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U.S. CORAL TRIANGLE INITIATIVE (CTI) SUPPORT PROGRAM
**SOUTHEAST ASIA REGIONAL FISHERIES
STAKEHOLDER ANALYSIS:
A STUDY UNDERTAKEN FOR USAID/RDMA**

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Southeast Asia Regional Fisheries Stakeholder Analysis: a study undertaken for USAID/RDMA

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US CTI Support Program Southeast Asia Regional Fisheries Stakeholder Analysis:

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EXECUTIVE SUMMARY

The Regional Development Mission for Asia (RDMA) of the United States Agency for International Development (USAID) has been supporting Asia and Pacific regional fisheries efforts through a number of projects and agreements. In order to further inform its understanding and planning efforts related to regional marine and fisheries engagement, during 2014 USAID/RDMA tasked Tetra Tech to conduct a fisheries stakeholder assessment in the Southeast Asia region focusing on commercial capture marine fisheries. This assessment follows off of a global Fisheries Opportunities Assessment conducted by USAID last decade (USAID 2006). The objective of the 2014 regional fisheries stakeholder analysis was to provide a comprehensive overview of national and regional fisheries-related actors and platforms that have a significant role—or the potential for playing a significant role—in improving the sustainable management of marine capture fisheries across Southeast Asia.

The topical scope of the fisheries stakeholder analysis was focused primarily on stakeholders operating within private sector commercial fisheries. Stakeholders under this scope included fishing companies, fish processors, fish brokers and middlemen, and in-country exporters. Commercial fishery associations (as well as federations of multiple fisheries associations) also fell under this scope. A secondary focus included small-scale commercial (often referred to by others in the region as “traditional”) fishers, many of who also fall into the stakeholder category of subsistence fishers.

The geographic scope of the fisheries stakeholder analysis was focused on trans-boundary and regional marine capture fisheries (not national-specific), particularly those fish stocks shared between Southeast Asian fishing nations operating within the Sulu, Celebes, and Molucca Seas. The primary focus of the stakeholder analysis was within the three neighboring countries of the Sulu-Sulawesi Marine Ecoregion (SSME): Indonesia (southern extent of the SSME), Sabah, Malaysia (eastern SSME extent), and the Philippines (northern and eastern extent of the SSME). A secondary geographic focus included the countries neighboring the South China Sea and Gulf of Thailand: Cambodia, Thailand, and Vietnam. In addition, a broad review of commercial fisheries was conducted across nine of the member countries within the Association of Southeast Nations (ASEAN): Brunei, Cambodia, Indonesia, Malaysia, Myanmar (Burma), the Philippines, Singapore, Thailand, and Vietnam. Laos was not included within the review, as being a land-locked country it does not have a well-developed marine capture fisheries industry.

The scope of actors involved in capture fisheries across the Southeast Asia region and their diverse interests is extensive. In order to focus the stakeholder analysis, emphasis was placed on assessing stakeholder characteristics and perceptions relating to the following three key questions posed by USAID/RDMA: (1) What are the most effective approaches and platforms for delivering capacity building support to regional fisheries management? (2) What is the potential for the establishment of sub-regional and/or species-specific and/or ecosystem specific Regional Fisheries Management Organizations (RFMOs) in the region? (3) What are private sector fishing industry interests and activities in the region, and how do they interface with regional fishery organizations?

Both primary and secondary data were used to conduct the regional fisheries stakeholder assessment. Secondary data collection occurred through desktop review of materials, reports, and websites relating to stakeholder groups, commercial fisheries statistics (national and regional), published reports and peer-reviewed journal articles, online news articles, and relevant grey literature. Primary data were collected via 144 structured interviews with fishery stakeholders using a standardized framework within Indonesia, Malaysia, and the Philippines (SSME) and Cambodia and Vietnam (Gulf of Thailand). Stakeholder interviews were not conducted in Thailand due to the military coup. Under the approved scope of work, interviews were not conducted in Brunei, Myanmar (Burma), and Singapore due to time and budgetary constraints.

Country level stakeholder profiles were undertaken for each of the nine coastal ASEAN countries. A standard format was used for each profile, including summaries of the country's capture fisheries production and post-harvest sectors; a summary on the national socioeconomic contributions made by the fisheries sector, and identification of trends, issues, and related marine resource development efforts. Country level profiles ended with a listing of relevant private sector entities; including commercial capture fishery operations, fishing associations, and post-harvest companies. Country-level information sourced for Cambodia, Indonesia, Malaysia, the Philippines, and Vietnam was augmented with additional information and perspectives offered by capture fishery-related stakeholders interviewed within each country by the investigation team.

As a complement to the country profiles, a number of relevant regional-level stakeholder profiles were also undertaken for selected regional organizations and programs, including: the Asian Development Bank (ADB) Southeast Asia Support to the Coral Triangle Initiative; the Asia-Pacific Economic Cooperation (APEC) Oceans and Fisheries Working Group; the Asia-Pacific Fishery Commission (APFIC); the Coral Triangle Initiative on Coral Reefs, Fisheries, and Food Security (CTI-CFF); the Illegal, Unregulated, and Unreported Regional Plan of Action (RPOA-IUU) for Southeast Asia; Partnerships in the Environmental Management for the Seas of East Asia (PEMSEA); the Southeast Asian Fisheries Development Center (SEAFDEC); and the United National Development Program (UNDP) and Global Environment Facility (GEF) Support to the Sulu-Celebes Sea Regional Fisheries Management Project; .

Based on the country- and regional-profiles and associated stakeholder interviews conducted, number of regional issues and trends within the fisheries sector were identified:

- Rapidly increasing population growth.
- Uneven levels of economic development, resource use and technological change.
- Overfishing resulting from overcapacity.
- IUU fishing impacts on environment and society.
- Growing maritime security concerns over conflicting living/non-living marine resource ownership claims.
- Increasing levels of at-sea conflict and social unrest at affecting regional security, environmental sustainability.

- Capture fisheries production not expected to keep pace with demand creating concerns for food security in Asia.

A range of drivers that underlie these issues and trends and negatively impact Southeast Asian fisheries were also identified; in particular:

- Weak marine resource governance, including corruption, lack of participation, poor enforcement, weak institutional capacity, fishing overcapacity, inadequate information, IUU fishing, and growing maritime insecurity.
- Socioeconomic conditions, including poverty, globalization of trade and market access, technological advances, population growth, poor health infrastructure and vulnerability, political and economic marginalization, gender inequality, and human rights.
- Ecosystem change, including habitat loss and degradation, marine pollution, and climate and ocean change (including ocean acidification).

The analysis aimed to provide a better understanding of the interplay between stakeholders identifying key points of influence as well as the system's strengths and weaknesses within the framework of promoting sustainable fisheries in a multi-stakeholder context. The findings addressed the three key questions identified by USAID/RDMA, and offer relevant considerations for future strategic directions and interventions relating to regional fisheries management.

Findings related to key question #1: The stakeholder analysis results illustrate how existing regional fisheries organizations such as SEAFDEC, CTI-CFF, RPOA-IUU, APFIC and PEMSEA are effective capacity building platforms for national government. However, existing regional organizations are not designed to deliver capacity building support to the commercial fishing sector. These regional organizations are also not designed to deliver capacity building support to the small-scale fisheries sector. Capacity building to the small-scale fisheries is usually done at the national and local level by government, NGOs, or projects through national or local organizations and associations. At present, there is a need for a regional small-scale fisheries association/organization to serve as a platform to represent the sector and for capacity building. The commercial fisheries sector is well organized through their own (country-level) associations, be it fishing, processing, exporting or trading. While engagement with the commercial sector could be undertaken through an appropriate existing regional organization such as SEAFDEC, there is currently low to no reported interest from commercial fishery operators in the creation of a new regional body through which they might have access to capacity building support. The commercial operator focus on engaging through the national-level commercial associations to which they are members could provide an opportunity to convene national-level associations, regionally.

Findings related to key question #2: There is limited potential for the establishment of sub-regional and/or species-specific and/or ecosystem-specific RFMOs within the region. Private companies and investors report that they are generally disinterested with increased levels of regional management efforts, and/or new layers of fisheries-related engagement and oversight of the commercial sector. Commercial fisheries associations at local and national levels indicated their interest in serving as the national-based host or clearinghouse for capacity building and/or regional fisheries management efforts, pursuant with the relevant human and financial resources being provided to them by an external source (i.e., non-commercially

financed). This finding further highlights the opportunity for a regional initiative to convene national-level commercial associations.

Findings related to question #3: The reported primary private sector interests regarding regional fisheries management are focused around business growth (i.e., maximizing profit and/or securing new markets) and economic (i.e., increased competitiveness and leverage, and/or market viability). Nearly all stakeholders interviewed have an inherent, long-term (i.e., multigenerational) financial interest in maintaining and growing the commercial fishing industry, often supported through long-term family business interests (including non-fishery enterprises) and a vision of business growth. The private sector has periodic interface and limited engagement with regional fishery organizations (RFMOs). They will engage when invited, but do not seek out engagement as they report that they often feel that they are targeted as the “cause of the problem” or the “bad guy” by conservation and environmental advocacy groups, rather than as a strategic partner who must be included as part of the solution.

Based on the findings generated out of the study, there are several strategies to consider in terms of how to address the priority issues and trends that face marine capture fisheries in the Southeast Asian region. These include:

- Strengthening marine resource governance;
- Addressing overfishing and overcapacity within both the commercial and small-scale sectors;
- Addressing maritime security concerns and issues, including at-sea safety issues with fishers;
- Diversification of livelihoods available to coastal residents and those willing to exit the fishery; and
- Addressing issues relating to the globalization of trade and market access.

Based on the findings outlined through this study, a future, strategic direction for USAID/RDMA could be to strengthen transboundary fisheries management within specific, sub-regions of Southeast Asia (e.g., SSME and the Gulf of Thailand) through direct engagement with the commercial capture fisheries sector via established commercial associations, with the goal of reducing illegal and overfishing in these sub-regions while simultaneously increasing maritime security and strengthening coastal community livelihoods. Through such direct engagement with the private sector, USAID/RDMA could play a role in promoting regional dialogues on fisheries management and improved governance, as well as providing technical support to regional alliances and networks in the areas of policy and regulatory development and capacity building for sustainable fisheries management.

A more in-depth, “deep dive” analysis conducted for the private commercial fishing sector across the region would be useful, building upon and focusing around some of the key issues, trends, and findings generated out of this cursory research. It is important to do an in-depth analysis for the whole of the ASEAN region, due to the integrated nature of the sector from fishing to exporting; for example, many of the fish caught within a specific country are shipped to Singapore for processing and export.

