004 and 2005.

- 2.3 The Hydropower Sector Pilot Project was supported by the World Bank in 2006 for identification and assessment of significant natural habitat relations with impacts both positive and negative of the proposed program of hydropower development in Vietnam.
- 2.4 The Global Environment Facility (GEF) National Strategy Support Project was supported by the World Bank and UNDP in 2006.
- 2.5 Vietnam Country Environment Analysis was supported by The World Bank between 2005 and 2006 for the assessment of industrial pollution.
- 2.6 Protected Areas Policy Reform Project was supported by the GEF in 2005.
- 2.7 Financial Sustainability for National Systems of Protected Areas was supported by UNDP and GEF in 2005 so as to develop a full scale on protection area financing.
- 2.8 Strengthening Environment Management and Land Administration Program is assisted by the Swedish International Development Assistance (SIDA) between 2005 and 2010 so as to provide technical backing for the implementation of the five year project.
- 2.9 Poverty and Environment Initiatives received support from UNDP and the UK Department for International Development (DFID) between 2003 and 2004 for contribution to environment protection and sustainable natural resource use.
- 2.10 Greater Annamite Mountains Conservation Strategy and The Action Plan for Improving Forest Management and Conservation in the Southeast Agro-ecological Region of Vietnam were supported by the World Wildlife Fund (WWF) and the Royal Netherlands Government between 2003 and 2004 so as to contribute to Vietnam Government's preparation of a conservation strategy and action plan for the Greater Annamite Mountain.
- 2.11 The review of Protection Areas and Development in the four countries of the Lower Mekhong River Region was supported with various donors, including DANIDA, the Australian Agency for International Development (AusAID), the Swiss Agency for Development and Cooperation (SDC), the ADB and the Royal Netherlands Government between 2001 and 2003.
- 2.12 Biodiversity Planning in Asia was supported by UNDP, GEF, the Governments of Norway, Switzerland, the United Kingdom and Germany. This between 2000 and 2001, and for reviewing of the experiences of national biodiversity planning in 17 Asian countries.<sup>86</sup>

Based on the allotment size from the central government, the Province, town or village allocates monies as appropriate to meet the prioritized needs of projects for that fiscal year. The central level has legislation power in National Assembly which approved the State budget. The budget from central is transferred to the local level by Ministries line. The budget transfer to the Provinces and major cities (Provincial budget) Provincial level divide district budget to district, town and cities and then through the communes, urban wards and small town (commune budget).<sup>82</sup>

Vietnam is rapidly increasing development in coastal zones as seen with coastal aquaculture and the tourism industry. In addition, Vietnam faces population growth in shore line communities and a high number of fishing gears that both affect the environment and sustainable resource uses. Otherwise, Vietnam seems to lack an action plan to solve the problems faced with rapid economic growth. Vietnam also allows foreign investments in marine aquaculture but lacks strong controls over the ever present pollution from the aquaculture activities. Overall, Vietnam is heading in the right direction as long as it learns from the hard lessons of neighbors in the region, including its own mistakes and capitalizes on the proven successes of its close neighbors. The future in Vietnam looks promising and intriguing.

### **3.3 Cambodia**

The country encompasses an area of 181,040 km<sup>2</sup> (69,900 miles<sup>2</sup>) includes 20 provinces. Cambodia has sea coast on the GOT with a total length of approximately 435 km. Major cities include the capital Phnom Penh, Battambang, Siam Reap, Sihanoukville, Prey Veng, and Kompong Cham. The country's total population is 14 million (2007) with about 1.2 million living in Phnom Penh. The average population annual growth rate is 1.72 percent. The nationalities, Cambodian and Khmer, consist of a few ethnic groups: Cambodian 90 percent, Vietnamese 5 percent, Chinese 1 percent, along with small numbers of hill tribes, Chams, and Laotian. 90 percentage of population is Buddhist. Geographically Cambodia has a central plain that is drained by the Tonle Sap (Great Lake), Mekong and Bassac Rivers. There are forests away from the rivers and the lakes and there are mountain ranges in the southwest (Cardamom Mountains) and north (Dangrek Mountains) along the border with Thailand. Natural resources include timber, gemstones, some iron, manganese and



negative impact on the environment and bring further benefits to the local area. Also, there is great focus on gaining social participation in the sustainable management and use of natural resources. This will assist in building, strengthening and promoting community as well as acquiring a process for the identification and prioritization of local needs. Funding for implementing these plans will come from the area's own local taxes. Cambodia is now being better integrated into the region by joining ASEAN and participating in all its activities.<sup>88</sup>

Cambodia's economic development has an emphasis on inland and fresh water because Cambodia only has 435 km of coastline and rice is the main produce of the country.<sup>88</sup> The regulations and laws are in place to make sure coastal and marine resources are fully protection within a few years. The oldest law on Fisheries Management and Administration was adopted in 1983. Between 1993 and 1994, two laws were established by Preah Reach Kret (Royal Decree): Creation of Protected National Area and Law on the Land Management, Urban Planning and Construction. The Environmental Protection and National Resource Management had been approved by the National Assembly in 1996, and addresses environmental planning, protected area management, environment impact assessment, environment monitoring, pollution control and inspection, and public participation under the Ministry of Environment.<sup>89</sup> It does not address the regulation of fisheries management, forestry and mining. So the Law on Fisheries has just been enacted in 2006 by the King. It is responsible for fisheries management, increasing the protection, sustainable use of fishery resources and includes managing the mangrove area and flood forests. In addition, the Royal Decree on the establishment of community fisheries was signed in May 2005.<sup>90</sup> In 1999 three Anukrets (Sub-Decree) were adopted: Sub-Decree on Environment Impact Assessment<sup>91</sup>, Sub-Decree on Water Pollution Control<sup>92</sup> and Sub-Decree on Solid Waste Management.<sup>93</sup> In 2001, the Land Law and an interim land policy framework were adopted.<sup>94</sup> In the last few years Law on Water Resource Management was adopted in June 2007. It is responsible for both fresh water and sea water through marine resource management.<sup>95</sup> Lastly, Cambodia has paid attention to climate change and is currently preparing the National Adaptation Programme of Action to Climate Change.<sup>87</sup>

Three main problems increasingly harm mangrove areas.

1. Charcoal kilns, more than 300 in Koh Kong, produce over 24,000 tonnes of charcoal. A total of an estimated 100,000 tonnes of mangrove wood was harvested by this

activity. The problem was uncontrollable in Koh Kong. The Department of Nature Conservation and Protection (DNCP) tried to reduce the number of charcoal kilns by taking action and destroying any charcoal kilns that were built.

2. Mangrove areas have been invaded by coastal aquaculture farms. For example, in Kampot, 1,438.8 hectares are being proposed for aquaculture development and 1,079 hectares have been selected for fish farming. However, only 197 hectares of area are legal.
3. Salt pans, which not only invade that mangrove areas but can even deteriorate the soil so that nothing can grow anymore.<sup>6</sup>

Cambodia coastal management has been given little attention because almost 75 percent of aquatic protein in 2003 comes from the Tonle Sap and Makhong Rivers.<sup>96</sup> In response to the above problems, the Mangrove Forest Rehabilitation Programme was established in collaboration between the Cambodian Environment Ministry and the Organization for Industrial, Spiritual and Cultural Advancement (OISCA) in October 2005. It took three years to implement the project in the Peam Krasaop Wildlife Sanctuary, Koh Kong Province. The project aimed to reforest about 30 hectares. Over 1,000 villagers, students, teachers and staff of the Environmental Ministry took part in the mangrove planning work. In the first year, they succeed in increasing the mangrove area by about 15 hectares.<sup>97</sup>

For the problems encountered in aquaculture, the DOF attempted to control the number of shrimp farms by establishing three policies conditions:

1. Clearing of mangrove forests for shrimp farming is prohibited;
2. Wastes from shrimp ponds must be treated before being discharged into the sea; and
3. Shrimp ponds must be constructed at least 150 meters above the shoreline.<sup>6</sup>

However, marine resources are also affected by population growth, high capacity of gear, the destruction of mangroves and illegal fishing activities. The fishers who live in the Peam Krasaop Wildlife Sanctuary commented in 1990, Cambodia's trade with Thailand caused an increase in charcoal production and they also used illegal fishing gear to increase their production for export, including using cyanide and illegal trawling and push nets.<sup>98</sup>

In addition, institutional arrangements were made in relation with coastal management which was responsible for the management, protection and sustainable use of the resources and environment. The key ministries and institutions involved in council for development of Cambodia include the Ministry of Agriculture, Forestry and Fisheries, the Ministry of Industry, Mines and Energy, the Ministry of Tourism, the Ministry of Rural Development, and the Ministry of Environment.

The cooperation of State bodies that share responsibility in coastal management includes:

1. The National Committee for Land Management Urbanization and Construction is regulates construction activities based on zoning plans.<sup>99</sup>
2. The National Coastal Steering Committee (NCSC) was adopted by decision of the Royal Government of Cambodia in 2001.<sup>100</sup> They are responsible for the management and protection of the environment and natural resources through the sustainable use and development of the coastal zones.
3. The Coastal Coordination Unit is responsible for coordinating coastal activities, reporting and making recommendations to the NCSC for approvals.<sup>101</sup>
4. The Commission on Monitoring and Assessing for Suppressing Encroachment into Mangrove Land and Coastal Reclamation was established by decision of the Royal Government of Cambodia in 2005. It is responsible for preventing the encroachment on the mangroves, including punishing wrongdoers through the replanting of the mangrove area destroyed.<sup>101</sup>

All of the coastal management projects which have been supported by international donors are as follows:

1. Environment Management of the Coastal Zone project was supported by the Danida for the three phase project between 1997 and 2007: phase 1 was completed in may 1998, phase 2 started in June 1998 and concluded March 2002, with phase 3 continuing in August 2002 thru July.<sup>102</sup>
2. Integrated Coastal Zone Management in Sihanoukville was supported by PEMSEA and IMO between 2000 and 2006. The aim of the project was for the prevention and mitigation of multi-use conflicts in coastal areas and as they related to preservation of marine resources utilization.<sup>103</sup>
3. The five year project of South China Sea Regional Project was supported by funds from GEF and implemented by UNEP (2000-2006). The project was implemented in seven countries bordering the South China Sea. The aim was to create an environment

at the regional level and enhance capacity of the participating Governments to integrate environmental consideration into national development planning.<sup>104</sup>

4. Participatory Management of Coastal Resources was implemented for ten years from 1997 to 2007. This project received funds by the International Development Research Center (IDRC) Canada and implemented by the Cambodian Ministry of Environment. The aim is for success of Community Based Coastal Resource Management in the Peam Krasaop Wildlife Sanctuary in Koh Kong Province.<sup>105</sup>
5. Commune and Community Based National Resource Environment Management in 2004-2006, this three year project received funds from the Ministry of Foreign Affairs of Denmark. The project provided budget to the commune councils for implementing natural resource management which targeted 166 communes.<sup>106</sup>
6. Integrated Coastal Zone Management in Sihanoukville (2005-2007) with cooperation between SEFDEC-TD and Department of Fisheries, Cambodia for the improvement of rural livelihoods, while enhancing food security and sustainable resources use.<sup>107</sup>
7. Since 1994 the GTZ supported Cambodia for rural development, health, family planning, HIV/AIDS prevention and develop market system.<sup>108</sup>

Since 2000, the Cambodian Government started playing attention to decentralization to the commune level. The Cambodian Fisheries policy was established in 2000 by the Royal Government of Cambodia, which in turn established Community Fisheries Groups. Through this these groups, the central Government will transfer its role and responsibilities with respect to fisheries management to the communities. It is the beginning of co-management as the Government encourages community management in fishery areas. In 2000, there were 165 CFs and these have multiplied to 509 by December 2007.<sup>109</sup> Two community Fisheries have been included in local regulation enforcement and started participation in enforcement patrol in their fishing ground.<sup>110</sup> Most CFs started requiring community input because of their lack of capacity, skills and finance; they did not have significant support from other projects or partners.<sup>109</sup>

Cambodia's Biodiversity Plan had been adopted by the Inter Governmental National Biodiversity Steering Committee. A multi-sector group related to natural resource management provided a draft of the strategy and Action Plan on biodiversity conservation during a national workshop which was held in October 2000. This recognizes the importance community toward a sustainable approach. The pilot project being

implemented at Virachey National Park is meant to develop and demonstrate Cambodia's Natural Protected Area System with the assistance funds from Global Environment Facility (GEF).<sup>111</sup>

NGOs are important to Coastal Management. The Cambodian Government access to significant NGOs that can help coastal management to reach sustainability. There are hundreds of NGOs involved in various sectors such as health, environment, agriculture, education, etc. They were invited to meetings and seminars initiated by the Government. (United Nations, 2002) In addition, they also sit on various committees such as the National Steering Committee, created in 1997 with a membership which includes:

1. The Minister of Environment (Chairman);
2. Undersecretaries of state from: Ministry of Agriculture, Fisheries and Forestry (Vice Chairman), Ministry of Tourism, Ministry of Industry, Mines and Energy, Ministry of Public Works and Transport, and Ministry of Rural Development;
3. Governors of the coastal Provinces;
4. Representative from the Cambodian Development Council;
5. Representative from the Danish Ministry of Foreign Affair (DANIDA);
6. Observers from coastal projects; and
7. Representatives from NGOs and International Organizations.

The Committee is responsible for all direct activities concerning coastal zones and is also mandated to provide technical advice to those preparing project proposals related to coastal area.<sup>6</sup>

Cambodia has enacted the Law on Fisheries in 2006 which is a tool for fisheries management.<sup>112</sup> The Department of Fisheries provided a fisheries policy that addresses the creation of jobs and seek to upgraded the livelihood in fishery communities, increase benefits from fisheries exports, promote inland and marine aquaculture, extended institutional representation of fisheries management to fisheries communities and encouraged Integrated Fisheries Management.<sup>6</sup>

Cambodia is relatively new in Coastal Management Programs. Many activities that cause harm to the environment and natural resources seem to prevail with little concentration on controls. It shows, a lot of coastal farms increasing seemingly at will and neighboring countries can come to Cambodia's territorial waters for illegal (non-permitted) fishing. Cambodian is an impoverished nation and they need to use the natural resources to increase income for their citizens while thinking about the effects from their activities on

the environment. For example, the at will destruction of mangroves for charcoal. Cambodia should place emphasis on sustainable mangrove area management, monitoring and control of near and offshore coastal zone usage, and finding alternative jobs for Cambodian citizens.