1.0 INTRODUCTION

The coastal waters of Southeast Asia are among the most productive and biologically diverse in the world. As a consequence, they are critical both for global economic and food security and as a conservation priority. Southeast Asians rely more heavily on fish as a primary source of dietary protein and income generation than any other people in the world. Furthermore, fish consumption continues to increase across the region, ensuring that the role of fisheries in providing livelihoods, trade, and food security to Southeast Asia will continue to grow. High rates of population growth and rapidly increasing food needs are putting enormous pressures on the region's coastal and marine resources, as are uneven levels of economic development, resource use, and technological change.

It is now almost universally accepted that most of the near-shore fisheries in Southeast Asia are overfished and that fishing overcapacity is one of the leading causes of this overfishing. Consequently, these waters are now experiencing increased levels of conflict and social unrest, affecting both regional security and environmental sustainability. If managed more effectively, capture fisheries can provide economic benefits to the countries of Southeast Asia.

The Regional Development Mission for Asia (RDMA) of the United States Agency for International Development (USAID) has been supporting Asia and Pacific regional fisheries efforts through a number of projects and agreements. This includes the \$43 million United States (US) Coral Triangle Initiative (CTI) Support Program funded between September 2008 and December 2013, which included the contributions and efforts of a number of US government (USG) agencies, non-governmental organizations (NGOs), and contracted partners. USAID/RDMA recently expanded its partnerships with the US National Oceanic and Atmospheric Administration (NOAA) and the Department of Interior (DOI) through the development of 5-year Participating Agency Partnership Agreements to further enhance USG support to the Asia-Pacific region at bilateral and multilateral levels.

In order to further inform its understanding and planning efforts related to regional marine and fisheries engagement, during 2014 USAID/RDMA tasked Tetra Tech to conduct a fisheries stakeholder assessment in the Southeast Asia region focusing on commercial capture marine fisheries. This assessment follows off of a global Fisheries Opportunities Assessment conducted by USAID last decade (USAID 2006). The global assessment identified several key fisheries issues and opportunities that remain relevant to Southeast Asia today. Related to these are a range of conditions and forces influencing Southeast Asian fisheries. These conditions and forces can be broadly categorized under the categories of weak governance, socioeconomic conditions, and ecosystem change.

Recent research by Williams (2013) provides information needed to develop a better understanding of the key multi-lateral and bi-lateral stakeholders including government, non-government, and private-sector bodies influencing (or positioned to influence) regional capture fisheries. The regional fisheries stakeholder analysis was requested to identify key regional issues and trends facing marine capture fisheries in Southeast Asia, as well as identifying relevant considerations and strategies in potentially addressing such regional issues and trends.

2.0 ANALYTICAL FRAMEWORK

Tetra Tech developed a draft analytical framework outlining the scope, objective, and methods to be employed under the study. The draft framework was reviewed and commented on by USAID/RDMA staff, and subsequently revised and finalized in March 2014, followed by pre-testing and refinement of stakeholder analysis methods. This sections outlines the major components of the finalized analytical framework used to complete the work.

2.0 Scope

The topical scope of the fisheries stakeholder analysis was focused primarily on stakeholders operating within private sector commercial fisheries. Stakeholders under this scope included fishing companies, fish processors, fish brokers and middlemen, and in-country exporters. Commercial fishery associations (as well as federations of multiple fisheries associations) also fell under this scope. A secondary focus included small-scale commercial (often referred to by others in the region as “traditional”) fishers, many of who also fall into the stakeholder category of subsistence fishers.

The geographic scope of the fisheries stakeholder analysis was focused on trans-boundary and regional marine capture fisheries (not national-specific), particularly those fish stocks shared between Southeast Asian fishing nations operating within the Sulu, Celebes, and Molucca Seas. The primary focus of the stakeholder analysis was within the three neighboring countries of the Sulu-Sulawesi Marine Ecoregion (SSME): Indonesia, Sabah, Malaysia, and the Philippines (Figure 1). A secondary geographic focus included the countries neighboring the South China Sea and Gulf of Thailand: Cambodia, Thailand, and Vietnam (Figure 2). In addition, a broad review of commercial fisheries was conducted across nine of the member countries within the Association of Southeast Nations (ASEAN): Brunei, Cambodia, Indonesia, Malaysia, Myanmar (Burma), the Philippines, Singapore, Thailand, and Vietnam. Laos was not included within the review, as being a land-locked country it does not have a well-developed marine capture fisheries industry.

2.1 Objective

The objective of the regional fisheries stakeholder analysis was to provide a comprehensive overview of national and regional fisheries-related actors and platforms that have a significant role, or the potential for playing a significant role, in improving the sustainable management of marine capture fisheries within the SSME, and more widely across Southeast Asia.

In addition to private sector fisheries operations, associations, and other capture fishery stakeholders, this objective included assessment of regional fisheries organizations after Williams (2013), among others, in order to better understand the current and potential role of these organizations in regional fisheries management, as well as any challenges and/or opportunities regarding enhancing their capacities and effectiveness.

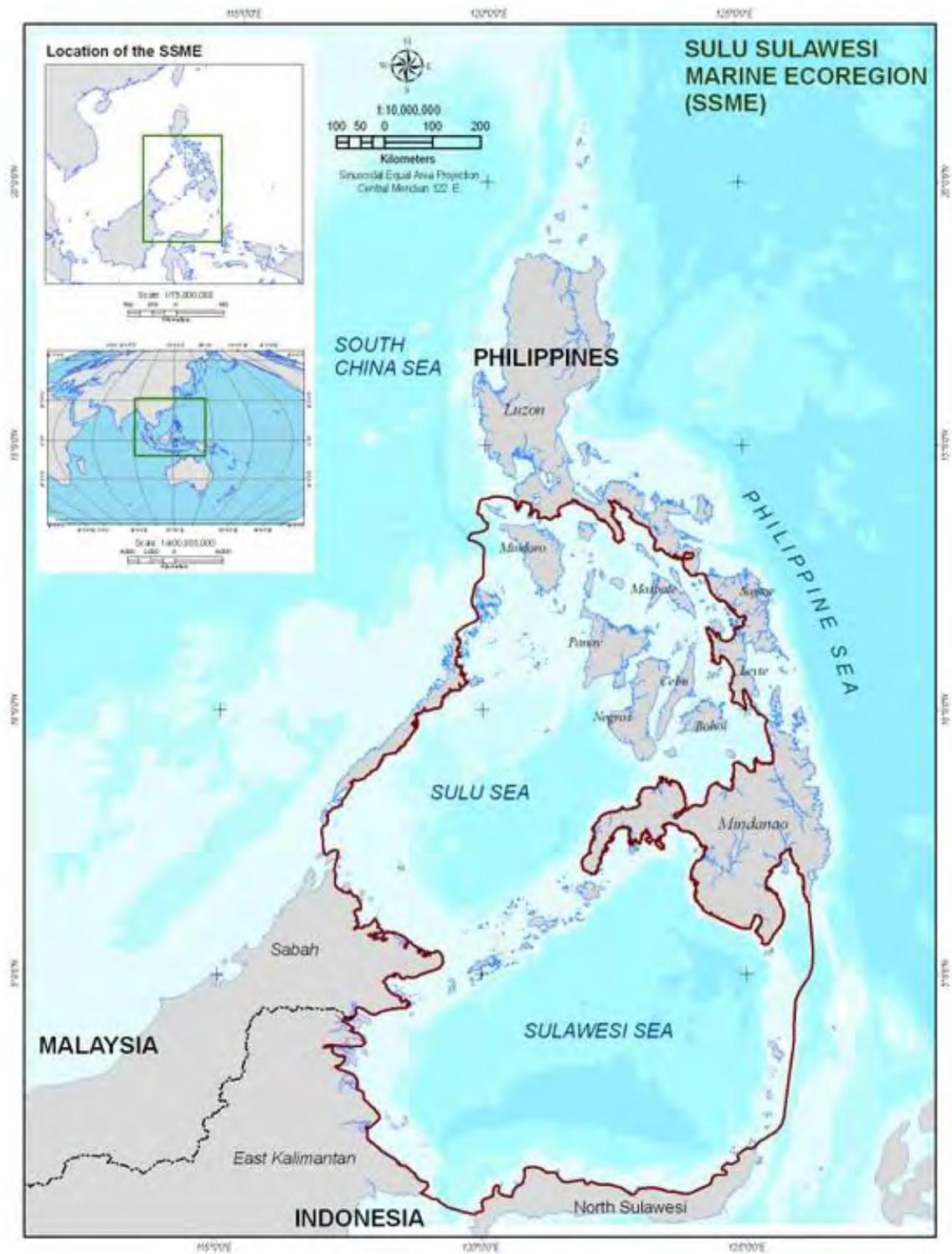


Figure 1. Map of the Sulu Sulawesi Marine Ecoregion

(source: Conservation International 2010)



Figure 2. Map of the Study Area Geographic Scope

2.2 Key Questions

The scope of actors involved in capture fisheries across the Southeast Asia region and their diverse interests is extensive. In order to focus the stakeholder analysis, emphasis was placed on assessing stakeholder characteristics and perceptions relating to the following three key questions posed by USAID/RDMA:

1. *What are the most effective approaches and platforms for delivering capacity building support to regional fisheries management? Is it through an existing regional fisheries organization or technical working group, or through a different mechanism?*
2. *What is the potential for the establishment of sub-regional and/or species-specific and/or ecosystem specific Regional Fisheries Management Organizations (RFMOs) in the region? Through which governance systems would sub-regional management units be most effective? What sub-regions and species already have de facto trans-boundary management structures or regimes? Can these structures be strengthened, legalized, and if so, how?*
3. *What are private sector fishing industry interests and activities in the region, and how do they interface with regional fishery organizations?*

Based on the analytical results generated out of this assessment, the findings to each of these three key questions are addressed within Section 6 of this report.

2.3 Methodology

Both primary and secondary data were used to conduct the regional fisheries stakeholder assessment. Secondary data collection occurred through desktop review of materials, reports, and websites relating to stakeholder groups, commercial fisheries statistics (national and regional), published reports and peer-reviewed journal articles, online news articles, and relevant grey literature. The United Nations Food and Agricultural Organization (FAO) provided significant contributions to existing data through online fisheries data profiles organized at the country level.

Secondary data was supplemented by primary data collection gathered from primary fishery stakeholders using semi-structured interview (SSI) techniques within Cambodia, Indonesia, Malaysia (Sabah), the Philippines, and Vietnam. Stakeholder interviews to be conducted in Thailand were not completed due to the military coup in May 2014, and subsequent suspension of USG travel and activities there. Under the approved scope of work, interviews were not conducted in Brunei, Myanmar (Burma), Peninsular Malaysia, and Singapore due to time and budgetary constraints.

Questionnaires used during the SSI process were designed during February 2014, based off of a set of stakeholder attributes/factors that were reviewed, revised, and approved by USAID staff.

Questionnaires were finalized during March 2014, following the pre-testing and refinement of the USAID-approved questions. Standardized questionnaires were created for four stakeholder group categories, with questions varying slightly across each category. The four stakeholder group categories for the structured questionnaire were: (a) private sector entities and associations (13 questions); (b) governmental bodies (9 questions); (c) non-governmental organizations (including academia; 12 questions); and (d) regional organizations and intergovernmental associations (12 questions).

Primary fishery stakeholder groups were identified and stratified across the investigation countries where interviews were to occur. Primary fishery stakeholder groups were defined as having a significant role in and/or influence over the governance and decision-making of fisheries management within the SSME region. Representatives of primary fishery stakeholder groups in each country were selected and invited by telephone and/or email to participate in the regional assessment. Typical primary stakeholder group representatives invited to be interviewed included: fishery business owners and workers (capture, processing, trading, and exporting); fishing association leaders and members; local and sub-national government agency leaders; non-governmental organization representatives (including academics); and local decision-makers or elected officials who significantly influence local capture fishery operations. Background information regarding the purpose and outputs of the regional stakeholder assessment was provided to all invited stakeholders. All follow-on questions and comments raised by invitees during the invitation process were addressed.

Due to limited time and resources, a purposive sample of stakeholders were interviewed. It should be made clear that only a small representative sample of stakeholders were interviewed across five countries. Once confirmed, interviews were conducted either one-on-one or in small, organized focus groups through open-ended responses made on the standardized questionnaire. Interviews commenced following a short introductory statement that included acknowledgement of respondent anonymity, the provision of informed consent by the interviewee, and an opportunity for the respondent to ask any questions or offer any comments prior to commencing the interview. All interviews were conducted in national languages. In the case of Indonesia, Malaysia, and Vietnam, this was aided through the assistance of interpreters. The average time to conduct a stakeholder interview was between 50-70 minutes, depending upon the depth and level of feedback provided by the respondent. A total of 144 stakeholder interviews were completed (Table 1). Anonymous summaries of all responses offered by participating stakeholders under the interviewing process completed can be found in the Appendix. The names and business/institutional affiliations of all participating stakeholders can be found in the Acknowledgements section of this report.

Table 1. Number of regional fishery stakeholder interviews completed by the investigation team (March through May 2014)

Country	# of interviews conducted
Cambodia	5
Indonesia	50
Malaysia (Sabah)	43
Philippines	31
Vietnam	15
TOTAL	144

2.4 Investigation Team

The fishery stakeholder analysis investigation team was comprised of five professionals, with specific roles, as follows:

1. *Robert Pomeroy, PhD* (University of Connecticut) served as the team's lead researcher and writer. Dr. Pomeroy led the team's efforts in completing the research, designing and conducting interviews, and developing and implementing the analytical framework. Dr. Pomeroy oversaw the team's completion of a comprehensive, rigorous, and on-time stakeholder analysis, and led writing, editing, and finalizing this findings report. Dr. Pomeroy completed stakeholder interviewing in Cambodia, the Philippines, and Vietnam.
2. *Catherine Courtney, PhD* (Tetra Tech) served as the team's senior technical advisor, facilitating and monitoring the overall process required for the team to complete the activity timeline (see Section 2.6), as well as helping to conduct desktop research and leading the team's production of country profiles (Section 3). Dr. Courtney provided overall team organizational support, including team activity coordination, consolidating team inputs and written products, and writing, editing, and formatting specific sections of this report.
3. *John Parks* (Marine Management Solutions) served as a team researcher and writer, supporting the team's development and implementation of the analytical framework and interview design process, as well as supporting completion of the analysis and drafting, editing, and finalizing this report. Mr. Parks completed stakeholder interviews in Indonesia, Malaysia, and the Philippines.
4. *Nives Mattich* (Tetra Tech; Deputy Chief of Party) coordinated and oversaw the logistical and operational aspects of the team's work under the stakeholder assessment. Ms. Mattich provided management, operational, logistical and technical support to the team as required, as well as review over all team documents and materials, including formatting and editing of this report.
5. *Peter Collier* (Tetra Tech; Chief of Party) served as the overall manager of the stakeholder assessment, ensuring that the team completed the USAID-approved Scope of Work efficiently, effectively, and on time. Mr. Collier served as the primary lead on the team's communications and coordination with USAID/RDMA staff.

The investigation team communicated regularly by email and conference call, working closely together throughout the assessment period to ensure optimal outcomes were achieved. Several key aspects of the assessment, such as defining the analytical framework, developing a stakeholder assessment methodology, and developing an outline for this findings report were done in a highly collaborative manner, in order to capitalize on the expertise of the respective team members.

2.5 Activity Schedule

A number of activities were completed by the investigation team between February and July 2014 in support of the regional fishery stakeholder assessment (Table 2). During February and March, the analytical framework was developed, development, pre-testing, and refinement of interview methods completed, and stakeholder groups identified. During March, April, and May, the team completed primary and secondary data collection. During May and June the team generated and wrote up analytical results and assessment findings within a draft of this report. This draft was subsequently reviewed by

USAID and expert peers, and finalized accordingly. The final version of this report was submitted in July 2014.

It should be noted that the approved Scope of Work for this stakeholder assessment originally included conducting a 1-day Experts Roundtable Forum in Bangkok, Thailand during June 2014. The purpose of the Experts Roundtable Forum was for the investigation team to present its draft analytical findings to a group of 10-15 capture fisheries experts from across the region, in order to invite their further input and validation on the study findings. An ancillary but important output of this proposed Forum was to be the proposed creation of an *ad hoc* expert working group, the members of whom could serve in a consultative capacity to US government interests in the region regarding relevant regional commercial fisheries management issues and policy priorities. However, due to a military coup and declaration of martial law in Thailand during May 2014, USAID indefinitely suspended the proposed Experts Roundtable Forum and creation of the *ad hoc* expert working group.

Table 2. Timeframe of activities completed under the regional fishery stakeholder assessment from February – July 2014

Activity	February	March	April	May	June	July
Scoping and development of analytical framework with USAID	X					
Primary stakeholder groups identified and stratified across countries		X				
Pre-testing and refinement of data collection methods		X				
Identify target stakeholder group representatives for engagement and interviewing		X	X			
Desktop literature review conducted; country profiles developed		X	X	X		
Regional stakeholder engagement conducted; interviews scheduled		X	X	X		
Cambodia and Vietnam interviews completed		X				
Indonesia and Philippines interviews completed			X			
Malaysia and Philippines interviews completed				X		
Team analysis and generation of results and findings				X	X	
Preparation of draft findings report; submission to USAID				X	X	
Review and comment by USAID on draft findings report					X	
Preparation of revised findings report; expert peer review conducted over revised report						X
Finalization and submission of report to USAID						X

3.0 COUNTRY PROFILES

National-level fisheries profiles are presented across nine ASEAN countries within this section:

1. Brunei
2. Cambodia
3. Indonesia
4. Malaysia
5. Myanmar
6. Philippines
7. Singapore
8. Thailand
9. Vietnam

Except Brunei and Singapore, the information presented within all country profiles in this section is sourced from FAO's online Country Fishery Profiles (see citations), and supplemented with other sources of existing secondary data (as cited). The Brunei and Singapore country profiles were created following the standardized outline used within the FAO Country Fishery Profiles (available online at <http://www.fao.org/fishery/countryprofiles/search/en>).

At the start of each country profile, a summary of key points is presented within a table. Each country profile consists of a production sector overview (including catch profiles, landing sites, fishing practices and systems, main resources, management, and a brief discussion on fishing communities), followed by post-harvest sector overview (fish utilization and fish markets), the socioeconomic contributions of the fishery sector (role in national economy, supply and demand, trade, food security, employment), followed by a summary of key trends and issues, and finally a summary of important private sector fishery associations and companies (capture fisheries, processing, brokering, marketing and exporting).

In addition, information presented within the Indonesia, Malaysia, Philippines, and Vietnam country profiles include stakeholder perspectives, as provided to the investigation team through completed interviews. Toward the end of each of these country profiles, a summary table is included with key points of feedback offered across stakeholders during the interview process.

Summary tables for all completed stakeholder interviews within Cambodia, Indonesia, Malaysia, the Philippines, and Vietnam are anonymously presented within the Appendix. A combined summary table representing all commercial fishery (private sector) stakeholder interviews conducted across these five countries under this study is also included in the Appendix (see Section A6). An alphabetical listing of all stakeholders interviewed (along with their company/organizational affiliation) is included within the Acknowledgements section of this report.

3.1 Brunei

The following marine capture fisheries profile is based on information published by the Government of Brunei Darussalam (Government of Brunei Darussalam ; Juna et al. 2007).

BRUNEI FISHERIES PROFILE SUMMARY

- Fisheries production has increased 67% over 6 years from 9,620 MT in 1999 to over 16,000 MT in 2005.
- Small-scale fisheries production contributes about 70% compared to 30% from the commercial sector.
- Small-scale fishers using traditional gear have exclusive use of inshore waters. Small-scale fisheries production leveled off in 2005, raising concerns of biological overfishing.
- Commercial fishers using trawls, purse seines, and longlines operate primarily in Zones 2 and 3.
- There are approximately 925 fulltime fishermen, and most of them are artisanal.
- Marine capture fisheries have provided 50% of the country's fish supply for the last 20 years.
- Per capita fish consumption is one of the highest in the region at around 45 kilograms per year.
- With an estimated population of about 344,500, the total annual consumption of fish is about 15,500 metric tons; Brunei still has to import about 50% of its fish requirement to supplement local production
- Due to its abundant oil and gas reserves, there is no economic pressure to exploit its fisheries resources. In trying to diversify the economy, growth in fisheries have been identified as an economic option.
- Local market for processed seafood products is estimated at B\$ 17 million annually at a sustainable level. Total 2001 production of processed seafood products was 273 metric tons valued at B\$ 2.6 million.

3.1.1 Production Sector

Overview

Small-scale fisheries production contributes about 70% compared to 30% from the commercial sector (Juna, Cinco, Wahab, & Salleh, 2007).

Catch profile

Fisheries production has increased 67% over 6 years from 9,620 MT in 1999 to over 16,000 metric tons in 2005. Small-scale fisheries production leveled off from 2002 through 2005 raising concerns of biological overfishing (Juna et al., 2007).

Fishing Practices and Systems

Various methods to catch fish and other aquatic resources include surrounding nets, seine nets, trawls, lift nets, falling gear, gill nets, scoop nets, traps, hook and line, and gleaning (Juna et al. 2007).