### **3.4 Thailand**

Thailand is a peninsular country located in Southeast Asia between latitudes 5° and 20° north and longitudes 97° and 106° east. There are 76 Provinces and a total land area of approximately 514,000 km<sup>2</sup>. The total boundary is 4,863 km in length, including borders with Burma (1,800 km), Laos (1,754 km), Cambodia (803 km), and Malaysia (506 km). Thailand has two oceans surrounding the country: the GOT, which is the main marine fishing ground in the east, and the Andaman Sea in the west. The GOT borders 17 Provinces with a coastline of approximately 2,469 km.<sup>113</sup> The EEZ covers 304,000 km<sup>2</sup>, including overlapping area between Thailand and Cambodia (34,000 km<sup>2</sup>); Thailand, Cambodia and Vietnam (14,000 km<sup>2</sup>); and Thailand and Malaysia (4,000 km<sup>2</sup>). The Andaman Sea lies next to 6 coastal Provinces with a coastline of approximately 865 km and an EEZ of 116,280 km<sup>2</sup>.<sup>114</sup> The total population was 63.03 million in 2007. The main religions present in Thailand include Buddhism (94.8 percent), Muslim (4.5 percent) and Christians (0.7 percent).<sup>115</sup> The GNI per capita is \$US 3,400 in 2008.<sup>116</sup> Its main exports are rice, rubber, chilled fish and prawns.<sup>117</sup>



**Figure 9** Thailand

Source: <http://images.google.com/>

Thailand is currently implementing its Tenth National Economic and Social Development Plan (NESDP)\* within the five-year span of 2007 to 2011.<sup>118</sup> The Thai Government is following the practice of Sufficiency Economy that was given by His Majesty the King.<sup>119</sup> This plan focuses on humans as central to development to achieve resource sustainability. It promotes community rights and participation in natural management e.g. community forest and community coastal management. Also, it increases the strength of communities and develops a co-management system for natural resource conservation. It emphasizes the decentralization of Provinces and local organizations. A local organization representative supports the people's needs. For environmental management, the key was adjusting the production methodology and the consumption behavior towards an environmentally friendly pattern to decrease negative impacts, e.g. to promote organic farming and enhance the market for environmentally friendly products. Besides this, the pollution regulations should be kept under control so that the combined reduction of overall pollution and activities that cause pollution do not affect the quality of life in an adverse or harmful way.<sup>120</sup>

Challenges that faced inland and sea water are coastal erosion, mangrove destruction, marine resource overexploitation and air and water pollution. In response to this, a coastal management regulation was established. There are many laws and regulations related to coastal resources and their development. They can be classified in the following manner:

1. Nature conservation acts: consisting of the Wild Animal Reservation and Protection Act of 1960, a National Park Act of 1961 and the National Forest Reserves Act of 1964. These three acts cover both land and water, especially the National Park Act which also includes marine parks as well as forest parks. These nature conservation acts are under the responsibility of the Royal Forestry Department.
2. Natural Resource Exploitation Acts. This group of acts consists of the Forest Act of 1941, the Fisheries Act of 1947, the Minerals Act of 1967, the Petroleum Act of 1971, and the Tourism Act of 1979. These acts are under the responsibility of a number of different agencies.
3. The Enhancement and Conservation of the National Environment Quality Act of 1992, which covers the control of quality and standards for the environment and conservation

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\* Thailand has 10 National Economic and Social Development Plans, with a period cycle of 5 years for each. The first NESDP initiated in B.E.2506 (1953s). It addresses the national development plan as a concern to society, community, economy, natural resource and environment along with good Governance

of natural resources. (Environment protection Act) The Office of National Environment Board (ONEB) is responsible for implementing these acts and is given the power to request an environmental statement from various development projects.<sup>121</sup> The Prime Minister is the Chairman of the National Environment Board (NEB). The NEB approves environment quality management plans, Provincial action plans and amends so as to improve environment law.<sup>122</sup>

Policies of Thailand promoted cooperation within the Government and between the Government and local agencies level. In 2002, a new Ministry was established according to a Government Reorganization Act in which agencies involved in natural resources and the environment have been placed under a new structure called the Ministry of Natural Resources and Environment (MONRE).<sup>123</sup> For CZM in Thailand, there are national and international projects. The national projects are collaborations with international agencies that assist in funding for the following projects:

1. Community Based Fisheries Management, Bang Saphan Bay Project initiated in 1999 by DOF to demonstrate the fishing right in fisheries communities.<sup>12</sup>
2. Integrated Management Plan for the Development of Shongkhla Lake River Basin started implementation in 2003 as one of the first holistic plans to provide all involved parties with applicable environmental management tools to restore natural resources and environment for sustainable development of the area.<sup>124</sup>
3. Phang-Nga Bay ICM received funds for implementing the activities from the Government's annual budget, along with international cooperation and loan. The aim of the project is to encourage Community Based Fisheries Management.<sup>125</sup>
4. Coastal Habitats and Resource Management (CHARM) project with cooperation between Royal Thai Government and the European Union. The five year project between 2002 and 2007 with the objective of establishing communities skill in fisheries management self-organization and with a strong, committed and enlightened local Government.<sup>126</sup>
5. Integrated Coastal Fisheries Management, Pathew District (ICFM-PD) project with cooperation between DOF and SEAFDEC-TD was to establish community based fisheries management. This five year project started in October 2001 with a pilot project in the Southeast Asia region.<sup>127</sup>

For the international projects, Thailand is involved with

1. Project of Reversing Environmental Degradation Trends in the South China Sea and Gulf of Thailand received supporting funds from GEF with implementation by UNEP partnership bordering the South China Sea, includes Cambodia, China, Indonesia, Malaysia, Philippines, Vietnam and Thailand. The Action Program for the protection and restoration of coastal and marine environments focused on four main issues: mangroves, coral reefs, sea grasses and wetlands.<sup>128</sup>
2. Bay of Bengal Project on Large Marine Ecosystem (BOBP-LME), this Large Marine Ecosystem is characterized by its tropical climate. It is situated in the monsoon belt and receives high amounts of rainfall. The LME borders eight countries: Bangladesh, India, Indonesia, Malaysia, Maldives, Myanmar, Sri Lanka and Thailand which received support in fisheries project by GEF.<sup>129</sup>
3. The Sampling Program of neritic tunas in Thailand with cooperation of IOTC along with implementation by DOF Thailand. Thailand is one sampling port to provide data on the activities of long line Tuna fleets.<sup>130</sup>
4. A project under the Japan Society for the Promotion of Science (JSPS) is a program to assist with scientific advancement, to include funding research, fostering researcher, and the fisheries international scientist exchange.<sup>131</sup>

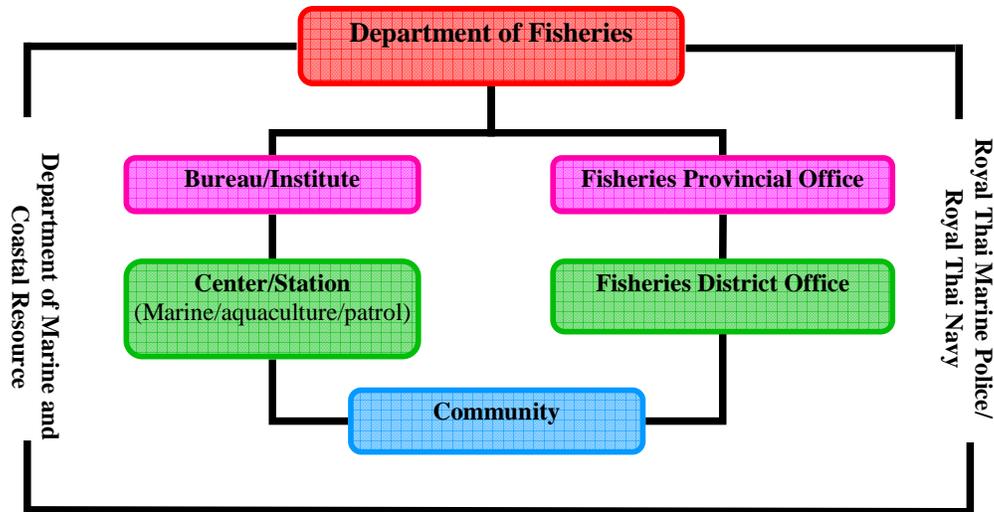
In addition to the above, Thailand has the two following projects that were established by His Majesty the King: The Kung Krabaen Royal Development Project which was established on 28 December 1981 in order to conduct studies, research and experimentation on appropriate development methods suitable for the development needs in the coastal area of Chanthaburi Province.<sup>132</sup> The aim is to prevent the destruction of mangroves, the decline of coastal fish stocks, and saline water intrusion into agricultural lands, which negatively affected the way of life of the local fishermen and farmers.<sup>133</sup> On the other hand, the Pak Panang Basin Develop Project in Nakhon Sri Thammarat Province, is very similar in that tidal salt waters negatively affect the fresh water resources during storm surges and exceptional higher than normal tides. This combined with shrimp farms draining salt water through rice fields causing soil salinity to increase. The tidal dam project aims to prevent saltwater intrusion into agriculture lands, and includes development of eco-friendly shrimp aquaculture system. The tidal dams also help to reduce this by either stopping or redirecting tidal salt water from reaching rice crops.<sup>134</sup> Both of them are

involved with various departmental agencies. The ministries advisors were involved and supported with funds from Thai Government.

The various agencies involved with fisheries administration and management are identified in mandate No. 340/2549 of the Ministry of Agriculture and Cooperatives. The committee composed of Government agencies, Thai fisheries associations, president of instant product association, and president of frozen food. DOF also appointed a fisheries conservation committee to amend and improve fisheries regulations. All fisheries laws must be approved by the fisheries conservation committee before they are proposed to the Ministry of Agriculture and Cooperatives or the Provincial governor for ratification.<sup>135</sup>

With in Thailand's fisheries management structure, the Department of Fisheries (DOF) is the lead national agency with three supporting agencies: the Department of Marine Coastal and Resources (DMCR), the Royal Thai Marine Police, and the Royal Thai Navy. The DOF is also the competent organization for fisheries research, development, and management of fisheries resources and aquatic animals, so as to ensure Thai fisheries produce sufficient quantities for the domestic consumption and for export of high-quality products; this respecting the sustainable utilization of fisheries resources and the environment.<sup>136</sup> The DMCR is responsible for the rehabilitation of natural resources and the environment and has elaborated main strategies with an emphasis on the role of public participation in preservation, protection, conservation, utilization and rehabilitation of natural resources through proactive and integrated natural resources management.<sup>137</sup>

The surveillance and enforcement of Thailand is ensured in collaboration among four agencies under the national fisheries law and international law. The Royal Thai Navy will concentrate on illegal fishing from neighboring countries while the coast guard and other agencies are to patrol near the shore line. With petroleum prices increasing day by day it has a negative effect on enforcement and fishery control. Thai Government allocates funding at the beginning of the year for each center and there is no process in place to request and receive additional monies before the end of the fiscal year.



**Figure 10** The administrative structure of fisheries management of Thailand

Source: Compiled by the author

The DOF has had a program to develop poor fisheries communities since 1982 which is undertaken by the Marine Fisheries Research and Development Bureau. The first program between 1982 and 1984, developed in inland and coastal areas' economy by providing funding to build fish ponds and support fishing ports. Then, between 1985 and 1992, three activities were undertaken in coastal areas of both the GOT and Andaman Sea: with the objectives to

1. provided infrastructure facilities, there are fishing ports, gears, maintenance building, break waters, rainwater tanks, boat hauling winches, and artificial reefs;
2. encourage the establishment of fisher groups, provided compromise fishing gears and promote product post harvest by woman groups; and
3. support training courses on coastal conservation of fisheries and the establishment of a coastal school.

After that the Thai marine enhancement program ran from 1992-1996, its name was changed but the activities which it undertook remained the same.<sup>138</sup>

Thai Government policy has provided for sufficient economic development of the State while encouraging people to be responsible for resource management so they can help achieve sustainable resource use. According to the Prime Minister who is the Chairman of the National Environment Board there are positive and negative ways to achieve this. The environment policy may be changed if the Government deems that resource use is not

sustainable. In addition, Thailand has participated with its neighbors in the region for the management of fish stock and primary habitats that assist natural sustainable resource approaches. Also, Thailand has had some Acts for at least 57 years which it has to improve and make them current to meet the needs of sustainable resource use now and projected use which meets demands of the future

#### **PART 4 COMMUNITY MANAGEMENT IN MALAYSIA, VIETNAM, CAMBODIA AND THAILAND**

Communities are very important for sustainability an ICM approach. The policy of all countries in Southeast Asia is to focus on the participation of communities in ICM and to be able to demonstrate the concept in their own country. Resource users will have a better idea of the problems and weaknesses in their own community or occupation. Fishers have experience in fishing, spawning seasons and fishing grounds. Some have worked in fisheries their whole lives. The stakeholders should be willing to share information, participate in the identification of problems, and help with implementing plans. For fisheries management, fishers themselves should be involved with monitoring for illegal fishing to assist the Government while saving funds. In addition, fishers can help researchers that monitor fisheries resources by recording their own capture. In Southeast Asia, many communities are involved in various ICM, projects but they do not participate in every activity. This section will address the four countries that surround Gulf of Thailand. The reasons for this, there in the same region and are slightly different in culture so it is justifiable to render comparisons. Especially when based on community management in Thailand, Cambodia and Malaysia, which are promoted by SEAFDEC-TD although they differ in activities and implementation techniques.

##### **4.1 Community management in Malaysia**

Malaysia lacks institutionalized community management so a local-level project will be used as a case study. The Locally Based Coastal Resource Management in Langkawi (LBCRM-PL) project is implemented by SEAFDEC and DOF Malaysia. The project started in August 2001 and was in effect until December 2007. The project had three objectives:

1. to provide technical assistance for the sustainable development of the coastal fisheries community in Pulau Langkawi;

2. suggest a Community Based Resource Management (CBRM) approach in fisheries management to the community; and
3. implement a pilot project using CBRM/ICRM in Kuala Teriang, Langkawi.

At first, DOF Malaysia considered the stakeholders who were living in the community, who were participating in zoning arrangements and in the Fisheries Resource Management Plan (FRMP). The Committee assigned community laws relating to fishing: there is no fishing on Friday and in the event anyone in the community dies. The traditional penalty for such an offence is a fine of one dozen plates to be given to the mosque. To enforce these fishing laws, two members of The Local Enforcement Unit (LEU) volunteer to patrol the demarcated area on basic rotation along with two officers from the Malaysia Enforcement Agency (MEA).<sup>83</sup>

In 2008, the MEA stationed a patrol boat at the Kuala Teriang LEU while the DOF donated binoculars and walkie-talkies to help protect from trawler incursion. Moreover, it is quite a common practice for both men and women to work in some part for the community such as cleaning the village, helping with lunch or dinner parties (e.g. for weddings), or helping at the mosque with religious activities. The project was implemented with cost-sharing between SEAFDEC and DOF Malaysia. At first, the Japanese Trust Fund I assisted with funds of \$US 35,000 while \$US 10,000 came from the Fisheries Consultative Group (FCG). From 2004 to 2007, the Japanese Trust Fund IV provided \$US 25,523 and the Japanese Grassroots Tsunami Relief Fund contributed \$US 55,506. Further still, DOF Malaysia supported the project with 97,404 \$US.<sup>139</sup>

Although, community based fisheries management is not easy to formulate and implement in any country, Malaysia could put to good use the lessons learned from the LBCRM-PL project in affect they place rotation of two officers and two volunteers per shift for monitoring. The community can mix religion and traditions with resource management as found in Malaysia and Vietnam. For fisheries monitoring and surveillances, they have a proven system which other countries can benefit from though it is not easily implemented in other countries. The members of families also kindly give manpower to help neighbors and or the community for preparation of parties or activities in the community. All of these might help communities strengthen and become self sufficient which in turn requires less Government resources.