Main resources

The fish fauna of Brunei Darussalam is typical of the fish communities in the Southeast Asian seas with high species diversity (Juna et al., 2007). About 500 species of fish and invertebrates have been reported from the catch of various fishing gears used in Brunei waters. There are two main resource groups caught during fishing operations, demersals and pelagics. Demersal fish species account for approximately 61 percent of the annual fish caught (approximately 12, 500 metric tons and 100 species) and pelagic fish species account for the remaining 39 percent (approximately 8,000 metric tons and 100 species). Demersal species include slipmouths, goatfishes, breams, croackers, grunts, lizardfishes, sea catfish, and majarras. Small pelagics include roundscades, mackerels, anchovies, herrings, jacks,

butterfish, and cobia. Large pelagics include yellowfin tuna, bigeye tuna, billfishes, skipjacks, sharks, wolfherrings, barracudas, and bonitos.

Management applied to the main fisheries

Fisheries zones are established based on distance from shore (Zone 1: 0-3 nm; Zone 2: 3-20 nm; Zone 3: 20-45 nm; and Zone 4: 45-200 nm) (Juna et al., 2007). Small-scale fishers using traditional gear (hook and line, trammel nets, set-bottom nets) have exclusive use of Zone 1. Commercial fishers using trawls, purse seines, and longlines operate primarily in Zones 2 and 3.

The Government, wanting to ensure maximum economic gains and at the same time to ensure the sustainability of the resources, is only allowing exploitation up to the "maximum economic yield" (MEY) which is taken to be 20% below the usually used "maximum sustainable yield" (MSY) level (Government of Brunei Darussalam). In this regard, the surveyed fishing areas of Brunei Darussalam have about 21,300 metric tons of fish at MEY as follows:

- Demersal resources - 12,500 metric tons
- Pelagic resources - 8,800 metric tons

In addition, Brunei Darussalam is also found to be in the migration path of the tuna resources and their abundance is scheduled to be surveyed in the near future. At the same time, there are large resources associated to the numerous off-shore oil-rigs, purposely-sunk tires, man-made concrete to reefs and old oil-rigs as artificial reefs and with appropriate gear and technology, these resources can be exploited.

The Government has identified potential areas ready for development with laid down essential basic infrastructure. It is anticipated that the steady increase in the population will increase the demand and with the current liberalization of trade, opportunities for export are there, even though as it is, the local demand and market price in itself already make the fisheries industry attractive. With the above, the opportunities for development of the fisheries sector in Brunei Darussalam are open and available and are coupled with a number of Government support and incentives.

Fishermen communities

There are approximately 925 fulltime fishermen and most of them are artisanal.

3.1.2 Post-Harvest Sector

The local market for processed seafood products presently is estimated to worth B\$ 17 million annually at a sustainable level (Government of Brunei Darussalam). The year 2001 saw the total production of processed seafood products at 273 metric tons valued at B\$ 2.6 million. There is also the domestic requirement for fishmeal, which at present, about 5 metric tons are being imported per day and with the growing aquaculture, chicken farming etc. in the country, the demand is set to increase. More rooms are still available for expansion and further development. In addition, the following factors also make the processing industry a tremendous potential in Brunei Darussalam:

- Brunei Darussalam's food products are regarded in the local as well as overseas market as synonymous with high quality and "halal";
- Relatively an undeveloped sector and therefore very low level competition;
- Large established local market to start with; and
- Available prepared industrial sites with required basic infrastructures.

Fish Utilization

The fish processing sector is relatively at a small scale despite the big numbers of processors and a joint-venture company involved in the production of a variety of fisheries products. These products include frozen fish, crackers, fish ball and cakes, fish nuggets, shrimp pastes, marinated fish and dried fish. They are sold and easily available in the local markets. The well-known prawn crackers of Brunei Darussalam are seeing further growth (Government of Brunei Darussalam).

Processed seafood products that are made traditionally include crackers, dried and salted fish, shrimp paste, and marinated fish. These products are made manually by housewives or group of women operating from their homes. They are termed as small-scale producers. With the introduction of machineries and semi-automation, the number and extent of producers also increase. Some are now moving away from homes and operating in factories and employing specialized workers. However, the small cottage industry still survives today though mainly catering for their loyal customers and producing traditional products. The big-scale producers are producing larger volumes and different products. The types of seafood products being produced by these entrepreneurs include frozen fish / shrimps, prepared / chilled products, comminuted products such fish cake, fish ball, fish burger and fish nugget, crackers and smoked fish. These entrepreneurs are termed as commercial producers or operators (Government of Brunei Darussalam, n.d.).

Fish Markets

The Department of Fisheries is continuously promoting the products locally and overseas. It is anticipated that the product will be available easily overseas. The Department of Fisheries has verified the technology for the production of other value-added products such as smoked fish from underutilized fish. The Department of Fisheries is also encouraging for the involvement of foreign companies to form a joint venture company with local entrepreneurs in further developing the fish processing sectors into larger enterprises. Under the current, 5-year National Development Plan, the Department has earmarked two projects to boost the seafood processing industry. One is the Storage and Distribution Center - Phase II. The goal of this activity is to develop and expand the Continuous supply and marketing of quality fish produce from both the capture and aquaculture industries. The second project is the Regional Fisheries Import and Export Center (HUB). The goal of this activity is to provide seafood processing facilities and catalytic mechanisms for the overall development and expansion of the local seafood industry (Government of Brunei Darussalam).

Ensuring the safety and quality of fish produced by local processors has been one of the main priorities of the Department of Fisheries. Through the Quality Control Programs, processed fish products are duly inspected. Seafood products intended for international markets are given Health Attestation certificates prior to exports to meet the importing country's requirement. Guidelines for the setting up of processing establishments are among other activities given by the department to entrepreneurs (Government of Brunei Darussalam).

3.1.3 Socioeconomic Contribution of the Fisheries Sector

Due to its abundant oil and gas reserves, there is no economic pressure to exploit its fisheries resources. However, realizing that oil and gas are non-renewable resources, the Government is putting a concerted effort to diversify the economy (Government of Brunei Darussalam). Fisheries have been

identified as one of the sectors that can contribute to the economic diversification and as such the Government is giving a number of incentives for commercial fishery development.

Role of Fisheries in National Economy

Fisheries Industries comprises of 3 sectors: capture fisheries, aquaculture, and processing, which contributed to the annual industry value of at least B\$200 million per year to Gross Domestic Product (GDP) by 2003 (Government of Brunei Darussalam). The capture fisheries industries estimated to contribute at least B\$112 million, aquaculture fisheries B\$71 million and processing industries of at least B\$17 million. Fisheries contributed about 1.1 percent of the GDP in 2004.

Demand and Supply

Marine capture fisheries have provided 50% of the country's fish supply for the last 20 years (Government of Brunei Darussalam).

Food Security

Along with its traditional of fishing, marine fish has been the principal source of protein for the people of Brunei Darussalam (Government of Brunei Darussalam). The per capita fish consumption is one of the highest in the region at around 47 kilograms per year. With an estimated population of about 344,500, the total annual consumption of fish is about 15,500 metric tons. However, with only about 925 fulltime fishermen and most of them are artisanal, Brunei Darussalam still has to import about 50% of its fish requirement to supplement the local production.

3.1.4 Trends, Issues, and Developments

The fishing industry is developing especially after the declaration of the 200 nautical miles Brunei Fishery Limits and also the change in policy that allows joint-ventures (Government of Brunei Darussalam). In term of the resources, Brunei Darussalam is fortunate that due to its abundant oil and gas reserves, there is no economic pressure to exploit its fisheries resources. However, realizing that oil and gas are non-renewable resources, the Government is putting a concerted effort to diversify the economy. Fisheries have been identified as one of the sectors that can contribute to the economic diversification and as such the Government is giving a number of incentives for commercial fishery development.

3.1.5 Private Sector Profiles

List of companies/associations

Commercial trawling companies include (Government of Brunei Darussalam):

- Akojha Enterprise
- Syarikat Pengangkutan Haji Raup bin Omar
- Syarikat Ben Kassim Sdn. Bhd.
- Syarikat Pengiran Haji Jaluddin Pengiran Haji Mustapha
- Syarikat Haji Mohd. Saidin & Anak-Anak
- Perusahaan Isdu & Anak Anak
- Syarikat Ari
- Syarikat Rahman dan Tew
- Syarikat Seafresh Sdn. Bhd.
- Syarikat Haji Rahim bin Haji Ibrahim
- Syarikat Amanah Haji Abdullah

- Syarikat Pg. Mohammad Shahrinin
- H.Z. Azam Enterprise
- Sri Jaya Muara Fisheries
- Syarikat Amirul Dewanti Sdn. Bhd.
- Ocean Marine Fishery
- Brumeca Deepsea Fishery

Commercial purse seiners include:

- Syarikat Bunga Semerbak
- Radims Fisheries Trading Co.
- Syarikat Seafresh Sdn. Bhd.
- Syarikat H.A. Sumali dan Adik-Beradik
- Comreach Fisheries
- Syarikat Amanah Haji Abdullah
- H.Z. Azam Enterprise
- Syarikat Haji Hassan bin Metali
- S.M.J. Enterprise
- Syarikat Dayungmas Jaya
- Nurul Reza Enterprise
- Brusar Net Sdn. Bhd.
- Don Jaya Sdn. Bhd.
- D.K. Sue Enterprise
- Rabbani Company Sdn. Bhd.

Hook and line/trap fisheries include:

- Syarikat Nurul Hadirah
- Semaun Seafood Sdn. Bhd.
- Syarikat Perusahaan Terbilang Jaya
- Syarikat Afamah
- Hock Hin Development Sdn. Bhd.
- Syarikat Haji Hassan bin Metali
- Syarikat Haji Mohiddin Haji Abd. Hamid
- Syarikat H.A. Sumali dan Adik-Beradik
- Syarikat Usaha Salihah
- Syarikat Ong Cheng Ham
- Syarikat Haji Zainal bin Husain & Anak-Anak
- Syarikat Abdul Muq̄sith
- Syarikat Dayungmas Jaya
- D.K. Sue Enterprise

Fish processing companies include:

- Semaun Seafood Sdn. Bhd.
- TMM Processing Sdn. Bhd.
- Golden Corporation Ltd.
- Syarikat Marimin dan Anak-Anak
- Seri Pekatan Sdn. Bhd.
- Perusahaan Zainab Utama
- Syarikat Norasyraf
- Syarikat Haji Mat Jali dan Anak-Anak
- Yu Lee Food Industries

- Perusahaan Bebola Emas Sdn. Bhd.
- PDS Maju Makmur Sdn. Bhd.
- Sabli Food Industries Co.
- DB Bumiku Sdn. Bhd.

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3.2 Cambodia

The following marine capture fisheries profile is based on FAO Fisheries and Aquaculture Profile for Cambodia updated in 2011 (FAO, 2011).