## 4.2 Community Management in Vietnam

The co-management strategy of near-shore and estuarine area management was endorsed by the Ministry of Fisheries. The ICM needs local organizations, individual fishers and groups of fishers for monitoring and enforcement.<sup>140</sup> As such, community management is not as easy in the more poverty-stricken countries. Vietnamese do not participate in the entire process of these activities because they want benefits for participating. In addition, Vietnamese are used to a traditional top-down system for coastal management as they are well acquainted with this system.<sup>141</sup> The legal framework is not clear on how much the local Government can be creative and proactive in the decision-making and planning of the local community.<sup>98</sup>

However, small-scale fisheries have traditionally assisted in fisheries management that concern residential proximity rights, primary rights, and the right to sell, transfer or lease and share these rights. This is how it is in Van Son Hai, Quang Nam Danang Province for long-term bearers of traditional fishing rules. For example, a person can set up an operation by establishing gear at a given fishing spot. Others can not fish in this area until the previous owner has dismantled the existing operation. For primary fishing rights, usually the son inherits the right to fish in the village's sea territory. But if a family does not have any sons, then a daughter is allowed to inherit this right. Outsiders must wait for a minimum of 10 years before being granted fishing rights. The fishers in Van Son Hai are permitted to loan or share their access rights, and annually re-allocate these rights with other fishers in their village.<sup>85</sup>

Based on questionnaires that were handed out and returned problems within the community were shown. The exception was Ha Lien Village\* which had proven methods of dispute resolution recognized at times as Community Based Managements Achilles' Heel. This was shown in a report by Strehlow and Kurt. They studied community action to protect fisheries resources and found the following problems: the use of drag nets, population increase, pollution from agriculture and cities, electric fishing, destruction of mangroves, pollution from shrimp ponds, and no alternative jobs.

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\* Ha Lien Village is in Nha Phu Lagoon, Khanh Hoa Province in central Vietnam

There is also a conflict between the small-scale operations who use traditional fishing gear and those who use electric fishing gear. The electric fishing gear came to Ha Lien around 1995 and it was adopted by 50 percent of the fishers. The fishers who use traditional gear find the need to switch to electric gear while the fishers who already use electric gear find the need to increase their profits. These two strong groups of fishermen led to much conflict and nearly destroyed the community and its resources. Finally, in 2002, the villagers called a meeting where they agreed to ban the electric fishing. After that, they formed a fisherman group called Fishery Protection Group which was officially recognized by the local Government. This group was strong and stable. The outcome was that the number of fishers using electric gears declined in the village. Also, fishers from outside the village were punished and their equipment confiscated if they used this gear in the village's protected area. Certainly, the villagers have seen a lot of conflict, but this group has stayed persistent.<sup>142</sup>

Vietnamese want the benefits from participating in community based resource management although this (CBRM) is not found in the whole country. As found in Danang Province, traditional practices of CBRM can help fisheries management in that they have respected the sustainable resource for a long time. In addition, the fishers in some villages have shown they can manage their resources and make agreements within their village when they have problems (dispute resolution). Base on traditional methods and practices along with problem solving lessons shows Vietnam has a real chance to implement successful community based management if the Government encourages and remains highly supportive.

### 4.3 Community Management in Cambodia

With 12 years of peace in Cambodia, there's been a trend toward top-down power transfer through a decentralization process which begun in February 2002.<sup>143</sup> This decentralization reform was mostly political, as it established a legitimate profile of the State at the local level through democratically elected local councils. The commune law approved in 2001 provided a basic legal framework for the establishment and operation of the Cambodian local councils. The law empowers a commune with legislative and executive authority and establishes the commune councils\* as the bodies representing their citizens.<sup>144</sup>

For communities to facilitate the implementation of community-based fisheries management, the Ministry of Agriculture, Forestry, and Fisheries created a Prakes (Sub-decree) on guidelines for community fisheries.<sup>145</sup> This Prakes has fourteen chapters comprehensively address community-based fisheries: how to establish the duties of the group; assignment of fisheries administration roles; how to make internal rules, authorities and duties of congress of the community fisheries; and the evaluation of the fisheries community area. In the community, congress is the highest-level group which is elected by the people. They have the authority to approve internal rules. The fisheries community must prepare an agreement to manage their community. The Fisheries Cantonment Chief and the fisheries committee must sign the agreement along with a signature of the local commune chief as a witness.<sup>146</sup>

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\* Cambodia has 1,621 commune councils. Each commune council is composed of 5 to 11 members depending on demography and geography. The members come from commune level elections.

Some policy-makers in Phnom Penh are working on legislation, but not everyone at the national, Provincial, or local level is particularly comfortable with community-based management initiatives. A more reasonable local official or governor may want to support community-based management, but without a clear legal mandate or policy for this, may be reluctant to act.<sup>98</sup> For example, the experience in Ratanakiri showed that the Community Based Natural Resource Management (CBNRM) is not easy and that it takes time and resources. Community empowerment is crucial to successful CBNRM, but at the same time, building the political will and capacity of the Government to decentralize and adopt new roles is also very important. At the Provincial level, the Government is more willing to tackle issues faced by indigenous communities, even when this involves politically sensitive issues such as limiting forest and fishing concessions.<sup>147</sup>

Some experience on community management was found in Peam Krasaop Wildlife Sanctuary, Koh Kong Province, where 10,000 people are living in three districts surrounding a mangrove area approximately 23,750 ha in size. The main general income comes from fisheries, charcoal production, farming, marketing, and manual labor. This area is faced with a decline in marine resources caused by mangrove destruction and illegal fishing from neighboring countries (Thailand and Vietnam). Moreover, problems on the fishing grounds arise from the combined use of fixed gear and moving gear. For example, one fisher uses crab traps but another uses trawlers and push nets in the same area, often resulting in the trawlers and push nets destroying crab traps. Another problem is when fishers engage with a middleman, who gives a money loan for fuel and gear. The fishers must sell fish to the middleman and, in doing so, they lose market power and have to sell at a lower price than usual.

The Participatory Management of Mangrove Resources (PMMR) project took four years to understand what CBNRM can do for the community. The PMMR team's main focus was to research how local-level resource management institutions can engage in resource management and how local livelihoods can be enhanced. The PMMR helped the people better understand the CBNRM concept with the practice of "learning-by-doing". The project will transfer knowledge to the community with the aid of study tours along with meetings and seminars. People can identify and discuss community problems and work on a management plan. Each village has a Village Management Committee (VMC) that is responsible for creating a management plan and solving the community's fisheries

problems. When VMC comes across a challenging problem that they cannot solve on their own, they will ask the PMMR to help in the process of finding a resolution.<sup>98</sup>

Cambodia has had problems with implementing coastal management at the local level. The policy-makers should cover many levels so implementers understand and can simplify. For fisheries, Cambodia has encouraged community management by establishing community based fisheries. However, when the fishers have engaged with the middleman they seem to have little power to set a higher price for their products. As this is a similar problem in countries bordering the GOT and is not easy to free them from the middleman. However, the strength of the fisherman groups may help them have increased power and approach profitable community management which is the goal of all fishers.

#### **4.4 Community Management in Thailand**

Thailand has had a decentralization policy since 1992, which was promulgated in 1997, but was not implemented right away. In 1999, Thailand started to decentralize at the local level. Article 283 of the Mandate for Decentralization provided localities the right to define their own self-Government. And articles 283 and 284 address how the local authority has independent power on policy formulation, administration, finance and personal management.<sup>148</sup>

The administration of the provincial level, the Tumbol Administrative Organization (TAO) is close to the lowest level with a grassroots organization. The fiscal budget comes from two channels: local taxes and Provincial Government agencies. Each TAO has a different budget depending on tax collection in each sub-district.

The TAO members\* come from each village by a vote based on how well each member represents what they know about the needs of their respective villages and peoples. TAO can respond to people's needs faster than a central Government because they are able to move budgets to new projects under TAO council agreement. By the Tenth-NESDP, TAO should be able to support the people's needs and add community plans to the TAO's own plans. Thus, TAO is one agency helping to build successful the CBFM projects. Local governors and fisher groups will work with TAO to develop their area.

Before community management projects were initiated in Thailand, the DOF had been encouraging fisheries communities along the coastlines of both the GOT and Andaman Sea to establish the saving of fisheries groups. This activity was strongly supported from the within fishers communities. The DOF also invited fishers' participation in replanting mangrove forests and releasing fingerlings.

Community management started in Thailand no more than 12 years ago. Initially, the DOF attempted to promote fishing rights called "Pramong Na Ban", in 1995 and subsequently established a pilot project in 1999 at Bang Saphan Bay.<sup>12</sup> The project followed the country's eighth NESDP (1997-2001) that addresses communities involved with natural resource management. The DOF adapted from the Japanese system and tried to promote a fishing system based on coastal fisheries. The project demarcated an area of about 240 km<sup>2</sup> in the coastal waters of the Gulf of Thailand. The territorial user's rights will be maintained by fisher's groups based upon legal framework established by the DOF. The community volunteers their services in conjunction with DOF officers in the monitoring for illegal fisheries.<sup>149</sup> The groups of fishers solved problems in their communities by holding public hearings and exchanging information. For example, in this area there has been conflict in the fishing grounds between daytime anchovy purse seines and anchovy cast nets with light lures. The fisheries officers sent a representative to bring the two groups of fishers face-to-face to discuss this problem. They agreed to share the area by having the daytime purse seine operators land their catch by 19:00 hrs at the latest, and then those who use anchovy cast nets can start their operations. This is a good example of dispute resolution by cooperation of resource sharing and management.<sup>112</sup>

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\* Each village has elected two TAO members with a term of 4 years.

Then there is the Coastal Habitats and Resource Management (CHARM) project with a five year term (November 2002-November 2007) under cooperation between Royal Thai Government and the European Union which had sound merit. During the five years, around 14,000 members were involved with the project.<sup>126</sup> They participated in activities that were closely related to them, including habitat monitoring, conflict analysis, mapping, eco-tourism planning, resource enhancement, product processing and more. Although the project was successful on the basis of the community's cooperation, the community lacked the understanding of the project's objectives. The project was not focused enough on the social problems: health, habit-forming drugs, conflict management, education and employment, and rubbish and waste management.<sup>150</sup>

In addition, people living in the Pakklong sub-district, not just the fisheries, are involved in the Integrated Coastal Fisheries Management, Pathew District project (ICFM-PD).<sup>151</sup> Agriculturists volunteer to develop road sides on the outskirts of their sub-district. Fishers need to assist each other. Therefore, the natural fisheries saving group was established by the necessity to give low interest loans to the members. Furthermore, they registered under the group name Pakklong Fisherman Group (PFG). This group is also involved with resource enhancement and the monitoring and surveillance of illegal outsider fishing activities. Part of the women's group also requested for the project to establish new alternatives as they needed to increase their income. Besides, when they have a conflict in their village they will find a solution by themselves. For example, fishers who live in Ban (village) Koh Teab had a conflict between users of crab traps and those who use push nets. The head of the village brought them together for discussions and to come to an agreement. They agreed to share fishing time by operating on alternate days.

The project lacks cooperation between the PFG and TAO, and among the DOF, TAO and the heads of villages. This is due to TAO not focusing as much on fisheries activities as they concentrate on the development of the infrastructure of the sub-district. They need more patrol officers to be assigned in the area so as to protect it from the commercial vessels from other Provinces. Other fishers do not participate in the PFG because they get more income, and hence more profit, from their individual activities.<sup>127</sup> Pattareeya has studied the participation of TAO members within the project and found just over 80 percent participated in at some time in each activity. It is likely that the council does not

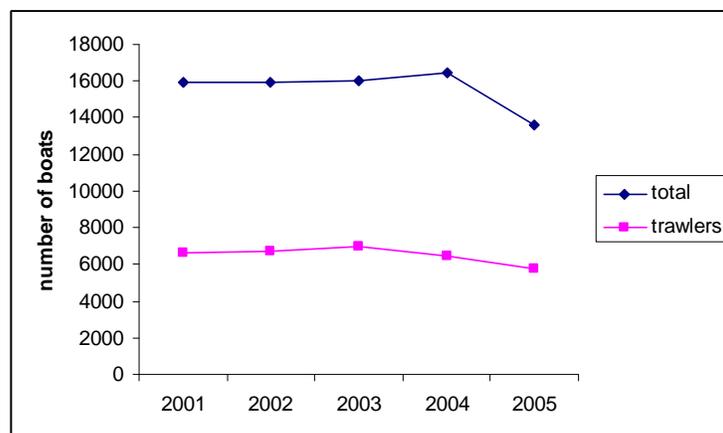
have sufficient experience to practice in each activity and might not understand the objective of the project. Otherwise, they would participate 100 percent in three activities:

1. establishing coastal zone demarcation;
2. zoning management for aquaculture; and
3. enlargement of the mesh size of collapsible crab traps.<sup>152</sup>

According to Thailand's decentralization Act, the lowest local (Sub-district) has access to administration of themselves and members who come from each village. This may help local groups receive supporting funds for implementing coastal management activities for the group. As coastal projects, also cooperate with the local organizations for achieving goals of the projects. From above it seems that fishermen's groups are interested in the MSC program and the Government should highly support. In addition, government should establish a community that is strong on self administration this may help them continue implementing successful activities after projects are completed.

## **PART 5 FISHERIES MANAGEMENT: THE CASE OF THAILAND**

In 1960, with cooperation between Thai and German researchers, new gear from Germany was demonstrated in Thailand. This gear has a high catch capacity, and the rapid use of gear increased in Thai waters. Trawlers numbered 99 in 1960, and increased to 13,113 in 1989.<sup>153</sup> Thai fishers are highly experienced and keen on adapting new techniques in fishing. This is the reason the GOT has experienced a strong decline in catch per unit of effort from 300 kg/hour in 1961, to about 50 kg/hour in 1980<sup>18</sup> and remained at 35.43 kg/hour in 2005.<sup>3</sup> This problem has been addressed by the Thai Government as written in the Eighth and Ninth Plan of NESDP. They have considered stopping the use of destructive gears in Thai waters, specifically trawlers and push nets. As the DOF has implemented the decreased use of trawlers and push nets in November 1996.<sup>154</sup> DOF stopped issuing licenses for trawlers and authorizing the transfer of licenses (except from father to son) licenses must be used every year otherwise they will be cancelled.<sup>155</sup> This program seems successful, as the numbers of fishing boats registered from 2001 to 2005 has slightly decreased from 17,295 to 16,432, and nearly 16 percent are trawlers (Figure 8).<sup>16</sup>



**Figure 11** The total number of fishing boats and trawlers of Thailand in 2000 to 2004

Source: Department of Fisheries, Thailand

Indeed, some of the fishers are fishing without a license; the DOF surveyed the number of trawlers and push nets in December 2003 and found the number of vessels was higher than licenses [table 1].<sup>155</sup> However this issue was not seriously addressed by the Thai Government. Nowadays the trawlers and push nets still operate in Thai waters and within conservation areas, as the various agencies involved with surveillance and enforcement are not adequate and the regulation is weak.

A DOF representative for fisheries management submits fisheries law to the Minister of Agriculture and Cooperatives for approval. First Thai fishery law was established in 1938 through the Thai Vessels Act of B.E. 2481 (1938).<sup>156</sup> After nine years, the Thai Government adopted the Fisheries Act of B.E. 2490 (1947).<sup>157</sup> The role and authority of the Government officers was addressed in one part of this Act. The officer has the authority to arrest the illegal fishers as listed in the fisheries Act of 1947, but only during the illegal fishing operation and not before or after. (Department of Fisheries (a), 2005) It is not easy to control illegal fishing with the high level of communications technology, such as cell phones which the poachers use to communicate when the fisheries officers leaves the dock.