CAMBODIA FISHERIES PROFILE SUMMARY

- Fishery production is primarily freshwater fisheries.
- Fishing activities can be classified into coastal and commercial fisheries.
- The coastal fishery is characterized by family-scale fishing within coastal waters up to a depth of 20 m.
- The commercial fishery is characterized by larger scale fishing boats, using engines of more than 50 horsepower, and fish from the 20 m depth line to the limit of the EEZ.
- Few fishers fish outside Cambodian waters.
- Boats fishing in Cambodia's waters can be classified as purse seiners, shrimp trawlers, and gillnetters.
- There is a good deal of foreign fishing in Cambodian waters, especially by Thailand and Vietnamese boats.
- Small number of marine fish processors and exporters based in Sihanoukville and Koh Kong.
- Processed commodities include: shrimp, lobster, crab, squid, octopus, cuttlefish; much of which is dried.
- The main export markets are Thailand and Viet Nam, and to a smaller extent Singapore, Malaysia, China, Hong Kong SAR, China, Taiwan Province of China, Japan, USA and Australia.
- Primarily small-scale processing of fishery products.
- The export of fish has occurred through the state-owned company, KAMFIMEX.
- No national seafood sector association; primarily individual companies.

3.2.1 Production Sector

Overview

Cambodia's fisheries produced an estimated 515,000 tons in 2009. The country's freshwater fisheries are among the most productive in the world due to the presence of large floodplains around the Great Lake and along the Tonle Sap and the Mekong Rivers. These inland fisheries are thought to have produced around 390,000 tons in 2009. By comparison, the total marine fishery production was small (75 000 tons) as is the aquaculture sector (50,000 tons). Much of the production generated is consumed domestically, although exports totaled 30,000 tons in product weight in 2009. The fisheries sector employs around 420,000 people directly and more than 2 million people are thought to derive some type of livelihood benefit from involvement in the sector.

Marine fisheries in Cambodia have been slow to develop relative to inland fisheries. Fisheries Administration (FiA) statistics suggest a near doubling of marine fish landings from 33,100 tons in 1993 to 75,000 tons in 2009. Fishing activities can be classified into coastal and commercial fisheries. The coastal fishery is characterized by family-scale fishing which extends from the coast to waters of a depth of 20 m. Boats used in this area are either without engines or have engines of less than 50 hp. The commercial fishery is characterized by larger scale fishing boats, using engines of more than 50 hp, and fish from the 20 m depth line to the limit of the EEZ. Boats fishing in Cambodia's waters can be broadly classified as purse seiners, shrimp trawlers and gillnetters.

In recent years, the marine fishery has seen a significant increase in the number of fishing boats (both national and foreign) resulting in an increase in pressure on coastal resources. Annual catches by licensed Thai vessels in Cambodian waters are thought to range from 26,500 – 37,500 tons per annum but there is probably also a substantial amount of illegal fishing by non-licensed foreign vessels. The

growing fishing effort in coastal areas is placing the natural resources under increasing pressure. There is substantial habitat degradation brought about through destructive fishing practices (dynamiting, cyanide fishing, illegal trawling in shallow nursery areas), mangrove forest destruction (for firewood, shrimp aquaculture), siltation and the pollution from urbanization/industrialization and increasing tourism. There are also reports of increasing conflict situations among different categories of fishermen.

Catch profile

The coastal waters of Cambodia support a diverse range of fish and invertebrate species. The main commercial species include mackerels, scads, anchovies and snappers, penaeid and metapenaeid shrimps, blue swimming crabs, cuttlefish, squid, green mussels, oysters and blood cockles. Although more than 30 species of finfish are exploited, only five species are abundant in the landings: These are: *Megalaspis cordyla* (torpedo scad), *Scomberomorus commerson* (narrow-barred spanish mackerel), *Rastrelliger brachysoma* (short mackerel), *Rastrelliger kanagurta* (Indian mackerel) and *Atule mate* (yellowtail scad).

Landing sites

Landing locations are not disaggregated from provincial fishing locations in the official records. FiA statistics show that Sihanoukville and Koh Kong have the highest landings. Harbor facilities are limited and in most cases poorly developed. A significant amount of the marine catch is transferred to foreign vessels at sea and is not landed in Cambodia.

Fishing Practices and Systems

The small-scale nature of the marine fishing fleet is illustrated with the bulk of boats being either non-motorized (57%) or motorized with less than 10 HP (35%) and also highlights the pressures on the inshore fishery where these smaller craft operate.

The following fishing gears are the most commonly used in Cambodia's marine waters: mackerel purse seines, anchovy purse seines, crab gillnets, mantis shrimp gillnets, shrimp gillnets, fish gillnets, crab traps, squid traps, hook & lines, push nets, stow nets & beach seine. Live coral reef fish and shellfish collection is carried out manually by divers. Many boats change fishing gear on a seasonal basis, according to the abundance of particular species and market demand.

Main resources

Cambodia has a relatively short coastline of 435 km and an EEZ of 55,600 km² including 69 offshore islands. The marine fishing grounds are relatively shallow with an average depth of 50m and are located on the eastern bank of the Gulf of Thailand. There are four provinces/municipalities bordering the sea; Koh Kong, Sihanoukville, Kampot & Krong Kep. Mangrove areas cover 56,188 ha, and these are found primarily in Koh Kong Province. There is little information regarding the status of Cambodia's marine stocks. However, the available literature indicates that the exploitation of Cambodian marine fishery resources is probably close to or has already exceeded the maximum sustainable yield.

Management applied to the main fisheries

Fisheries management in Cambodia is divided between central and local governments. At the central level, the Fisheries Administration (FiA) of the Ministry of Agriculture, Forestry and Fisheries (MAFF) is in charge of developing research and drafting laws and policies on fisheries (and aquaculture). The FiA is also vested with inspecting powers. At the local level, fisheries are managed by the Provincial-Urban

Fishery Authorities, which have the necessary powers to ensure compliance with the law, in the area under their jurisdiction.

The Cambodia fishery law identifies a range of input controls to be used as main management tools:

- Fishing permits for commercial fishing,
- Licenses for offshore boats,
- Licenses for foreign vessels fishing in Cambodian waters,
- Prohibition of illegal fishing gears, such as electro-fishing, explosives & poisons,
- Restrictions on some gear types and sizes,
- Prohibition to trawling in waters less than 20 m deep,
- Protection of mangrove areas and designated fish sanctuaries,
- Closed spawning season for mackerel from 15 January to 31st March,
- Prohibition of harvesting corals and endangered species listed in the CITES appendices.

The coastal fishery is freely accessible for boats with smaller than 33 horsepower (hp) engines. Trawling and light fishing are illegal in coastal waters and pair trawling is illegal offshore. The enforcement of these limitations is generally poor.

Cambodia has four established marine protected areas totaling about 2,500 km², including Ream National Park that has significant coral reef resources. The other MPAs are: Botum Sakor National Park (171,250 ha); Dong Peng Multiple Use Area (27,700 ha) and Peam Krasop Wildlife Sanctuary (25,897 ha).

In recent years there have been efforts to apply community based fisheries management to ensure stakeholder and resource user participation in the management of fisheries resources.

There have been major changes in Cambodia's marine fisheries during the past decade, including:

- An increase in total catch which, according to the DoF statistical system, has risen from 36,000 metric tons in 2000 to 60,500 metric tons in 2006;
- The rise and fall of shrimp aquaculture in the 1990s;
- Increased use of trawling gear by small vessels in inshore areas;
- An apparent increase in fishery-related conflicts, mainly involving interaction between users of different types of fishing gear;
- The decline of some important commercial fisheries and associated processing industries; and
- An increased interest by Government agencies, donors, and NGOs for supporting community involvement in management of coastal resources.

Fishermen communities

In coastal Cambodia, as in other parts of the country, the poverty level is very high and a majority of the population faces issues such as low levels of education, a poor health infrastructure, and associated services.

The 2008 census indicated that the population of the coastal provinces and municipalities was 960,480 people, a 13.7% increase from the 1998 figure of 844,861 people, (although the province of Koh Kong has shown a decline in population over that time). This represents 6.6 percent of the population of Cambodia. Population densities vary considerably in the coastal provinces and are as low as 12 people/km² on Koh Kong to 178/km² in Sihanoukville. The fisheries communities in Kompot province are considered to be among the poorest in the country where typical incomes from marine fisheries range from USD 25-30 per family per month. Households in Sihanoukville and Koh Kong Provinces are slightly better off due to the more productive fishing grounds.

A number of studies have shown that most residents of Cambodia's four coastal provinces and municipalities are recent migrants to the coastal zone. Statistics from the 2008 National population census indicate that up to 41% of the coastal population had their previous residence outside the district or province of remuneration. Some 3% of the population of Kampot Province moved there from another province or municipality in Cambodia, while 45% of the residents of Koh Kong are from another province. Sideth and Vanntha (1999) point out that "many residents of coastal Cambodia are economic migrants and internally displaced people from inland areas of the country and therefore do not have traditional ties to the landscape or experience in the management of mangroves".

In coastal areas, men are primarily responsible for fishing in the open ocean, while women undertake fishing activities closer to home as well as processing, marketing, tending fish culture ponds and cages, and maintaining fishing equipment.

3.2.2 Post-Harvest Sector

Fish Utilization

Cambodia has a centuries old tradition of processing freshwater fish. Products include: fish paste, fermented fish, dry salted fish, smoked fish, fish sauce, and dried fish for animal feed. These products are both for the domestic and international markets. For the domestic market, the most important fish for processing are two *Cirrhinus* species, which are caught in huge amounts during the annual migration from the Great Lake. Marine processed fish commodities include: shrimp, lobster, crab, squid, octopus, and cuttlefish, much of which is dried.

The processing of marine fishery products is undertaken by both small-scale family style operations as well as on a much larger commercial level. Small-scale operations primarily comprise the manufacture of pastes, like shrimp, and dried products, e.g., dried shrimp, squid, and shark. According to an estimate about 480 metric tons of these processed marine items worth US\$1,131,500 were produced in 2000 (Touch and Todd, 2002:16). While most of this production is for family use, significant amounts are sold commercially (Navy, 2002:17). Even though the final product is generally of low value, small-scale operations are able to process large amounts of raw product during peak landing periods. On a larger commercial scale, fish sauce is an important product of marine fisheries in Cambodia. As the sauce traditionally uses anchovy as a primary ingredient, the catch of this fish have declined in recent years, and so has the production of the sauce. Although there were several marine fish sauce factories in the country a decade ago, presently there are only three; one in Kampot and two in Sihanoukville. Larger-scale processing includes a crabmeat operation in Kep, a fishmeal factory outside Sihanoukville, and a few other facilities in Sihanoukville for the freezing and export of shrimp and fish.