**Table 1** The number of trawlers and push nets with license and actually fishing Thailand in 2003

Province	Otter board trawl		Pair trawl		Beam trawl		Push nett	
	2003	Dec 2003	2003	Dec 2003	2003	Dec 2003	2003	Dec 2003
Chonburi	172	179	98	89	0	16	21	64
Chachoengsao	40	41	16	8	0	0	24	123
Samut Phakan	492	465	270	236	34	12	103	282
Bangkok	81	81	10	10	0	2	1	1
Samut Sakhon	390	166	198	62	1	4	162	256
Samut Songkhram	301	62	593	409	0	2	0	19
Petchaburi	148	55	17	18	0	1	48	41
Total	1,624	1,049	1,202	823	35	37	359	795

Source: Department of Fisheries, Thailand

2003: number of licenses

Dec 2003: number of fishing vessels

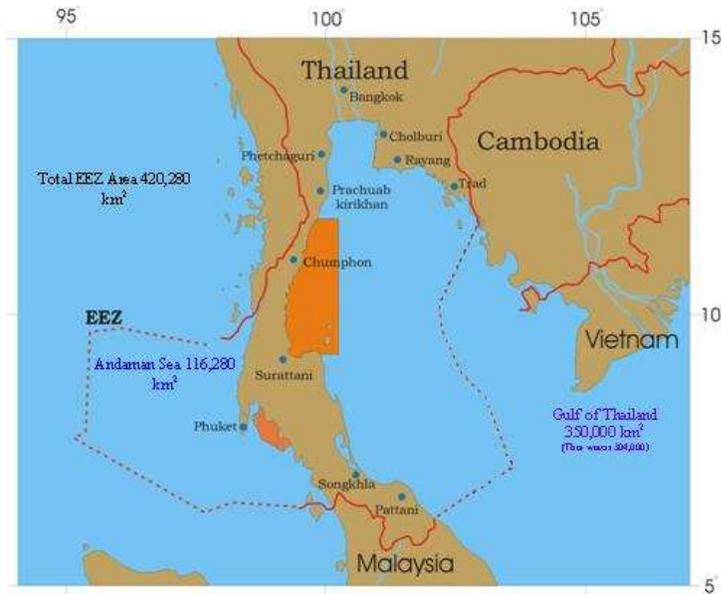
Since 1947, the Thai Government under DOF has not improved the Fisheries Act, yet laws are clearly outdated. The new regulations are necessary to properly administer and enforce proper fisheries management and the Ministry of Agriculture and Cooperation is empowered to impose fisheries regulations. Thai fisheries law covers only seasons, gear types, species and areas to control sustainable use.

Fisheries laws deemed critical to sustainable fisheries in Thailand are as follows:

1. Prohibited area for conservation of spawning grounds during spawning season of economic species especially Indo-pacific mackerel.

Two conservation areas have been established: one in the middle of the GOT, and the other in the Andaman Sea. GOT Ministerial regulations were adopted 28 November 1984 and were amended 3 times (1984, 1999 and 2006). The conservation area in the GOT covers an area approximately 26,400 km<sup>2</sup> and is closed from 15 February to 15 May each year to commercial scale vessels including trawlers, push net, purse seine, encircling gill net, lift net, falling net and mackerel gill net. Furthermore, push nets with a size of less than 14 meters in length on out board trawlers and beam trawlers with net sizes less than

16 meters in length can operate during the night. In 2006, DOF limited gear length of mackerel gill net, tackle and certain types of boats were also prohibited. On the other hand, the Andaman sea Ministerial regulations adopted in 11 April 1985 covers an area 18,000 km<sup>2</sup> and is in effect two months (15 April to 15 June). This side prohibited all trawlers, purse seines and encircling nets with a mesh size less than 4.7 cm.<sup>97</sup> (Figure 12).



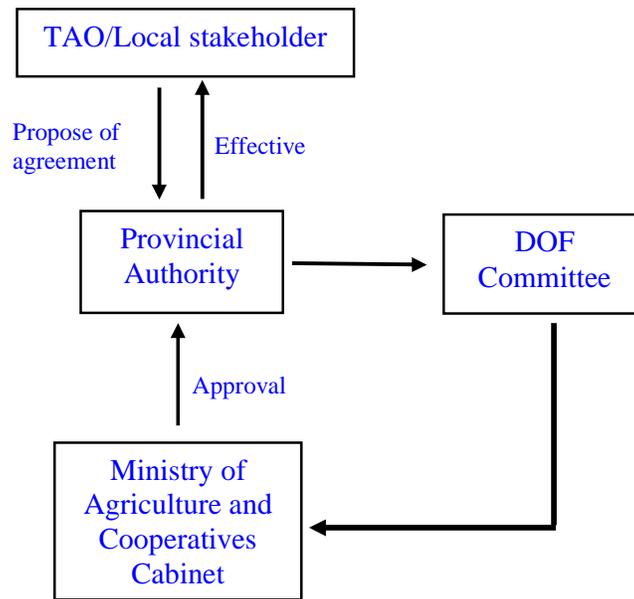
**Figure 12** Prohibited areas in Thailand

Source: Improved from Chankong, A. and S. Prisanhul, 2006

## 2. Prohibited type of gear in some areas

In July 1972, DOF considered establishing a conservation zone within 3000 meter from the base lines in the GOT for the creation of a nursing area zone for juvenile fish and invertebrates. Trawlers and push nets with engine would be banned in this area.<sup>97</sup>

In addition, the heads of Provincial Governments were empowered to impose fisheries regulations so as to follow the Fisheries Act of 1947. The Provincial mandate can solve real problems in the Provinces. Community management can be established within a legal justification for the protection of areas by this form of Government. The provincial mandate process as seen in. (figure 13)



**Figure 13** Process of consensus approval

Source: Boonsit L., DOF Thailand

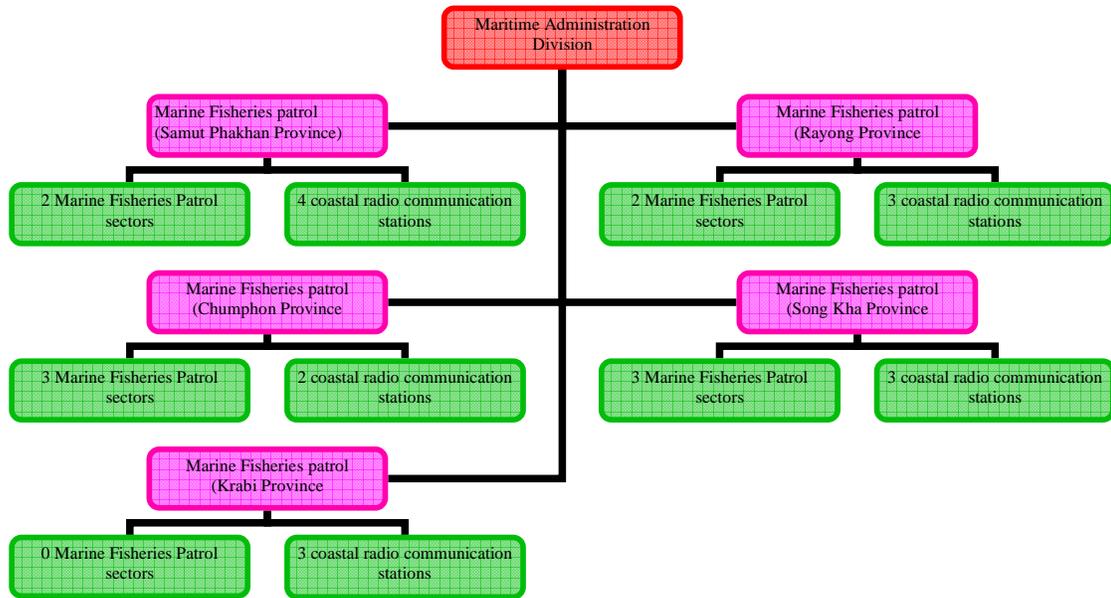
Some of the Fisheries Law has led to conflicts with fishers, as they did not accept some of the provisions. They often asked the DOF to improve and change the legislation so they can get more benefits. The DOF wanted to decrease pressure so the DOF has cooperated with fisherman agents and private companies who related with fisheries resource controls to make a strategy for fisheries management in 2007 and proposed changes to Government Cabinet in August 2008. The objective of this strategy was:

1. To develop the quality of life for the fishers and the stakeholders involved in the marine fisheries industry.
2. To enhance fisheries sustainability taking into account conditions and conducts of responsible fisheries.
3. To upgrade fisheries management efficiencies by emphasizing public participation of all sectors.
4. To utilize marine fisheries resources appropriately, and fairly.
5. To strengthen fisheries capacities at all levels in compliance with the changing environment and acceptable determinations and conditions.
6. To create security and safe food products derived from marine fisheries.
7. To rehabilitate and maintain healthy and sustainable aquatic resources and ecological system.<sup>158</sup>

The implementation of fisheries resource conservation under Ministry of Agricultural and Cooperative though the DOF is the lead agency in four areas:

1. Fisheries enforcement and surveillance

This activity is cooperation among DOF, DMCR, Thai Marine Police and Thai Royal Navy. The DOF is the lead on fisheries control along the coastline. The Bureau of Fisheries Administration and Management take action to control both fresh water and marine areas. For marine areas, DOF divided its responsibility in five zones; four in the GOT (Eastern, Central, Middle and Southern) and one in the Andaman Sea. These five centers are responsible for fisheries control near shoreline not more than 80 miles by patrol vessels less than 60 ft length. The other is responsible for 100 ft. vessel in cooperation with the Thai Royal Navy. The DOF has 72 patrol vessels so as to enforce fisheries laws.<sup>159</sup> This is not enough to control the Thai waters which cover an area of about 420,280 km<sup>2</sup>. In addition to this, fuel is prices arising day by day resulting in reduced capacity to control these areas. This, as they are not allocated more money from the central Government to compensate for the increased costs of operations. Furthermore, fisheries control in Thailand is not too strict as it might be related to religious practice; social compromise and peacefulness leads to forgiving and kindness with others. There is a high probability that officers will overlook illegal small-scale fishing even though it is the biggest problem in Thai fisheries. On the other hand, one action plan is to promote fisherman participation in fisheries management. With fisherman groups getting involved in the monitoring and surveillance of illegal fishing in their areas and communicating with the DOF officers to help control these illegal activities, this should help keep resource use sustainable. While fishers can participate on MSC with the officers, the actual enforcement will be done by the officers only.



**Figure 14** Structures of Marine Administrative and Management, DOF, Thailand

Source: Compiled by the author

## 2. Study, research and monitoring

The data base on fisheries is very important to support regulation changes, and Thai fisheries regulation is referenced on technical data. Two departments share duties for the study, research and monitoring of marine resources. DMCR is mandated to study and enhance mangrove forests, sea grass, coral reefs, and marine animals.<sup>160</sup> Their work to this mandate addresses only DOF concerns as they relate to economic species. The Marine Fisheries Research and Development Bureau (MFRDB) within DOF has direct responsibility for marine fisheries research.<sup>161</sup> Though the work of two institutes: Marine Fisheries Research and Development Technology (MFRDT) and Deep Sea Fisheries Research and Development Technology (DSFRDT). The MFRDT has five centers which are responsible for the study and research of pelagic and demersal fishes and fishery in the coastal zone. The DSFRDT is studies deep sea water and high sea so as survey fishing grounds and estimate the size of fish stocks. In addition, they also cooperate with international agencies to support research vessels and experts studying and surveying in other countries.<sup>162</sup>



**Figure 15** The location of Marine Research and Development Center  
 Source: Adapted from Google Earth

### 3. Coastal resource enhancement

Resource enhancement projects are the result of much needed habitat conservation efforts by the DOF and DMCR agencies that are charged with this responsibility. Both of them are responsible for the release of fingerlings, planting and protecting mangrove areas, and establishing artificial reefs. The protection of sea grass, seaweed and coral is the responsibility of DMCR.

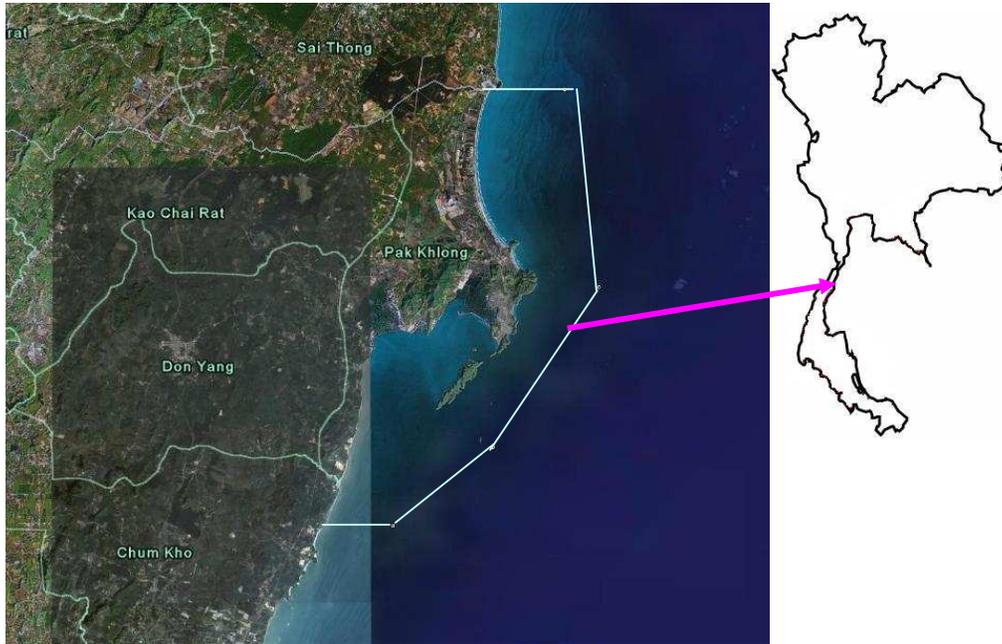
Within the DOF, three sectors take responsibility for the release of juvenile fishes: the Coastal Fisheries Research and Development Bureau, the Marine Fisheries Research and Development Bureau and the Provincial Fisheries. The Coastal Fisheries Research and Development Bureau is responsible for the production of juveniles, the two other agencies determine the location and release sites. The DMCR's role in all of this is to provide the time and location of releases but also to fund the purchase of fingerlings.