For the most part, the production of small-scale processing is for domestic use; marine fish sauce being a good example here. Most other commercial marine fishery products are for export. Even with the recent migration of people to the coastlines, the population of Cambodia mainly resides inland and traditionally there is a consumer preference for inland fish species. In addition, the coastline is physically isolated from much of the rest of the country and years of political instability has resulted in a lack of infrastructure development to allow for fresh marine fish to be distributed throughout the country.

Fish Markets

Frozen fish is exported through the seaport of Sihanoukville and fresh and live fish is exported via the international airport of Phnom Penh. A significant amount of fish is exported unofficially through the border with Viet Nam.

3.2.3 Socioeconomic Contribution of the Fisheries Sector

Role of Fisheries in National Economy

The share of fisheries in the GDP was 10.8% in 2000 and the estimate for 2005 was 9.30%.

Demand and Supply

The pressures on and coastal fisheries are resulting in fish of lower economic value predominating in catches. Many of the larger and more valuable species have declined significantly both in numbers and size and are now in short supply in local markets.

The marine production is about 15% of all fish production in the country (FAO, 2011). One reason for that is the preference for inland fish species by local consumers. Another factor is the lack of capacity of the Cambodian fisheries sector to harvest marine areas properly due to poor investment. From an ecological point of view this reduces stresses on fish stocks. But this situation is fast changing with the advent of the free market economy and the opening of Cambodian waters to international fishing companies. Apart from stresses exerted on the marine ecosystem by local communities there is the increasing pressure put on these coastlines; this, coupled with Cambodia's very limited offshore surveillance capability would imply that the number of illegal foreign vessels could be large. According to the Foreign Ministry of Thailand, an estimated 2,810 Thai fishing vessels were operating illegally in the waters of neighboring countries in the mid-1990s. In this light it comes as no surprise that between 40% and 60% of the total catch of Thai vessels comes from outside Thai waters.

The Cambodian people have a strong preference for freshwater fish and the domestic demand for fish is expected to increase with population growth. Domestic demand of marine fisheries products is limited and most marine fisheries products are exported.

Domestic consumption of marine species is primarily confine to coastal areas. Hence, the national market for marine products is small, and market channels for marine products are not so well developed.

Food Security

Freshwater fish is of great importance for food security and nutrition of the Cambodian people. Average per capita fresh fish consumption nationally is estimated at 33.0 kg per annum with 14 kg of processed fish. Fish paste is of vital importance for many poor Cambodians during periods of low fresh fish

availability. By contrast other animal protein sources account for about 5 kg per person per year. In some areas with large-scale fisheries, fish consumption can be as high as 123 kg fish per person, per year.

Trade

Fish exports increased steadily from the 1993 level of 32,332 tons before peaking in 2003 at 56,000 tons. Since that time exports have declined to 24,100 tons in 2007, to increase again to 25,000 tons in 2008 and to 30,000 tons in 2009. The main export markets are Thailand and Viet Nam, and to a smaller extent Singapore, Malaysia, China, Hong Kong SAR, China, Taiwan Province of China, Japan, USA and Australia.

Employment

The labor force involved in the marine fishery sector, including fishing, gathering, processing, and marketing is estimated to be only 20 000 people (20% of the coastal inhabitants). Income generated from marine fishing activities has decreased in recent years due to market constraints, poor quality raw materials, resource depletion, and insecurity.

Rural Development

In many rural areas poor roads and a lack of electricity make the storage and transportation of fisheries products difficult.

3.2.4 Trends, Issues, and Developments

The fishery sector in Cambodia is still developing and most businesses continue to be single proprietor enterprises. Any consolidation that has taken place appears to be confined to processing/export operations. There are several constraints to the further growth of the fisheries sector in Cambodia; namely:

- Lack of major investment in the fisheries sector;
- Lack of information regarding fishery products;
- Excessive export taxes;
- Inefficient and expensive customs and shipping agencies; and
- The need to meet “unofficial” facilitating and gratuity payments.
- Illegal fishing;
- Increased population and fishermen;
- Habitat destruction;
- Pollution;
- Destructive fishing gears;
- Poor law enforcement; and
- Lack of data.

Recently the European Commission rejected fish imports from Cambodia as it was identified as a country not cooperating in the fight against illegal, unreported and unregulated (IUU) fishing. Cambodia maintains flags of convenience.

3.2.5 Private Sector Profiles

There is no national seafood sector association. There are individual companies.

List of Companies/Associations

- Sun Wah Fisheries Co. Ltd.
No. 196, Preah Trasak Paem, Phnom Penh
Frozen seafood processing
- Lian Heng Trading Co
No 16, St 206, Phnom Penh
Export
- Ocean King (Cambodia) Co.
Akak Mohasna Pakdey Decho Hun Sen St, Village 3, Sangkat I, Sihanoukville
Export

3.3 Indonesia

The following marine capture fisheries profile is based largely on the FAO Fisheries and Aquaculture Country Profile for Indonesia, last updated in 2006 (FAO 2006). Additional information has been included to supplement the FAO profile.

INDONESIA FISHERIES PROFILE SUMMARY

- Indonesia has a large and active commercial fisheries private sector, with regional fisheries production second only to China. During 2012, experienced 12% growth in total value. In 2011, the country's fishery production totaled 5.7 million tons, about 95% of which comes from artisanal fishermen. In 2012, over 6 million people were estimated to be engaged in inland and marine fishing and fish farming. The marine fishing fleet comprises an estimated 590,000 vessels.
- Most of Indonesia fishery landings are tropical mixed species coastal fisheries (including small pelagics), largely consumed through local markets (non-export).
- About 54% of Indonesia's animal protein supply comes from seafood. Per capita annual consumption has almost tripled during the past 50 years, from an average of 10.2 kg in the 1970s, to 27.3 kg in 2010.
- Fisheries exports are experiencing significant growth. In 2013, the total value of Indonesia's fisheries exports was \$4.9 billion, up from \$2.9 billion in 2010. In 2012, the fishing industry accounted for 21% of Indonesia's agricultural economy, and 3% of national GDP. Target export value for 2014 is \$5.65 billion.
- Export markets globally, including Asia (China, Japan, and Korea), USA, and the EU. Recent growth in EU demand (particularly France).
- Total production of marine capture fisheries steadily increased during the past three decades, slowing during the past 10 years. Production of tunas and shrimps has remained about the same in recent years.
- Tuna and shrimp are the major exports of Indonesia's marine capture fisheries, together representing an estimated 23% of total fisheries production (17% and 6%, respectively).
- In total, there are about 10,000 small fish processing operations, generally using traditional methods. Less than half of total landings are exported, due to limited refrigerated storage and transport facilities. About 16% of total production is frozen for export (largely tuna and shrimp), with less than 2% canned (largely oil sardines and skipjack). Approximately 56% of fish production is consumed fresh. The balance is processed and consumed as dried and salted (18%), smoked, or fermented.
- Processing of fishmeal is under development, limited currently to joint processing/canning operations.
- North and South Sulawesi (FMAs 716, 717) are estimated to contribute just under one-quarter of total marine capture fishery landings within Indonesia.
- Large increases observed during the past 15 years in the production of blue swing crab, common squid, cuttlefish, and miscellaneous fish species including Sardinella, coraker, and groupers.
- By 2010, the number of fish farmers (3.4 million) had surpassed number of capture fishers (2.6 million)
- Fisheries development is primarily focused on capture and market expansion of small pelagics, including squid, skipjacks, and tuna using purse seines, gillnets, and longlines
- Development potential of public-private partnerships exist for fish processing operations, including cold storage/ice production facilities and value addition of ready-to-cook fishery products.

3.3.1 Production Sector

Overview

Indonesia is the world's largest archipelagic nation, with two-thirds of its total area being ocean waters that contain some of Earth's most abundant and diverse concentrations of marine resources. The total area of Indonesia's marine waters is 5.8 million km², consisting of Archipelagic and Territorial Sea (3.1

million km²) and an Exclusive Economic Zone (EEZ; 2.7 million km²)(MoMAF 2009). Indonesia has the world's fourth longest coastline (behind Canada, the US, and Russia), stretching 95,181 km (WRI 2012).

Indonesia has a large and active commercial fisheries private sector, consistently ranking each year among the top three to five fish producing countries in the world (typically behind China and India). Indonesia ranks second behind China in terms of regional fisheries production in Southeast Asia. The commercial fisheries industry is comprised of three sectors: marine capture fisheries, inland fisheries, and aquaculture. Recreational fisheries have not developed extensively within the country beyond tourism-focused operations in visitor centers such as Bali. Inland fisheries operate in inland waters such as lakes, reservoirs and rivers, including estuaries. Aquaculture involves aquatic organisms in fresh, brackish and marine waters.

Catch profile

Capture marine fisheries is one of the important sub-sectors of Indonesia's agricultural and fisheries production. Total production of marine capture fisheries steadily increased during the past three decades, slowing during the past 10 years.

Most of Indonesia fishery landings are tropical mixed species coastal fisheries (including small pelagics). Despite the relatively small contribution to total landings, both shrimp and squid are the major exports of Indonesia's marine capture fisheries, together representing an estimated 23% of total fisheries production (17% and 6%, respectively)(Funge-Smith *et al.* 2012). Large increases have been observed in the production of blue swing crab, common squid, cuttlefish, sharks and rays, and miscellaneous fish species including *Sardinella*, anchovy, coraker, and groupers. However, catch rates of tunas and shrimps have remained about the same during the past several years.

Production from the marine capture fisheries sector in 2004 was 4,501,070 tons (FAO 2006). Tunas represented 16.6% of production, shrimp was 5.5%, other fish was 70.3%, and other aquatic organisms were 7.6% (FAO 2006). In 2004, marine capture fisheries landings were distributed 6.41% in West Sumatra, 2.88% in South Java, 8.73% in Malacca Strait, 12.15% in East Sumatra, 18.05% in North Java, 5.59% in Bali-Nusatenggara, 5.80% in South- West Kalimantan, 3.44% in East Kalimantan, 11.63% in South Sulawesi, 7.29% in North Sulawesi and 18.04% in Maluku-Papua (FAO 2006). The marine fishing fleet during 2012 comprised an estimated 590,000 vessels (FAO 2013).

Artisanal and small-scale fishers contribute the vast majority of total national landings. In 2011, the country's fishery production totaled 5.7 million tons, approximately 95% of which is landed by artisanal fishermen (FAO 2013).

North and South Sulawesi (FMAs 716, 717) are estimated to contribute just under one-quarter of total marine capture fishery landings within Indonesia (Funge-Smith *et al.* 2012).

Inland open water capture fisheries production reached 310,250 tons in 2004. The production of fish accounted for 93.6% of total production with major species of snakehead murrel (tilapia, catfish), kissing gouramis. Production of shrimp was 1.8% of total. Major inland open water production came from set gillnets 61,568 t, or 18.6% of total inland open water capture production in 2004, followed by hook & lines, 10.8%, and portable traps, 10.7%.

Landing sites

Generally, fish landing places in Indonesia are classified into three categories, based on their capacity and facilities available. The first category is the Oceanic Fishing Harbor (Type A fishing harbor), which is able to provide daily shelter for at least 100 fishing vessels of more than 60 GRT each, especially those fishing in the waters of the Indonesian EEZ. Additionally, Type A harbors are able to support annual landings of 18,000 to 120,000 tons.

The second category is the Nusantara Fishing Harbor (Type B fishing harbor), that are able to provide daily servicing of 75 fishing vessels of 15–60 GRT each, fishing in Indonesian home waters and the EEZ. The Type B harbors are able to support annual landings of 7,200–18,000 tons.

The third category is the Coastal Fishing Harbor (Type C fishing harbor), capable of daily harboring 50 fishing vessels of 5–15 GRT and supporting annual landings of 3,000–7,200 tons.

Harbor types A, B, and C are managed by the Ministry of Marine Affairs and Fisheries. In addition, there is a Type D, namely fish landing centers, which are under the management of Provincial governments. Three-quarters of these fisheries harbors are in the western part of Indonesia. Their location and the approximate catch handled annually in Table 3.

Table 3. Fisheries harbor, type, target and actual landings (tons; t) in 2005
(Source: FAO 2006)

Fisheries harbor	Type	Capacity (t)	Actual landings (t)
Jakarta	A	18,000	10,180
Kendari	A	18,000	9,395
Cilacap	A	180,000	20,763
Belawan (Medan)	A	180,000	35,672
Bungus (Padang)	A	18,000	549
Pelabuhanratu	B	7,200	6,235
Kejawanan	B	7,200	2,438
Sibolga	B	7,200	231
Pemangkat	B	7,200	9,279
Brondong	B	7,200	24,736
Ternate	C	3,000	3,969
Tg. Pandan	C	3,000	3,849
Pekalongan	B	7,200	22,766
Ambon	B	7,200	719
Tual	B	7,200	64,980
Prigi	C	3,000	12,948
Sungai Liat	C	3,000	3,681
Karang Antu	C	3,000	1,849
Teluk Batang	C	3,000	304
Bawean	C	3,000	2,049
Karimun Jawa	C	3,000	53

Fisheries harbor	Type	Capacity (t)	Actual landings (t)
Banjarmasin	C	3,000	6,566
Hantipan	C	3,000	--
Lab. Lombok	C	3,000	2,121
Sorong	C	3,000	1,833
Tarempa	C	3,000	--
Lampulo	C	3,000	--
Dagho	C	3,000	--
Pulau Tello	C	3,000	--
Sikakap	C	3,000	868
Kupang	C	3,000	--
Tarakan	C	3,000	4,309
TOTAL			252,075

Source: Monthly Report of Directorate of Fisheries Infrastructure, 2006.

Fishing Practices and Systems

Fishing in Indonesia occurs within three zones: from the shoreline out to 4 nm (zone 1), from 4 to 12 nm (zone 2), and from 12 nm to the EEZ limit (zone 3) (Funge-Smith *et al.* 2012).

Common capture fisheries gears in Indonesia include trawls, large to medium purse seines, gillnets, longlines, pole and line, traps, and drift gillnets (Funge-Smith *et al.* 2012). The number of registered marine fishing gear units was 1,354,516 units in 2004. Marine fishing gear types that increased between years included portable traps, guiding barrier, beach seine, boat liftnet, set gillnet, encircling gillnet, troll lines and skipjack, pole and line.

In 2004, the main gear operated in the West Sumatra area were troll lines, set gillnets and drift gillnets. In the South Java area, most used were drift longline (other than tuna longline), muroami and cast net. The main gear types in the Malacca Strait area were cast net, drift longline (other than tuna longline) and trammel nets. The main gear types in the East Sumatra area used were shellfish gear and hand lines. The main gear types in the North Java area used were bottom Danish seine and scoop net. The main gear types in the Bali-Nusatenggara area were purse seine, other lift nets, and guiding barrier. Stationary lift nets, stow nets and encircling gillnets were most operated in South-West Kalimantan. Other traps, guiding barriers and set longlines were most operated in East Kalimantan. Other lines, boat or raft lift nets and cast nets were most operated in South Sulawesi. Hand lines and harpoons were most used in North Sulawesi. Portable traps, beach seines and drift longlines (other than tuna longline) were most used in Maluku-Papua.

In 2004, the number of marine fishing boats was 549,100 units: 15.76% in North Java, 13.76% in Maluku-Papua, 12.49% in South Sulawesi, 11.83% in North Sulawesi, 11.62% in Bali-Nusatenggara, 9.37% in East Sumatra, and 25.17% for all the rest, including West Sumatra, South-West Kalimantan, East Kalimantan and South Java. The number of fishing boats rose to 729,682 in 2006, showing the continued steady increase since 1998. This increase was largely caused by the increase in the number of outboard motor craft. However, by 2011 the marine fishing fleet declined to 581,845 fishing vessels, reflecting declines in commercial landings during late 2000s.

Most non-powered boats were found in the Maluku-Papua area (25.46% of all marine unpowered craft), with significant numbers in South Sulawesi, North Sulawesi and Bali-Nusatenggara.

Most outboard motor powered vessels were found in North Java (39.24% of all marine outboard motor powered vessels). The greatest number of inboard motor vessels is in East Sumatra (21.13% of all marine inboard motor vessels). In the East Sumatra area, most (75.32%) inboard motors are in vessels <5 GRT.

Most marine fishing boats in number terms are unpowered, at 256,830 units in 2004. Of those, 52.49% were dugouts, 27.17% small, plank-built boats, 16.74% medium, plank-built boat and 3.60% large, plank-built boats. At the same time, outboard powered and inboard powered vessels 30.11% and 23.12%, respectively, of the fleet.

Main resources

Marine fisheries resources are classified into (1) large pelagics (skipjack, other tunas, billfish, oceanic sharks and small tuna); (2) small pelagics (scads, mackerels, sardinellas, trevallies, engraulid anchovy); (3) demersal and coral reef fishes (groupers, snappers, rabbitfish, slipmouth, etc.); and (4) prawn, shrimp, other crustaceans, etc. (Funge-Smith *et al.* 2012; FAO 2006).

Most of the marine resources in the western part of Indonesian waters have been exploited intensively, while some resources in the eastern part may have potential for development (Funge-Smith *et al.* 2012; MoMAF 2009).

Management applied to the main fisheries

At present, Indonesia manages its fisheries largely based on fish quotas and closed areas (reserves) (Funge-Smith *et al.* 2012). There are no closed seasons or size limits established for regulated species (Funge-Smith *et al.* 2012). Biologically, management of Indonesia's fishery resources is achieved through fish quotas based on the total allowable catch (TAC), determined on the basis of up to 80% of the estimated Maximum Sustainable Yield (MSY), implemented across 11 national fisheries management areas (FMAs) (Funge-Smith *et al.* 2012). The available MSY for Indonesia is calculated at 6.4 million tons/year, with the TAC being calculated at 5.1 million tons/year (i.e., 80% of MSY). Until 2006, only 4,468,010 tons of this potential was utilized by the nation, or 69.8% of the current total (MoMAF 2009). Since 2006, these calculated targets have been met or surpassed, indicating that Indonesia is likely harvested at or beyond its estimated fishery yield (Funge-Smith *et al.* 2012).

Previously, fisheries administration came under the Agriculture Department, but since 1998 has been under the Ministry of Marine Affairs and Fisheries (MoMAF). The MoMAF vision for marine affairs and fisheries development is: "Marine and Freshwater Ecosystem with all Natural Resources in it are the God Almighty's gift, that should be Considered, Sustained and Managed in an Optimum and Sustainable Manner for National Unity, National Development, and Indonesian Community Welfare." The MoMAF mission includes the following components:

- To improve the role of marine and fisheries sector as a source of economic growth;
- To improve prosperity for coastal fisheries and marine communities, especially fishermen and small-scale fish farmers; and
- To improve fish consumption of the population; to maintain and improve the environmental quality of freshwater, coastal, small-island and marine ecosystems; and to improve the role of the sea as a

unifying instrument for the nation and the creation of a Indonesia maritime work ethic to improve role of marine and inland fisheries as a source of economic growth.

In order to support the MoMAF vision and mission, the following strategies are being used by the Indonesian government through a decentralized administrative approach, where Provincial government partners play a lead role on strategy implementation:

- Utilization of optimal, efficient and sustainable marine resources and services;
- Improvement of surveillance and control of marine and fisheries resources;
- Rehabilitation of coastal and marine habitats and ecosystems;
- Application of science, technology and professional management in marine affairs and fisheries businesses;
- Establishment of a conducive fiscal and monetary policy;
- Empowerment in social and economic terms in marine and fisheries communities;
- Expansion and strengthening of the economic network;
- Expansion and strengthening of the information system for marine and inland fisheries;
- Expansion of the system and mechanism of relevant law, and cooperation with international and national organizations; and
- Establishment of a marine concept in society.

MoMAF's Directorate General of Capture Fisheries (DGCF) aims to utilize Indonesia's marine and fisheries resources optimally, establishing a national vision of "Solid, Self-Reliance and Sustainable Indonesia Capture Fisheries in 2020" (MoMAF 2009). DGCF's mission is to: (1) manage fisheries resources in a sustainable manner; (2) increase fishers' income and welfare; (3) facilitate the readiness of fishing ports both in quality and quantity; (4) strengthen the national fishing fleet; and (5) develop competitive and efficient capture fisheries businesses. The official duty of DGCF is to compose and conduct the policies and technical standardization in Capture Fisheries (Indonesia Ministerial Decree No. KEP.07/MEN/2005 on Organization and Working Management of Ministry of Marine Affairs and Fisheries). The functions of DGCF are to:

- To prepare MoMAF regulatory policies concerning capture fisheries;
- To conduct the policies of capture fisheries according to stated regulations;
- To compose national standards, norms, guidelines, criteria, and procedures of capture fisheries;
- To provide technical assistance on and evaluation of capture fisheries; and
- To conduct administration tasks in support of MoMAF.

Indonesia's primary oceanographic and marine resource research institutions are:

- National Coordinating Agency for Survey and Mapping (BAKOSURTANAL).
- Meteorological and Geophysics Institute of Indonesia (BMG).
- Agency for the Assessment and Application of Technology (BPPT).
- Indonesian Navy Hydrographic and Oceanographic Service (DISHIDROS TNIAL).
- Agency for Marine and Fisheries Research, Ministry of Marine Affairs and Fisheries (BRKP-DKP).
- Research Centre for Oceanography, Indonesian Institute of Sciences (P2O -LIPI).