The establishment of artificial reefs was demonstrated in Rayong Province in 1978 (B.C. 2521) then extended to Pang-nga Bay in 1981 (B.C. 2524) and Nakornsri Thammarat and

Song Kha Province in 1982 (B.E. 2525).<sup>163</sup> Recently, artificial reefs will be greatly improved by DOF and it plans to add one location in each coastal Province per year. The main goal of the project is to increase the habitat for juveniles and to protect the nursery grounds from highly destructive gear (trawlers and push nets) that operate near shore. A very important project of Queen Sirikit is Coastal Resource Enhancement taking place in Pattani and Naratiwat Provinces. The project sunk 608 shipwrecked boats, 189 garbage trucks, 707 concrete tubes and 23,000 concrete boxes in the sea at 47 locations. The results were successful: as the standard of water quality improved and fish species increasing from 15 in the first year to 43 in second years. The average catch per unit effort (CPUE) also increased from 7.9 to 14.5 kg/boat/day in the first and second year respectively, which resulted in higher incomes for the fishers. Before the establishment artificial reefs, fishers averaged 10,680 baht/month, after which this income increased to 12,272 and 15,440 baht/month in first and second years.<sup>84</sup> Thailand has mangrove forests along the coastline and approximately 36 percent of the shore line (936 km.). Once the Mangroves covered an area of nearly 2,299,375 rai (around 367,899 hectares) in 1961, but dropped to 1,047,390 rai (around 167,582 hectares) by 1996. Almost all the clearing was for aquaculture. The Government agencies lead by DMCR responded by reinforcing their mangrove management. Private companies (petroleum and others) responded with financial and employee help along with college volunteers for the planting of mangrove forests. As a result of these initiatives mangrove areas increased to nearly 1,526,125 rai (around 244,179 hectares) in 2000.<sup>164</sup>

#### 4. Encourage Community Based Fisheries Management (CBFM)

A number of DOF staffs who report on fisheries control, including how to reduce costs for monitoring and surveillance, suggested ICFM as a cost saving approach. DOF significantly embraced the ICFM approach to marine resource sustainability. Many coastal communities participate in fisheries management; at the very least they are involved in replanting mangrove areas and releasing fingerlings. Communities also help DOF to manage fisheries resources in their village. For example, the ICFM-PD project which along with project staffs, local council members, the head of the village and fishers discussing maritime management within the first year. They established maritime territorial project site, divided the area for aquaculture (sea-bass cages and green mussel) and vessels avoidance area. The project site's prohibited area status was ratified in October 2002 through a Provincial mandate that banned trawlers, push nets and dredges from operating in the project area.<sup>165</sup>



**Figure 16** Marine territory of ICFM-PD project, Chumphon Province, Thailand

Source: Adapted from Google Earth

The Pakklong Fisherman Group (PFG) is around 100 members strong and was established in October 2006. It is composed of seven sub-groups from each gear in their sub-district. This group has quite a few strengths, as demonstrated by their activities. The PFG has more than 100 members. There is a high level of active commitment by the areas' local fisherman. The PFG also has a good management system because the leader as well as the members is quite adept at handing matters needing immediate action. The group related with zoning arrangement and monitoring of illegal fishing in their area. They observed illegal fishing decline of 80 percent compared with the previous year. They facilitate the sharing of information regarding fisheries gear and its repair.<sup>166</sup>

Before 2002, the Koh Teab village in Chumphon Province used crab traps and faced a decrease in the swimming crab populations due to over fishing. They identified the problem and found solutions with DOF and NGO assistance. Two solutions were agreed on, and include the increase in mesh size of bottom crab traps and the building cage of nets to keep gravid crabs until they spawn. Subsequently, the Crab Bank Fisherman Group was established in 2002 with 15 members. Every morning, members bring gravid crabs to the chairman and then the chairman's representative will take them to the cage net and take

care of them. In 2006, non-government organization in Japan invited the chairman to Japan for the chance to experience and learns the Japanese method of crab conservation. In the monsoon season of 2006, this group started a new method by marking crabs on their carapace and releasing them to the sea. The results showed average carapace length and total catch was increasing as shown in table 2.<sup>167</sup> This group is strongly involved with the donation of gravid crab but lacks the manpower for additional necessary duties and responsibilities such as organizational and distribution needs therefore the chairman undertakes these on his own.

**Table 2** CPUE and average size of blue swimming crabs caught by crab traps in Pakklong Sub-district

year	Catching rate (kg/trip )	Average carapace length (cm)		Total catch (mt/year)
		Male	Female	
2002	9.40	8.6	8.97	41.72
2003	9.45	9.17	9.56	44.34
2004	14.44	9.55	10.01	76.88
2005	17.13	10.15	10.34	98.33
2006	12.96	10.39	10.62	67.47

Source: Chumphon Marine Research and Development Center

Fishermen know that mangrove forest serve as a habitat for fish larvae and juveniles. Some fishermen fish mud crab for their livelihood. Thus, PFG has been planning to enhance this habitat by planting mangrove on Mother's Day of each year. This activity sees the participation of many sectors, there are PFGs, schools, housewives, CMDEC staff, SEAFDEC staffs and TAO members. The PFG council subsequently monitors and observes mortality of plants so as to improve the initiative in subsequently on for next year.

Moreover, members of the PFG are involved with technical research such as recording total catch, fisheries, gear and species during each fishing trip. They also collect tagged fish that help study their migration and distribution. These two activities help the

Government save funds and time, and ensure the fisherman will know the condition of resources thereby help them to easily manage resource sustainable in a manner.

Although, fisheries communities received authority from the Thai Government to manage fisheries in their own unit by establishing a territorial fishing area, they only have the authority for monitoring and surveillance. The Thai Government has not yet granted communities the right to perform policing and enforcement duties within their own communities.

Thailand Government initiatives undertaken by DOF started stakeholder involvement in the establishment of a strategy for fisheries management that brings everyone happiness and can decrease any negative pressure between the fisherman and the Thai Government. The fisheries management is not implemented only by the Thai Government, for example resource enhancement which was established by private companies such as reforestation of mangrove areas. These show Thai Government and community responsibility to the overall well being of the environment as it should be in all GOT surrounding nations. In addition, communities also participate in monitoring of illegal fishing activities, releasing of fingerings and mangrove planting that encourages communities' love and respect of natural resources vital to their livelihoods. The result will be significant reductions in illegal fishing and with Thai Government encouragement this can extend to other areas by establishing community networks so as to enhance fisheries management for continued sustainable resource use. For fisheries enforcement, if joint participation within the Governments' four agencies could be implemented by not overlapping areas of control which can increase the capacity of monitoring and controlling illegal fishing activity while also reducing the costs, as the DOF has not shown it can effectively cover surveillance of illegal fishing activities within their budget.

## **PART 6 COMPARISON OF COASTAL MANAGEMENT IN MALAYSIA, VIETNAM, CAMBODIA AND THAILAND**

Malaysia, Vietnam, Cambodia, and Thailand, all located around the GOT found implementing coastal management problematic, and all initiated their programs in response to basic problems such as air pollution, water pollution, coastal erosion, resource decline, etc. The harmonized national policies were adopted and developed to suit the current national and local conditions. The policies and action plans were developed by different departments to respond to often times national policy. It seems clear, that implementation was not always fully successful under many activities with multi-agency involvement. Some countries have proven strengths and some have a variety of weaknesses which are outlined in Table 3. But, in no case does any one country have all the answers.

**Table 3** Comparative analysis of strengths and weaknesses of Community Management in Malaysia, Vietnam, Cambodia and Thailand

Country	Strengths	Weaknesses
Malaysia	<ul style="list-style-type: none"> <li>- Federal Government composed of various departments that cover all activities in coastal zone</li> <li>- Strong in surveillance (coast guard) and enforcement (of illegal fishing)</li> <li>- Fisheries management by zoning</li> <li>- Strong support of fisheries management</li> </ul>	<ul style="list-style-type: none"> <li>- Most ICZM is administered and manage by the federal Government that does not appear to be community based</li> <li>- The federal system lacks integration among the three levels within the federal system which can pose problems</li> <li>- Merchant shipping ordinances are not unified. Malaysia has three merchant shipping ordinances for Peninsular Malaysia, Sarawak and Sabah</li> <li>- No agency has the authority to manage environment of the EEZ</li> <li>- Government budgets do not fully support coastal management activities</li> </ul>

**Table 3** Comparative analyses of strengths and weaknesses of Community Management in Malaysia, Vietnam, Cambodia and Thailand (continued)

Country	Strengths	Weaknesses
Vietnam	<ul style="list-style-type: none"> <li>- Various international donor funds help improve capacity to govern in ICZM and help to develop strategy and action plans</li> <li>- Fisheries management by limited fishing efforts in fishing grounds</li> <li>- Traditional Community Based Management in fisheries</li> <li>- Community has appreciated the importance to conserve natural resources</li> </ul>	<ul style="list-style-type: none"> <li>- Vietnamese Governments lacks knowledge and experience to created appropriate Coastal Management policies</li> <li>- Lack of enforcement due to lack of legal instruments</li> <li>- Local organizations have no authority to established projects</li> <li>- Needs focused attention on environmental impact such as oil spills</li> <li>- No data base and fishery log book</li> <li>- Needs to establish policy to control investors</li> <li>- No environment fee system</li> </ul>
Cambodia	<ul style="list-style-type: none"> <li>- Latest up to date laws</li> <li>- Started mangrove rehabilitation program</li> <li>- Stakeholders volunteer to participate in Government activities</li> <li>- The number of Community Fisheries are increasing which facilitates self-management</li> <li>- Various international donor assistance</li> <li>- Fresh water resources can support protein needs in Cambodian</li> </ul>	<ul style="list-style-type: none"> <li>- Needs a few more years of coastal management to see if implemented policies are effective</li> <li>- Lack of information and knowledge on coastal resource management</li> <li>- Needs concentrated effort in coast guard patrols to control illegal fishing and resource depletion</li> </ul>

**Table 3** analyses of strengths and weaknesses of Community Management in Malaysia, Vietnam, Cambodia and Thailand (continued)

Country	Strengths	Weaknesses
Thailand	<ul style="list-style-type: none"> <li>- King helps and supports coastal management activities</li> <li>- The Chairman of the Natural Environment Board is also the Prime Minister</li> <li>- The tenth NDESP currently focuses on people as being central to resource conservation and promoting harmonized farming and environmentally friendly products. Promotes cooperation among Government agencies</li> <li>- Decentralized tax collecting and budgeting to TAO</li> <li>- Fishers can govern local fishing rights areas</li> </ul>	<ul style="list-style-type: none"> <li>- Some Legal Acts are out of date</li> <li>- Needs concentrated effort on enforcement patrols to control illegal fishing and resource depletion</li> <li>- Needs larger budget to support enforcement program</li> <li>- Lack of cooperation between departments at Ministry and Provincial levels</li> <li>- Lack of cooperation between Provincial Governments and TAOs</li> <li>- Users and stakeholders are poor at importance resource and conservation</li> </ul>

### 6.1 Administrative and Management system

The countries reviewed have different administrative and management approaches to coastal management. Malaysia is implementing coastal management under a federal system in three levels: federal, state and local. The lack of integration among the three levels within the federal system can pose problems. Each level is composed of various departments while agencies establish their own policies. The result is many policies are duplicated in the same area and some policies have conflicting agendas between local, state and federal Ministries. Malaysia has problems in environment management in that no agency has jurisdiction over the EEZ and lack of cooperation among departments seems a detriment to success.

Vietnam's decentralization does not let local levels of Government create activities for their communities. All projects are established at the Provincial level.<sup>82</sup> Fisheries management, Vietnam's lack of interest in fishery data bases and log books, with respect to both necessary to support future management and policy decisions, seem to be an oversight. However, Vietnam is a very fortunate country in that various donor agencies provide funds to help improve capacity in ICZM. However, Vietnam's lack of knowledge and experience in creating a successful national policy has not been a severe hindrance to moderate success. Accordingly Vietnamese have promoted foreign investment in their country. The investors are not responsible for impact on the environment and Vietnam also has no environmental fee system. Furthermore, Vietnam faces a problem with many of oil spills, which occur each year, and for which Vietnam does not any response plans.<sup>76</sup>

Cambodia is an impoverished country. Thus, the national policy emphasizes the well-being of its population: GNI per capita, health and education. Cambodia's Government does not concentrate on coastal management because 75 percent of aquatic protein comes from fresh water: the Tonle Sap and Maekong Rivers.<sup>96</sup> Cambodia is very young with respect to coastal management, and thus needs more years to properly asses if implemented policies and effective. However, Cambodia has received assistance from various international donors for the implementation and demonstration of ICZM projects.

For Thailand, it is different from other countries because Thailand has extra projects given by His Majesty the King which are called "King Projects". The Ministry Advisor, involved with the project as well as the various departments involved with implementation, are part of the Government. The NEB represents environmental management of which the Prime Minister is the Chairman. This board's responsibility is to provide policy and plans, but also to approve Provincial action plans. The implementation of these focuses on people as central to resource management. Thailand has decentralized fiscal authority to the local Government since 1999 and the local organization can administer and manage they own Sub-District. Although, this decentralization probably helps coastal management activities achieve their goals, it is not owe hundred percent successful. All of the activities depend on TAO council approvals and some TAOs lack funds and cannot support the activities. Furthermore, Thailand lacks cooperation between departments at Ministry and Provincial levels and also lacks cooperation between Provincial Governments and TAOs

## 6.2 Legal and regulation

Legal Acts and Ordinances have been implemented to help establish legal guidelines and frameworks to simplify the implementation and decentralization of CZM, ICZM and CBRM. Even though, Legal Acts and Ordinances do not cover all the inherent problems associated with implementation and decentralization, they do outline rules connected to the process. Thailand first enacted the Forest Act of 1941, while Malaysia enacted the Merchant Shipping Ordinance of 1952, and then Vietnam enacted the Ordinance on Aquatic Resource Protection of 1989 and Ordinance of Resource Tax, finally Cambodia between 1993 and 1994 they established two laws we have the Preah Reach Kret on Creation of Protected National Area and Law on Land Management, Urban Planning and Construction. See table 4.

Some ordinances of Malaysia are not unified and are unclear such as the merchant shipping ordinances. Malaysia had adopted three ordinances, while three of them were different laws, the Merchant Shipping Ordinance of 1952 for Peninsular Malaysia, the Merchant Shipping Ordinance No. 11 of 1960 for Sabah, the Merchant Shipping Ordinance No. 2 of 1969 for Sarawak.<sup>168</sup>

Vietnam is coastal administration and management entities have implemented many Acts and action plans, but these lacked the enforcement and legal instruments necessary for success. Cambodia very young with respect to the implementation of coastal management as all of the decrees and laws has been adopted in the past few years. The Cambodian Government lacks the capacity to create suitable national policy and other regulations on coastal management, but it does receive assistance from international organizations as outlined above (page 29 paragraph 2).

**Table 4** Legal Acts and Ordinances of Malaysia, Vietnam, Cambodia and Thailand

Title	Malaysia	Vietnam	Cambodia	Thailand
Forest and National park	- National Forestry Act of 1984 - Conservation Act of 1960	- Forest Protection Act of 1991	- Preah Reach Kret on Creation of Protected National Area of 1993	- Forest Act of 1941 - Wild Animal Reservation and Protection Act of 1960 - National Park Act of 1961 - National Forest Reserves Act of 1964.
Fisheries	- Fisheries Act 1985	- Aquatic Resource Protection of 1989 - Water Resource Law of 1998	- Law on Fisheries Management and Administration of 1983 - Law on Fisheries of 2006 - Law on Fisheries Resources Management of 2007	- Fisheries Act of 1947
Land	- National Land Code of 1965	- land use Law of 1993	- Law on Land Management of 1994 - Land Law of 2001	
Shipping	- Merchant Shipping Ordinance of 1952 - Merchant Shipping (Oil Pollution) Act of 1994 (Act No.515)			

**Table 4** Legal Acts and Ordinances of Malaysia, Vietnam, Cambodia and Thailand (continued)

Title	Malaysia	Vietnam	Cambodia	Thailand
Environment	- Environment Quality Act of 1974	- Environment Protection Law of 1993 - Ordinance of Vegetation Protection and Quarantine of 1993 - Ordinance on Radiation Safety and Control of 1996 - Law on Oil and Patrol of 1996 - Mineral Resource Law of 1996	- Environmental Protection and National Resource Management Act of 1996 - Anukret on Environment Impact Assessment of 1999 - Anukret on Water Pollution Control of 1999 - Anukret on Solid Waste Management Of 1999	- The Enhancement and conservation of the National Environment Quality Act of 1992 - Petroleum Act of 1971 - Minerals Act of 1967
Tourism				- Tourism Act of 1979
Construction	- Street, Drainage and Building Act of 1974 - Town and Country Planning Act of 1976			
Resource tax		- Ordinance of Resource Tax of 1989		

### **6.3 Surveillances and enforcement program**

The surveillance and enforcement are very important to achieve success in the coastal management approach. Malaysia is the strongest on monitoring, surveillance, and control within the four countries. This includes a zoned fisheries management approach that regulates boat sizes in respective zones there by providing clarify to fishers and enforcement personnel and thus rendering the system more manageable. A seemingly weak point is that too many agencies involved with surveillance and enforcement program while using the same law may see differences in interpretation. Cambodia's apparent weakness to control mangrove deforestation investment that showed charcoal kilns continuing to work and also aquaculture farms are still increasing in those areas. Also weak on coast guard that has often shown illegal fishing from neighboring countries operations in Cambodia's jurisdiction. Cambodia lacks proper information so as to increase their knowledge on coastal ecological system and the hazards of illegal/over fishing. Thailand, though at this longer, may not be stronger when it comes to controlling illegal fishing than Cambodia and or Vietnam. Thailand seems as though it lacks control on small-scale fishing. Inclusive, some of Thailand's (Acts) were established a long time ago and may need to be updated such as the Fisheries Act, the license fees and fines for illegal fishing are very low. Particular problem, the soft punishment for infractions does not make fishers fearful hence any motivation to obey laws. Strong laws along with strong enforcement are critical to sustainable natural resource use. Thai users and stakeholders are poor at appreciating resources conservation. For example, Thai fishermen use small mesh sizes in their netting operation near shore, and fish milk factories continue to buy the juvenile economic fishes to produce their products, if factories do not buy the smaller sizes the fishers will adapt their nets to catch only economic size fish.

### **6.4 Community management**

Community management has been encouraged in the region by national Government and donors agencies. However, various problems were found in each country's implementation approach. Malaysia seems poor in its support of community management. Almost all of the projects have driven by federal in each level. Although, the Malaysian Government has included community management in the current Ninth National Plan, it lacks agency capacity to support and integrated cooperation.<sup>61</sup> However, there is a case study in which

the community has successfully manages their marine resources. This community agreed to no fishing on Friday and used religion to punish illegal fishing.<sup>139</sup>

Community management in Cambodia is very new compared to other countries and will require some time for the concept to be understood. Cambodian fishermen's education is rather low, so the Cambodian Government applied the "learning by doing" method (practice makes perfect), which seemed suitable for Cambodia. However, Cambodia has an excellent chance to practice sound community management. The Cambodian Government is encouraging fisherman involvement in community resource management by establishing CF, and it hopes to see the number of CF increase year by year. The Department of Fisheries also created guidelines for CF to practice that made CF understand their rights and roles.<sup>109</sup>

The example of Vietnamese fishers learning how to protect their resources, such as is the case with Ha Lien village, demonstrates what can be accomplished through community management. This community can, and did, identify and discover the solutions needed for sustainable resource use. However, under an agreement, with no formal regulations it might not be successful in the long term, as fishing rights, regulations and law are also important for achieving sustainable resource use.<sup>169</sup> Furthermore, Vietnamese traditional rules and behavior can help fisheries management. Some villages will, in the absence of sons, give fishing rights to daughters and some will not allow outsider fisherman to operate in their village until 10 years have passed so they fully understand the 140 year old fishing rules and behavior.<sup>85</sup> Traditional rules and behavior should be able to promote and adapt to community needs.

Thailand has also recognized local fishing rights, as exemplified through the Bang Saphan Bay and ICFM-PD projects. Bang Saphan Bay community has the right to manage their area, and the area boundaries have been created by the community. The main activities are participation in MCS and enhancement of resources (replanting mangrove and releasing fingerlings). The community set up the action plans under local Government assistance.<sup>148</sup>

Each country has been strong and weak in regards to the implementation of community management, which should and could be improved. Malaysia should increase community participation in resources management, Vietnam should establish stronger laws so as to

control illegal fishing activity, Cambodia should learn from the successful experiences of neighboring countries so as to effectively improve the efficiencies of implemented projects, while Thailand should support fully the funding of the local communities so the implementation of the MCS program is successful and independently sustainable. For the future and continued success of all of these listed above, cooperation between Government and community is highly important, in that the Government does not always know the real problems in the community and the community also needs technical consultation along with funds from the Government so as stated before Integrated Community Based Resource Management will not only be successful but it can be sustainable.

## **6.5 Finance**

Financial is the main issue driving all projects and determines the level of success. All of the activities need financial investments for items such as publications, meetings, consultants, etc. The funds come to the project usually in two ways: from Government and donors. Some projects receive funds only from donor countries, or some projects share costs between donors and receiver countries. Almost all projects have a limited time period, such as 3 years or 5 years, to operate. Once financial assistance from the donor countries stops, the lack of funds reduces the chance of continued success.

The majority of Malaysian fiscal support goes to inland activities, and less than 1 percent of GDP is invested in environment management. Vietnam spends only about 0.1-0.3 percent of their GDP on similar projects.<sup>41</sup> Likewise, Vietnam has various donor agency supported funds as well as Cambodia. In Thailand, some projects share funding between the Thai Government and donor agencies in the short term. The budgets come from the central Government and the TAO.

Malaysia's coastal management programs implemented by the Government should provide increased encouragement for community participation in surveillance of illegal fishing activities which would reduce the cost of enforcement and control of the coastline. Vietnam and Cambodia appear to need assistance from other countries so as to increase capacity of the Government's control on coastal management because many of the projects lack impact plans for economic development as they relate to the environment and sustainable resource use. Otherwise, they have a good opportunity to approach successful

community management, and some communities in Vietnam have proven resource management for a long time by established traditional methods. Cambodia also has a CF and the numbers increase year by year. Thailand is the oldest when we look at coastal management but appears weak on enforcement and control. Thailand fisheries communities have the right to manage their resources but lack the funds to implement MSC programs. The central Government and/or TAO should fully fund and support these activities so they can achieve this goal.

## **PART 7 CONCLUSIONS AND RECOMMENDATIONS**

This report cannot say which country has the best coastal management solution because all four countries have not completely implemented coastal management initiatives. The policies depend on priorities in each country, such as in Cambodia which needs to develop social and economic well-being of its citizens. Cambodian also needs more food, health and higher education levels for its citizens; thus the Cambodian Government must prioritize to the basic needs of its people.

Most Malaysians have never been to the ocean and the major GDP of the country comes from agriculture (rubbers and palm oils).<sup>36</sup> Malaysia is a good lesson which respect to surveillance and enforcement as it is very strong in this region. Otherwise, Malaysia should focus its attention on community management because it can save costs through fishermen monitoring and collecting data via log books that can be used for research.

Meanwhile, Vietnam is good at community management themselves and traditional rules and behavior can lend itself to developing an approach to integrated community resource management. Vietnamese communities are not yet regulated by the rule of law, which is very important for sustainable resource use. This could, in the long term, lead to problems with control and bring about conflict within communities or between communities and outsiders.

Cambodia needs more time to develop because it is very young with respect to ICZM. However, Cambodia has a chance to make real changes in the coastal environment by influencing the school children. One way to accomplish this is to have part of the curriculum changed so as to show pride and acceptance of the rich coastal heritage they

are managing now. With that small change, a sense of pride and ownership in all things good, as it relates to the coast, can become cultural wellness.

Thai fisherman groups have the right to manage marine resources simultaneously with fisheries law so as to control illegal fishing. Thai fishers appreciate and are ready to participate in MCS activities. Otherwise, the Thai Government would lack the funds and manpower to fully support a MCS program. Therefore, to succeed in community management, the Thai Government should support necessary equipment and funds so the communities can self implement.

For achieving success, the donor agencies should establish short term and long term goals while supporting each project. Many projects available in the region are short in length: just 3 or 5 years. This region need more time for development and to make sure the communities fully understand how the implementation process achieves long term success. The resident's lack of knowledge of sustainable resource use and environmental conservation could be a detriment to the long term success of many projects. So much so that the State should elaborate plans and budgets to continue to programs after financial support by donors has ended.

Finally, this region should increase attention to environmental pollution and should establish action plans for the protection from pollution and the strengthening of monitoring and control. In addition, taxes that are collected from companies, industries or persons that may affect the environment negatively should return to the local level to help with environmental solutions. The decentralization process should ensure communities have the right to resource management and should encourage resource users and stakeholders to become involved in resource management. Long term action plans should be established, coastal community networks along coasts for the exchange of the information and linkages to co-management for sustainable use of resource should be implemented.

This case study in four countries found CZM is flexible in that it depends on the necessity of, and the needs of, the individual community in each habitat locale. Although, being within the same country, the implementation may be different based on agreements in particular areas. In addition, the culture and traditional differences will affect the implementation agreements and local laws. Agreeably, one of the most important aspects

for sustainable resources use is to establish pride in the coastal environment by positively influencing and involving school children in most if not all of the activities.

## END NOTES

- 1 Lem, A., R. Subasinghe, and M.J. Phillips, Presentation on Small-scale fisheries producers and globalization; available from ([http://km.dmcg.go.th:81/mesu/mangrove/mangrove\\_map.aspx](http://km.dmcg.go.th:81/mesu/mangrove/mangrove_map.aspx))
- 2 Nagasawa K. No date. Background and Objectives of the Meeting on Current Status of Transboundary Fish Diseases in Southeast Asia: Occurrence, Surveillance, Research and Training. Southeast Asian Fisheries Development Center, Aquaculture Department, Iloilo, Philippines.
- 3 Kongprom, A., R. Phoosawat, U. Ossapornpitakkul, U. Augsornpa-ob, S. Hoimuk, K. Loychuen, M. Sumontha, and S. Sripanpaibool. 2005. Status of Marine Resources from Commercial Trawlers in the Gulf of Thailand and Andaman Sea, Marine Fisheries Research and Development Bureau. Department of Fisheries. Thailand, 97 pp.
- 4 Tookwinas, S. No date. Coastal Planning of Shrimp Farming: Carrying Capacity, Zoning and Integrated Planning in Thailand, Coastal Aquaculture Division, DOF, Thailand
- 5 Graaf de G.J. and T.T. Xuan 1998. Extensive Shrimp Farming, Mangrove clearance and Marine Fisheries in the Southern Province of Vietnam, Mangrove and Salt Marshes 2, page 159-166.
- 6 Vicheth, P., T. Carson, H. Narin, S. Chhay, S.L. Song, C. Dara, O. Siphon, V. Monyneath, M. Kosal, B. O'Callaghan, and M. Torell, Institution and Policy Issues in the Management of Fisheries and Coastal Resources in Cambodia; available from (<http://www.pemsea.org/knowledge-center/c2c-infonet/links-to-costal-and-marine-topics/legislation/cambodia>)
- 7 Environment Data Based Division, June 13, 2006; available from ([http://www.nea.gov.vn/html/Baocao\\_hientrang/VN\\_SoE/overview/environmental\\_management\\_and\\_legislation.htm](http://www.nea.gov.vn/html/Baocao_hientrang/VN_SoE/overview/environmental_management_and_legislation.htm))
- 8 Pullen, S. 1994. Integrated Coastal Zone Management, International Commitments; available from (<http://www.wwf.org.uk/filelibrary/pdf/mu17.pdf>)
- 9 National Statistic Office (NSO), 2000; available from ([http://www.survice.nso.go.th/nso/data/data23/data23\\_10.html](http://www.survice.nso.go.th/nso/data/data23/data23_10.html))
- 10 United Nation Department of Economic and Social Affairs. 1992. Division for Sustainable Development, Conference on Environment and Development (Rio de Janeiro, 3-14 June 1992), A/CONF.151/26 (Vol. II), 13 August 1992; available from ([http://www.un.org/depts/los/consultative\\_process/documents/A21-Ch17.htm](http://www.un.org/depts/los/consultative_process/documents/A21-Ch17.htm))
- 11 Vietnam environment agencies, Ministry of natural resource and environment; available from (<http://www.nea.gov.vn/English/organization/MONRE/>)
- 12 Boonsit L. 2000. Community Based Fisheries Management, Bang Saphan Bay Project, 11 pp. in Thai.
- 13 Siar, S. and G. Marmulla. Successful Involvement of Local Communities in Conservation programmes for Malayan Mahseer in River Kinabatangan of Sabah, Malaysia. FOA, Community-Based Fisheries Resource Management; available from (<http://www.fao.org/Paticipation/Tagal-lessons.html>)
- 14 Monyneath, V. 2007. Integrated Coastal Zone Management in Cambodia, Prepared for "UNITAR WORKSHOP, 15-19 October, 2007, Hiroshima, Japan", Ministry of Environment, Cambodia.
- 15 Partnership in Environment Management for the Sea of East Asia (PEMSEA); available from (<http://www.pemsea.org/>)
- 16 Department of Fisheries. 2005. Statistic of Coastal Aquaculture Fishery in 2005, Thailand; available from (<http://www.fisheries.go.th/it-stat/>)

- 17 Food and Agricultural Organization. August 1999. Information on fisheries management in the socialist republic of Vietnam from: <http://www.foa.org/fi/oldsite/RCP/en/VNM/body.htm>
- 18 Boonyubol, M. and S. Pramokchutima. 1984. Trawl Fisheries in the Gulf of Thailand, ICLARM Translation 4, 12pp.
- 19 FICen (Fisheries Scientific- Technological Economic Information), July 2, 2006; available from ([http://www.fistenet.gov.vn/details\\_e.asp?Object=2112463&news\\_ID=7263407](http://www.fistenet.gov.vn/details_e.asp?Object=2112463&news_ID=7263407))
- 20 Pho, H.H. 2007. Fisheries development in Vietnam: A case study in the exclusive economic zone, Ocean & coastal management, Volume 50, issue 9, page 699-712.
- 21 Raakjaer, J., M.S. Dao, K.J Staehr, H. Hovgard, T.D.T. Ngayen, K. Ellegaard, F. Riget, V.T. Dang, and G.T. Phung. 2006. Adaptive Fisheries Management in Vietnam the use of Indicators and the introduction of a multi-disciplinary Marine Fisheries Specialist Team to Support Implementation. Marine policy 31 (2007), page 143-152.
- 22 Gillett, R.2004. The Marine Fisheries of Cambodia, FAO/Fishcode Review No.4, 50 pp.
- 23 World Fishing, International support to upgrade Cambodia's fishery sector; available from ([http://www.worldfishing.net/new\\_horizons/new\\_horizon.ehtml?o=2075](http://www.worldfishing.net/new_horizons/new_horizon.ehtml?o=2075))
- 24 Fisheries and Aquaculture Department, Fisheries and Aquaculture country Profile Malaysia, Food and Agriculture Organization of the United Nations; available from (<http://www.fao.org/fishery/conutrysector/FI-cp-my/en>)
- 25 United Nation Environment Programme. 2006. Division of Technology, Industry and Economics.. Sustainable development of tourism; available from (<http://www.uneptie.org>)
- 26 Tourism Authority of Thailand; available from ([http://www2.tat.or.th/stat/web/static\\_index.php](http://www2.tat.or.th/stat/web/static_index.php))
- 27 Statistics and Tourism Information Department, Ministry of tourism, Cambodia; Available form (<http://www.mot.gov.kh>)
- 28 Malaysia Tourism Promotion Board, Annual report 2000 and 2006; available from ([http://www.tourism.gov.my/corporate/trade.asp?page=marketing\\_training&subpage=annual\\_report](http://www.tourism.gov.my/corporate/trade.asp?page=marketing_training&subpage=annual_report))
- 29 Tourism Information Technology Center, Vietnam National Administration of Tourism, available from ([http://www.vietnamtourism.com/e\\_pages/news/index.asp](http://www.vietnamtourism.com/e_pages/news/index.asp))
- 30 Tourism Authority of Thailand; available from (<http://www.tourismthailand.org/destination-guide/>)
- 31 Thaifocus.com; available from (<http://www.thaifocus.com/cambodia/index.htm>)
- 32 Malaysia Tourism Promotion Board; available from ([http://www.tourism.gov.my/corporate/trade.asp?page=marketing\\_training&subpage=pow erpoint](http://www.tourism.gov.my/corporate/trade.asp?page=marketing_training&subpage=pow erpoint))
- 33 PEMSEA, About PEMSEA; available from (<http://www.pemsea.org/about-pemsea>)
- 34 Yu, H. and M.A. Bermas. No date. Integrated Coastal Management: PEMSEA'S PrActices and Lessons Learned. GEF/UNDP/IMO Regional Programme on Partnerships in Environmental Management for the Seas of East Asia (PEMSEA), 16 pp.
- 35 SEAFDEC-TD (Southeast Asia Fisheries Development Center: Training Division), Project Document. Final Version Endorsed at the 1<sup>st</sup> SC Meeting on 10<sup>th</sup> November 2005, 16 pp.
- 36 Central Intelligent Agency; available from (<https://www.cia.gov/library/publications/the-world-factbook/geos/my.html>)
- 37 Department of statistic Malaysia; available from ([http://www.statistics.gov.my/English/frameset\\_keystats.php](http://www.statistics.gov.my/English/frameset_keystats.php))

- 38 World Wildlife Fund; available from  
([http://www.panda.org/about\\_wwf/where\\_we\\_work/asia\\_pacific/where/malaysia/environmental\\_problems\\_malaysia/index.cfm](http://www.panda.org/about_wwf/where_we_work/asia_pacific/where/malaysia/environmental_problems_malaysia/index.cfm))
- 39 Lim, T.W., Mangroves and Coastal Forest-A Malaysia Case Study, 18 August 2005, available from (<http://www.wyf.org.my/2005/lim%20teck%20wyn.doc>)
- 40 The Public International Law and Policy Group, December 2006, Devolution of Power Federal Territories; available from  
(<http://www.publicinternationallaw.org/areas/peacebuilding/PILPGDevolutionFederalTerritories12.1.2006.doc>)
- 41 Economic Planning Unit. Ninth Malaysia Plan 2006-2010; available from  
(<http://www.epu.gov.my/rm9/html/english.htm>)
- 42 The Commissioner of Law Revision, Law of Malaysia; Land Conservation Act 1960 (Act 385), 2006, 19 pp.
- 43 Ismail Omar, Rules Affecting the Land Development Process in Malaysia - A Review on Regulation of Environment Impact Assessment (EIA), Pacific Rim Real Estate Society Conference 21-23 January 2002, Lincoln University, Christchurch, New Zealand, 20 pp.
- 44 Environmental Quality Act of 1974 (Act No. 127), Law of Malaysia, incorporation all amendment up to 1 January 2006
- 45 Street, Drainage and Building Act of 1974 (Act No.133), Malaysia; available from  
(<http://www.hba.org.my/laws/street/partII.htm>)
- 46 Town and Country Planning Act of 1976 (Act No.172), Law of Malaysia, incorporation all amendment up to 1 January 2006.
- 47 National Forestry Act of 1984 (Act No. 313), Malaysia; available from  
([http://faolex.fao.org/cgi-bin/faolex.exe?rec\\_id=002550&database=FAOLEX&search\\_type=link&table=result&lang=eng&format\\_name=@ERALL](http://faolex.fao.org/cgi-bin/faolex.exe?rec_id=002550&database=FAOLEX&search_type=link&table=result&lang=eng&format_name=@ERALL)).
- 48 FAOLEX. Malaysia: Fisheries Acts 1985 (Act 317); available from  
([http://faolex.fao.org/cgi-bin/faolex.exe?rec\\_id=001342&database=FAOLEX&search\\_type=link&table=result&lang=eng&format\\_name=@ERALL](http://faolex.fao.org/cgi-bin/faolex.exe?rec_id=001342&database=FAOLEX&search_type=link&table=result&lang=eng&format_name=@ERALL))
- 49 Ramli, J. 2003. Development Malaysia National Coastal and Marine Strategy: Harmonising State and Federal Legislation. Sea Resources Management Sdn Bhd. 6 pp.
- 50 Merchant Shipping (Oil Pollution) Act of 1994, Malaysia, Came into force on 6 April 1995 [P.U. (B) 144/1995
- 51 Department of Irrigation and drainage. Coastal Management – Activities, Ministry of Natural Resources and Environment, Malaysia, available from  
([http://www.water.gov.my/index.php?option=com\\_content&task=view&id=30&Itemid=184](http://www.water.gov.my/index.php?option=com_content&task=view&id=30&Itemid=184))
- 52 Cicin-Sain, B. and R.W. Knecht, Integrated Coastal and Ocean Management, Concept and Practices, 1998, page 373-380.
- 53 Jeppensen, G., Overview of the Integrated Coastal Zone Management (ICZM) project; available from (<http://www.iczm.sabah.gov.my/Reports/Sandakanpercent20mst-Overview.html>)
- 54 Sabah ICZM project; available from (<http://www.townplanning.sabah.gov.my/iczm/>)
- 55 Saharuddin, A.H. 2001. National Ocean Policy – New Opportunities for Malaysian Ocean Development, Marine policy journal, Volume 25, page 427-436.
- 56 Hui-Min, K. and S. Normara. 2006. Economic instrument and their potential in conserving the Malaysia Coastal Zone, Ocean & Coastal Management Journal, Volume 49, Issues 9-10, Page 727-738.

- 57 Flewelling, P. and G. Hosch, Country review: Malaysia; available from (<http://www.fao.org/docrep/009/a0477e/a0477e0c.htm>)
- 58 Ogawa, Y., Marine Fisheries Management and Utilization of Fishing Ground in Malaysia; available from (<http://sciencelink.jp/j-east/article/200506/000020050604A0860586.php>)
- 59 Ministry of Agriculture Malaysia. 1993. The National Agricultural Policy (1992-2010), ISBN 983-9863-80-8.
- 60 Fisheries and Aquaculture Department, Food and agriculture Organization, Fisheries and Agriculture Country Profile, Malaysia; available from ([http://www.fao.org/fishery/countrysector/FI-CP\\_MY/en](http://www.fao.org/fishery/countrysector/FI-CP_MY/en))
- 61 Siry, H.Y. 2006. Decentralized Coastal Zone Management in Malaysia and Indonesia: A Comparative Perspective. Coastal Management journal, Volume 34, issue 3, pp 267-285.
- 62 Barui, F., available from (<http://www.reefball.com/malaysia.htm>)
- 63 The World Factbook; available from (<https://www.cia.gov/library/publications/the-world-factbook/geos/vm.html>)
- 64 Nguyen, C.H. and N.G. Hoang. No date. Presentation of Towards a Integrated Coastal and Marine Policy. Ministry of Fisheries and Hanoi Nation University
- 65 Alan K.J. Tan. 1998. Preliminary Assessment of Vietnam's Environment Law, Faculty of Law National University of Singapore, 15 September 1998, available from; (<http://sunsite.nus.edu.sg/apcel/dbase/vietnam/reportv.html>)
- 66 Ordinance on Resource Tax of Vietnam; available from (<http://coombs.anu.edu.au/~vern/luat/english/Ord-nat-resource-tax.txt>)
- 67 The decree of the Council of the Minister for the Enforcement of Forest Resource Protection and Development Act; available from (<http://coombs.anu.edu.au/~vern/luat/english/CoM-17HDBT-forest-pro.txt>)
- 68 Asian Pacific Centre for Environmental Law Environment Protection law; available from (<http://sunsite.nus.edu.sg/apcel/dbase/vietnam/primary/viaenv.html>)
- 69 Asian Pacific Centre for Environmental Law Environment Protection law; available from (<http://sunsite.nus.edu.sg/apcel/dbase/vietnam/primary/viapet.html>)
- 70 Land use Law; available from (<http://coombs.anu.edu.au/~vern/luat/english/Law-land-law.txt>)
- 71 State of the Environment in Vietnam, 2001, available from ([http://www.nea.gov.vn/html/Baocao\\_hientrang/VN\\_SoE/summary/national\\_responses\\_for\\_environmental\\_protection\\_in\\_summary.htm](http://www.nea.gov.vn/html/Baocao_hientrang/VN_SoE/summary/national_responses_for_environmental_protection_in_summary.htm))
- 72 Mineral resource Law; available from (<http://coombs.anu.edu.au/~vern/luat/english/Ord-min-resource.txt>)
- 73 The President of the Socialist Republics of Vietnam, the Ordinance on Radiation Safety and control 1996
- 74 Truong Thi Qughn, Water Resources Management in Vietnam, Workshop on the Water in Mainland Southeast Asia, Siem Reap, Cambodia, 30 November to 2 December 2005. 10 page
- 75 Environment Data Based Division; available from ([http://www.nea.gov.vn/html/Baocao\\_hientrang/VN\\_SoE/overview/environmental\\_management\\_and\\_legislation.htm](http://www.nea.gov.vn/html/Baocao_hientrang/VN_SoE/overview/environmental_management_and_legislation.htm))
- 76 Sekhar, N.U. 2005. Integrated Coastal Zone Management in Vietnam: Present Potentials and Future Challenges, Ocean & coastal management, Volume 48, issue 9-10, Page 813-827
- 77 International Atomic Energy Agency; available from (<http://www.iaea.org/inisnkm/nkm/aws/eedrb/data/VN-gd.html>)

- 78 National Integrated Coastal Management Demonstration Site Project in Danang, Vietnam; available from  
([http://www.danangcoastlink.org.vn/English/Danangcoast/w\\_message.htm](http://www.danangcoastlink.org.vn/English/Danangcoast/w_message.htm))
- 79 Vu, H.T. 2001. The Development of the Marine Protected Area System: the Vietnam Experience; available from (<http://www.mekong-protected-areas.org/vietnam/thu.htm>)
- 80 Vietnam Integrated Coastal Zone Management; available from  
([http://www.nea.gov.vn/html/duan/Halan/English/VNICZM\\_HomePage.html](http://www.nea.gov.vn/html/duan/Halan/English/VNICZM_HomePage.html))
- 81 Vietnamese fisheries sector project, list of donor funded projects; available from  
([http://www.ficen.org.vn/details.asp?Object=54&news\\_ID=12168708](http://www.ficen.org.vn/details.asp?Object=54&news_ID=12168708))
- 82 Pham, L.H. 2006. Fiscal Decentralization from Central to Sub-national Government in Vietnam. Paper presented at Seventh Annual Global Development Conference Institutions and Development: At the Nexus of Global Change St. Petersburg, Russia, 20 January 2006
- 83 Ninh, X.T. No date. Fisheries Law, Status and Perspectives to Improve Fisheries Management. Conference Paper No.3, Appendix D.3, FAO/FishCode Review No.9. page 51-87.
- 84 Socialist Republic of Vietnam, Decree of the Government regulating and guiding the implementation of certain articles in the fisheries law, Decree N0. 27/2005/ND-CP, Hanoi, March 8, 2005, 20 pp.
- 85 Ruddle, K. 1998. Traditional Community-based Coastal Marine Fisheries Management in Vietnam, *Ocean & Coastal Management*, volume 40 (1998), page 1-22.
- 86 International Center for Environment Management; available from  
([http://www.icem.com.au/02\\_contents/03/03.htm](http://www.icem.com.au/02_contents/03/03.htm))
- 87 Bureau of East Asian and Pacific Affairs, June 2008, Cambodia; available from  
(<http://www.state.gov/r/pa/ei/bgn/2732.htm>)
- 88 Royal Government of Cambodia. 2006. National Strategic Development Plan 2006-2010. Approve by Council Minister Meeting 27 January 2006. Kingdom of Cambodia. 154 pp.
- 89 Law on Environmental Protection and National Resource Management of Cambodia; available from (<http://faolex.fao.org/docs/html/cam19300.htm>)
- 90 Draft of Sub-Decree on community Fisheries Management, the Royal Government of Cambodia.
- 91 Sub-Decree on Environment Impact Assessment, Royal Government of Cambodia, No:72 ANRK.BK, August 11,1999; available from  
([http://www.camnet.com.kh/moe/sub\\_EIA.htm](http://www.camnet.com.kh/moe/sub_EIA.htm))
- 92 Sub-Decree of water Pollution Control, the Royal Government of Cambodia, No 27 ANRK.BK Phnom Penh, April 06, 1999; available from  
([http://www.camnet.com.kh/moe/sub-decree\\_English.htm](http://www.camnet.com.kh/moe/sub-decree_English.htm))
- 93 Sub-Decree on Solid Waste Management, the Royal Government of Cambodia, No 36 ANRK.BK, April 27,1999; available from ([http://www.camnet.com.kh/moe/sub-decree\\_SWM\\_English.htm](http://www.camnet.com.kh/moe/sub-decree_SWM_English.htm))
- 94 Land Law, the Royal Government of Cambodia, No NS/RKM/0801/14
- 95 Law on Water Resources Management of the Kingdom of Cambodia, entry into force in July 2007; available from (<http://faolex.fao.org/docs/texts/cam75723.doc>)
- 96 Kurokura, H., M. Hori, K. Enomoto, S. Ishikawa, and N. Thuok. Small-scale Fishing by Farmer in Kompong TOM Province, Cambodia: Social Background of Fisheries by Farmer. ([www.jst.go.jp/asts/asts\\_m/files/0312pdf/01\\_Kurokura\\_.ppt.pdf](http://www.jst.go.jp/asts/asts_m/files/0312pdf/01_Kurokura_.ppt.pdf))
- 97 IOSCA. 2006. Cooperation with Cambodian Government in Mangrove Project; available from ([http://www.oisca.org/e/about/news/2006/1110\\_2.htm](http://www.oisca.org/e/about/news/2006/1110_2.htm))

- 98 Marschke, M. and K. Nong. 2003. Adaptive Co-Management: Lessons from Coastal Cambodia. *Canadian Journal of Development Studies*, Volume XXIV, No 3, Page 269-383.
- 99 Ministry of Land Management Urban Planning and Construction; available from ([http://www.mlmupc.gov.kh/mlm/index.php?page=9701&lang=e&showdocument\\_ID=428&itempage=14&search=&fyear=&fmonth=&fproduct\\_ID=&fcategory\\_ID=&fdotype\\_ID=&fororganisation\\_ID=&yetailed\\_search=](http://www.mlmupc.gov.kh/mlm/index.php?page=9701&lang=e&showdocument_ID=428&itempage=14&search=&fyear=&fmonth=&fproduct_ID=&fcategory_ID=&fdotype_ID=&fororganisation_ID=&yetailed_search=))
- 100 Ministry of Environment; available from (<http://www.czmcam.org/>)
- 101 Ministry of Environment and Danida. 2006. Cambodia Shoreline Management Strategy: Executive summary, Environment Management of the Coastal Zone Project, Vietnam, April 2006, 30 pp.
- 102 Ministry of Environment and the National Coastal Steering Committee, Environmental Management in the Coastal Zone, page 1-1
- 103 UNDP; available from ([http://www.undp.org/gef/05/documents/writeups\\_doc/iw/Pemsea\\_IW2\\_revised12\\_06.doc](http://www.undp.org/gef/05/documents/writeups_doc/iw/Pemsea_IW2_revised12_06.doc))
- 104 UNEP/GEF, Reversing Environmental Degradation Trends in the South China Sea and Gulf of Thailand, available from: ([http://www.unepscs.org/Project\\_Background.html](http://www.unepscs.org/Project_Background.html))
- 105 Community-Based Natural Resource Management Learning Institute, Learning for Change: Ten Years of Experience on Community Based Coastal Resource Management and Livelihood Improvement in Koh Kong, Cambodia.
- 106 Ministry of Foreign Affair of Denmark, Commune and Community Based Natural resources and Environment Management Component; available from (<http://www.phnompenh.um.dk/en/menu/DevelopmentCooperation/CambodiaCountryProgramme/CambodiaCountryProgramme20012005/NaturalResourceandEnvironmentProgramme/CommuneAndCommunityBasedNaturalResourceandEnvironmentManagementComponent/>)
- 107 SEAFDEC-TD (Southeast Asia Fisheries Development Center: Training Division), Project Document, Final Version Endorsed at the 1<sup>st</sup> SC Meeting on 10<sup>th</sup> November 2005, 16 pp.
- 108 GTZ, GTZ in Cambodia; available from (<http://www.gtz.de/en/weltweit/asien-pazifik/609.htm>.)
- 109 Vuthy, L. 2008. National Synthesis on Small-scale Fisheries in Cambodia. WP02b, ASEAN-SEAFDEC Regional Technical Consultation on Small-scale Fisheries in Southeast Asia. 29 April-2 May 2008, Thailand, Bangkok. 5 pp.
- 110 WWF, Community Fisheries Project, Cambodia; available from ([http://www.panda.org/about\\_wwf/where\\_we\\_work/project/projects/index.cfm?uProjectID=9S0812](http://www.panda.org/about_wwf/where_we_work/project/projects/index.cfm?uProjectID=9S0812))
- 111 United Nation. 2002. Country Profile: Cambodia. Johannesburg Summit 2002. 46 pp.
- 112 ASEAN-SEAFDEC. 2008. Socio-economic Conditions of Small-scale Fisheries: An Experience on Implementation of Development Projects in Thailand, WP03.29 April-2 May 2008, Bangkok, Thailand. 9 pp.
- 113 Federal Research Division. July 2007. Country profile: Thailand. 27 pp.
- 114 Nakthon, N. 1992. Marine Territory of Thailand and Neighboring Countries. Hydrograph Department. Royal Thai Navy. Master of Science Thesis (in Thai), page 1-9.
- 115 [http://service.nso.go.th/nso/nso\\_center/project/search\\_center/23project-th.htm](http://service.nso.go.th/nso/nso_center/project/search_center/23project-th.htm)
- 116 The World Bank Group; available from (<http://www.doingbusiness.org/ExploreEconomies/?economyid=186>)
- 117 Department of Export Promotion, Thai Export Product; available from ([http://sunsite.au.ac.th/thailand/export/export\\_eng.html](http://sunsite.au.ac.th/thailand/export/export_eng.html))

- 118 The mandate of Tenth National Economic and Social Development Plan, No.10, 19 October 2006. in Thai
- 119 Office of the National Economic and Social Development Board , Summery of the Tenth National Economic and Social Development Plan (2007-2011); available from <http://www.nesdb.go.th/Default.aspx?tabid=139>
- 120 National Economic and Social Development Board, The Tenth National Economic and Social Development Plan, Thailand. In Thai; available from (<http://www.nesdb.go.th/Default.aspx?tabid=139>)
- 121 Baker, I. and P. Kaeoniam. 1986. Manual of Coastal Development Planning and Management for Thailand, Supported by the UNESCO MAB and COMAR Programme. 179 pp.
- 122 Alan, K.J. Tan. 1998. Preliminary assessment of Thailand's Environment Law. Faculty of Law, National University of Singapore; available from (<http://sunsite.nus.edu.sg/apcel/dbase/thailand/reportt.html>)
- 123 Ministry of Natural Resources and Environment, The background of the Ministry; available from (<http://www.warehouse.mnre.go.th/Portal/เกยวกบกระทรวงฯนบสนบ/ความเปนมมา/tabid/205/Default.aspx>), in Thai.
- 124 Chankong, A. and S. Prisanhul. 2006. Integrated coastal zone Management Thailand, Training workshop on IZCM, Walailuk University, August 21 –September 23, 22 pp.
- 125 Sangchan S. and K. Jankusol. No date. Community-based Fisheries Management in Phang-Nga Bay, 18 pp.
- 126 CHARM (Coastal Habitats and Resource Management) project management team. November 2007. CHARM Completion Report (November 2002-November 2007). Thailand. 72 pp.
- 127 Boromthanasat, S. January 2007. Final Project Evaluation: Integrated Coastal Resource Management Pathew District (ICRM-PD). Coastal Resource Institute (CORIN), Prince of Songkha University, Hat Yai, Thailand. 72 pp.
- 128 South China Sea Project, Reversing Environment Degradation Trends in the South China Sea, and Gulf of Thailand; available from ([http://www.unepscs.org/Project\\_Background.html](http://www.unepscs.org/Project_Background.html))
- 129 Bay of Bengal (LME); available from (<http://na.nefsc.noaa.gov/lme/text/lme34.htm>)
- 130 IOTC, Sampling Programme; available from (<http://www.iotc.org/English/activities/sampling.php>)
- 131 SPS, Massage for JSPS President, Prof. Motoyuki Ono; available from ([http://www.jsps.go.jp/english/about\\_us/brochure.html](http://www.jsps.go.jp/english/about_us/brochure.html))
- 132 The Royal Development Study Centre and the Philosophy of Sufficiency Economy. 2004. The Ministerial Conference on Alternative Development Sufficiency Economy, 8-10 November 2004, Office of the Royal Development Project Board, Thailand, 27 pp.
- 133 Tookwinas, S, 1998, Coastal Zone Management at Kung Krabaen Bay, Eastern Thailand: experience and Model Study, Department of Fisheries; available from (<http://srdis.ciesin.columbia.edu/cases/thailand-006.html>)
- 134 The Chaipattana Foundation Journal, The Royally-initiated Pak Panang Basin Development Project, Nakhon Si Thammarat Province; available from ([http://www.chaipat.or.th/chaipat/journal/dec00/eng/e\\_news.html](http://www.chaipat.or.th/chaipat/journal/dec00/eng/e_news.html))
- 135 Ministry of Agriculture and Cooperatives. 2005. The mandate No. 340/2549 of Ministry of Agriculture and cooperatives, Thailand, In Thai
- 136 Department of Fisheries, Thailand; available from (<http://www.fisheries.go.th/>)
- 137 Department of marine and coastal resource, Thailand; available from (<http://www.dmcr.go.th/>)

- 138 Marine Fisheries Research and Development Bureau, Department of Fisheries, Thailand; available from  
([http://www.fisheries.go.th/marine/Artificial\\_Reef/Queen\\_project/Ar\\_queen.html](http://www.fisheries.go.th/marine/Artificial_Reef/Queen_project/Ar_queen.html))
- 139 Saleh, I.B. 2008. Final Project Evaluation “Integrated Coastal Resources Management in Pulau Langkawi (ICRM-PL)” Implemented by Training Department Southeast Asian Fisheries DEPARTMENT Center and Department of Fisheries Malaysia, Consultant on Fisheries Project Evaluation, Kuala Lumpur, Malaysia, 23 pp.
- 140 Pomeroy, R.S. 1995. Community-Based and Co-Management Institutions for Sustainable Coastal Fisheries Management in Southeast Asia, *Ocean & Coastal Management*, Vol.27, No.3, page 143-162.
- 141 Le, V.A. 2006. Toward Upland Sustainable Development: Livelihood Gains and Resource Management in Central Vietnam, in *Communities Livelihood and Natural Resource, Action Research and Policy Change in Asia*, Edited by Stephen R Tyler, Chapter 5, page 84-105.
- 142 Strehlow, H.V. and P.J. Kurt. No date. Community Action to protect Fishery Resources in Nha Phu Lagoon, Vietnam. Humboldt University of Berlin, Department for Animal Breeding in Tropics and Subtropics, Germany. 6 pp.
- 143 Cambodia Rehabilitation and Development Board, Council for the development Cambodia, the 6<sup>th</sup> Consultative Group Meeting for Cambodia; available from  
([http://www.cdc-crdb.gov.kh/cdc/new\\_decentralized.htm](http://www.cdc-crdb.gov.kh/cdc/new_decentralized.htm))
- 144 Romeo G. L. and L. Spyckerelle. 2004. Decentralization Reforms and Commune-Level Services Delivery, Case Study Submitted at a Workshop on “Local Government Pro-Poor Service Delivery Manila, 9-13 February 2004. 30 pp.
- 145 FAO, Report of the regional workshop of the Asia-Pacific Fishery commission, Annex 3: Opening Statements to the Workshop, in part of the Opening Speech by Mr Nao Thouk, Director General of the Department of Fisheries, Ministry of Agriculture Forestry and Fisheries (MAFF), Kingdom of Cambodia; available from  
(<http://www.fao.org/docrep/008/ae940e/ae940e0e.htm>)
- 146 Ministry of Agriculture, Forestry, and Fisheries. Draft of Prakes on Guideline for Community Fisheries of Cambodia.
- 147 Joshia, A., J. Ingty, and C. Phalla. 2006. Community-based natural resource management and decentralized governance in Ratanakiri, Cambodia, in *Communities, Livelihoods and Natural Resources, Action Research and Policy Change in Asia*, Edited by Stephen R. Tyler. Page 33-55.
- 148 The Decentralization Act of 1999, Thailand
- 149 Anuchiracheeva, S., H.D. Ganesh, P. Shivakoti, and K. Ruddle 2003. Systematizing local knowledge using GIS: fisheries management in Bang Saphan Bay, Thailand. *Ocean & Coastal Management journal*, Volume 46 (2003), pp 1049–1068.
- 150 CHARM (Coastal Habitats and Resource Management project). November 2007. Final Report Project Impact Assessment, Euroaid/125162/N/SER/TH/06, Thailand. 57 pp.
- 151 SEAFDEC-TD, Locally Based Coastal Fisheries Management in Chumphon; available in (<http://td.seafdec.org/locallybased/chumporn/activities.php>)
- 152 Suanrattanachai P. No date. The New Experience of Sub-district Administrative Organization in Coastal Resource Management: the Case of Chumphon Province, Thailand, SEAFDEC, 26 pp.
- 153 Technical (in Thai). 1989. Statistic of Thai fishing vessels in Department of Fisheries, Fisheries Policy and plan Division, Statistic and Evaluation section, 1991/11. paper No. Department of Fisheries Thailand. pp 38

- 154 Poonsawat, R. and P. Saikileng. No date. The Fisheries Situation of Trawl and Push net in Upper Gulf of Thailand. Upper Marine Fisheries Research and Development Center, DOF, Thailand, 12 pp. (in Thai)
- 155 Thai Vessels Act B.E. 2481; available from ([http://www.lawreform.go.th/lawreform/eng/index.php?option=com\\_homelawreformen&task=showtoc&lid=583&gid=6&year=1939&ename=Acts%20of%20Parliament&elawname=Thai%20Vessel%20Act,%20B.E.%202481%20\(1938\)#](http://www.lawreform.go.th/lawreform/eng/index.php?option=com_homelawreformen&task=showtoc&lid=583&gid=6&year=1939&ename=Acts%20of%20Parliament&elawname=Thai%20Vessel%20Act,%20B.E.%202481%20(1938)#)), in Thai.
- 156 Fisheries Act of B.E 2490; available from ([http://www.fisheries.go.th/fish/web/prb\\_law%20.html](http://www.fisheries.go.th/fish/web/prb_law%20.html)), in Thai.
- 157 Song Kha Provincial Government, Song Kha Provincial mandate 1998, Thailand
- 158 Department of Fisheries, Draft of Strategies for the Management of Marine Fisheries in Thailand 2008
- 159 Chantharachot, K. and S. Peamsomboon, Report on Total Cost in Fisheries Management. Thailand, 2001, 86 pp. (in Thai)
- 160 Department of Marine Coastal Resource; available from ([http://www.dmcrc.go.th/index.php?option=com\\_content&task=view&id=509&Itemid=222](http://www.dmcrc.go.th/index.php?option=com_content&task=view&id=509&Itemid=222))
- 161 Department of Fisheries, available from (<http://www.fisheries.go.th/english/index.php?m=2>)
- 162 Marine Fisheries Research and Development Bureau, Department of Fisheries, Thailand. ([http://www.fisheries.go.th/marine/Artificial\\_Reef/Queen\\_project/Ar\\_queen.html](http://www.fisheries.go.th/marine/Artificial_Reef/Queen_project/Ar_queen.html))
- 163 Marine Fisheries Research and Development Bureau, More to it magazine, September 2008.
- 164 Thailand Development Research Institute Foundation. Coastal Resource ; available from (<http://www.thaienvimonitor.net/Database/coast.htm#coast1>) , in Thai
- 165 Auimrod, S., P. Suanrattanachai, and J. Petchkamnerd. 2003. Technical Seminar on Fisheries Management: case study of Community-based Fisheries Management in Pathew District, TD/RP/55 LBCRM-PD No.20, page 131-137. in Thai
- 166 Boromthanasat, S. January 2007. Final Project Evaluation: Integrated Coastal Resource Management Pathew District (ICRM-PD). Coastal Resource Institute (CORIN), Prince of Songkha University, Hat Yai, Thailand. 72 pp.
- 167 Suppanirun T. 2007. Crab Bank. Regional Seminar Integrated Coastal Resource Management in Southeast Asia, RS/07/WP07/1, 6 pp.
- 168 Ramli, J. 2003. Development Malaysia National Coastal and Marine Strategy: Harmonising State and Federal Legislation. Sea Resources Management Sdn Bhd. 6 pp.
- 169 Graham, J., Charles, A. and A. Bull. 2006. Community Fisheries Management Handbook. Published by Gorse brook Research Institute, Saint Mary's University, Halifax, Nova Scotia, Canada. 135 pp.