During recent years, MoMAF has focused on building national capacity to create fishery management plans for its designated fishery management areas (FMAs), implement an ecosystem approach to fisheries

management (EAFM), and strengthening its national system of marine protected areas (MPAs). The national EAFM strategy follows off of the Coral Triangle Initiative's Regional EAFM Framework, and adheres to the international EAFM guidance outlined by FAO.

Fishermen communities

There were 898,609 fishing units recorded in 2004 in inland open water fisheries. Hook-and-line gear remained the dominant artisanal fishing gear used by fishing communities, only displaced by portable traps in Kalimantan and by set gillnets in Sulawesi. Other major gears used by fishing communities included portable traps and set gillnets.

There were 180,582 inland openwater fishing boats in 2004, mostly (80.59%) unpowered. Outboard motor boats were 18.60% of the inland open water fishing fleet, with only 0.81% having inboard propulsion units. In general the trend is for increasing use of outboard power in the inland fleet, going from 17,677 units in 2003 to 33,599 units in 2004.

3.3.2 Post-Harvest Sector

In total, there are about 10,000 small fish processing operations, generally using traditional methods. Less than half of total landings are exported, due to limited refrigerated storage and transport facilities. About 16% of total production is frozen for export (largely tuna and shrimp), with less than 2% canned (largely oil sardines and skipjack). Approximately 56% of fish production is consumed fresh. The balance is processed and consumed as dried and salted (18%), smoked, or fermented.

Processing of fishmeal is under development, limited currently to joint processing/canning operations.

Fish Utilization

About 56% of fish production is consumed fresh. There are severe limits to the supply of ice and availability of refrigerated storage and transport facilities, so the balance is processed and consumed as dried and salted (18%), smoked or fermented. There are about 10 000 small fish processing operations, generally using traditional methods.

Less than 2% of the catch is canned. The canneries utilize pelagics, mostly oil sardines and skipjack. Processing of fishmeal has still not yet developed and takes place mostly in conjunction with canning operations. About 16% of total production is frozen for export, mostly shrimp and tuna.

Fish Markets

Harbor types A, B, and C (managed nationally) and type D, or fish landing centers, (managed through provincial government) all host fish markets. Most fish landing sites are in western Indonesia.

Bitung (North Sulawesi) and Ambon (Moluccas) represent two important fish markets located within north-central Indonesia, known particularly as international tuna fishery marketing centers. Bitung is known in Indonesia as "Fish City" and abroad as the "Tuna Capitol of Indonesia".

3.3.3 Socioeconomic Contribution of the Fisheries Sector

Role of Fisheries in National Economy

The contribution of fisheries sector within Indonesia's gross domestic product (GDP) has steadily grown during the past two decades. Indonesian fisheries contributed approximately 2.4% to Indonesia's GDP in

2004 (GFA 2009). During 2012, the fishing industry accounted for 21% of Indonesia's agricultural economy, and over 3% of national GDP (FAO 2013).

Demand and Supply

The demand for Indonesian fisheries exports has experienced significant growth during the past few decades. In 2013, the total value of Indonesia's fisheries exports was US\$4.9 billion, up from US\$3.6 billion in 2012, US\$2.9 billion in 2010, and US\$1.7 billion in 2004 (FAO 2013; GFA 2009). Target export value for 2014 is US\$5.65 billion.

During 2012 alone, Indonesia experienced 12% growth in total value of fisheries from the previous year. An estimated 60-70% of all fish landed in Indonesia are consumed locally. Therefore, the net value of fisheries production is likely at least double that of export values.

Export destination markets are primarily China, Thailand, Japan, US, Singapore, the EU, Korea. There has been notable growth in EU demand during recent years, particularly France.

During the years from 2001 to 2006, annual growth increased 2.4% in capture fisheries (production), 15.22% in export volume, 5.41% in foreign income, and 4.24% in human resources.

Total food supply in 2003 was reported at 4,673,335 metric tons (live weight)(FAO 2006). Total production for direct human consumption was reported at 5,671,759 metric tons (live weight) for 2003 (FAO 2006).

Food Security

Fisheries play a critical role in Indonesia's food security. Approximately 18% of Indonesia's urban population and 32% of its rural population are living in poverty. Poverty alleviation in Indonesia and ensuring food security are major policy initiatives of both national interests and international partnerships. Poor households and coastal communities generally consume fishery products as the primary source protein to meet dietary requirements. Due to the economic decline experienced in Southeast Asia during the late 1990s and globally in the late 2000s, Indonesia has experienced increasing dependency on fish as a primary source of animal protein and livelihoods. In 1998 it was estimated that 41.5 million Indonesians (25% of the population at that time) fell below the national poverty line.

About 54% of Indonesia's animal protein supply comes from seafood. Per capita annual consumption has almost tripled during the past 50 years, from an average of 10.2 kg in the 1970s, to 27.3 kg in 2010, one of the highest in the developing world. During 1999 to 2003 alone, annual per capita fish consumption rose from 19.6 kg/person to 21.3 kg/person, well above the worldwide average of approximately 16 kg/person (GFA 2009).

Indonesia is one of 38 countries that have already met the Millennium Development Goal of halving their percentage of hunger by 2015 (FAO 2013).

Trade

Total gross value of fisheries output reported in 2004 was estimated at US\$3.13 billion across the capture fisheries sector. Gross import trade value was estimated at US\$140 million, and gross export trade value at US\$1.65 billion.

Employment

Between 2009 and 2011, fisheries provided over 6 million people with direct employment and indirectly to millions more (FAO 2013; GFA 2009), in 2009 consisting of 3.8 million fishermen and 2.2 million fish farmers (GFA 2009). This was up significantly from estimated employment contributions between 1999 and 2003 (Table 4), and later during 2005 when there were an estimated 2,734,090 jobs from capture fisheries (primary sector), and 1,164,178 jobs in commercial processing, handling, and sales (secondary sector)(FAO 2006).

By 2010, the number of fish farmers (3.4 million) had surpassed number of capture fishers (2.6 million) in terms of employment (Funge-Smith *et al.* 2012).

Table 4. Employment in the Indonesian fisheries sectors, 1999–2003
Source: FAO 2006

Category	1999	2000	2001	2002	2003
Capture,					
- total	2,890,054	3,104,861	3,286,500	3,046,473	3,857,597
- marine	2,409,029	2,486,456	2,562,945	2,572,042	3,311,821
- inland	481,025	618,405	723,555	474,431	545,776
Culture	1,877,814	2,181,650	2,190,920	2,270,164	2,384,238
TOTAL	4,767,868	5,286,511	5,477,420	5,316,673	6,241,835

Source: Fisheries and Aquaculture Statistic of Indonesia, 2005.

Rural Development

Fisheries develop by improving business productivity and efficiency, which in turn increases fisheries production, resulting in increases in fish consumption, foreign exchange earnings and supply of raw material for domestic industry. Increases in fish production are also expected to improve incomes of fishermen and fish farmers, enhance job and business opportunities, encourage development of domestic industries and support regional development. Development efforts are implemented with due consideration of the fishery resource and the environment in order to achieve environmentally sound and sustainable fisheries development.

3.3.4 Trends, Issues, and Developments

There are various constraints and problems at all administrative levels – national, provincial, district and local – affecting fisheries management. However, overall, the major current issues and problems associated with development of capture and culture fisheries are:

- Overfishing in both marine and inland fisheries waters;
- Low income for fishers and fish farmers;
- Low standard of living of fishers;
- Lack of financial support in terms of credit schemes;
- Weak practical fisheries management and governance, particularly concerning monitoring, surveillance, and enforcement; and
- Degradation of coral reef ecosystems and other critical marine habitat types affecting fisheries due to development, destructive fishing techniques, and coastal pollution.

Illegal, unreported, and unregulated (IUU) fishing is a major and growing concern of the commercial fisheries sector and national government.

Overfishing within Indonesian waters is a commonly and widely acknowledged issue, and is generally accepted by fishery stakeholders, including from within the capture fisheries sector. Across Indonesia's 11 FMAs, MoMAF estimates that available demersal fisheries and shrimp are either over- or fully-exploited within nearly all FMAs, with the remainder having an uncertain status due to a lack of data (MoMAF 2009). Small and large pelagics are moderately to over-exploited across FMAs where data are available (MoMAF 2009). Significant conservation and management investment by national, provincial, and local government bodies and foreign and domestic non-governmental organizations and donors.

Indonesian fishery development prospects include:

- *Marine Fishery* The variety of fish and other marine aquatic organisms provides opportunities for a wide range of fishing activities. It is, however, important to manage those activities so as to avoid conflict among small-, medium- and large-scale fisheries. Moreover, further development in terms of increase in number of fishing vessels to optimize the utilization of marine resources has to be directed to the eastern waters of Indonesia (KTI) and EEZ, where fish resources utilization is relatively less (24% utilized in KTI and 47% in the EEZ in 1998). In this respect, further development is primarily directed to the waters of: (1) western Sumatra and southern Java, Bali and Nusa Tenggara for tuna and skipjack using longlines and gillnets; (2) Makassar Strait and Sulawesi Sea for small pelagics, squid and tuna and skipjack using purse seines, gillnets and longlines; (3) Maluku Sea, Halmahera and Pacific Ocean for tuna, skipjack and demersal species using longlines, pole-and-line and bottom trawls. Also, further development will be encouraged in EEZ waters apart from the Malacca Strait and the Arafura Sea.
- *Prospects for Mariculture* The coastline of Indonesia is estimated at around 81 000 km and has great potential for development of mariculture activities. However, in mariculture, each species requires specific environmental conditions. Therefore each region has to develop its mariculture for a particular species or commodity, namely (1) Groupers and Giant perch in North Sumatra, Riau, South Sumatra, Nusa Tenggara and Lampung; (2) Blood cockles in North Sumatra, Riau and Lampung; (3) seaweed in Riau, Lampung, East Kalimantan, Nusa Tenggara and South and South-east Sulawesi; and (4) Sea cucumber in Riau, Lampung, Nusa Tenggara, central and South-east Sulawesi.
- *Prospect for Brackish-water Culture* There are various potential species for brackish-water culture, including high-value species such as crustaceans (e.g. *Penaeus monodon*) and some fish (e.g. Milk fish [*Chanos chanos*]). As for mariculture, different regions have differing potentials: (1) shrimp and Milk fish: in all Provinces; (2) Giant perch and groupers in Aceh, North and South Sumatra, Riau, Jambi, West, East and central Java, Lampung, South Sulawesi and Bali; and (3) Streaked Spinefoot in Riau, central and East Java and South Sulawesi.
- *Prospects for the Processing Industry* Modern processing units generally process product for export. Commodities include shrimp, tuna and skipjack, fish fillets, tuna loin and tuna steak. There are several processing operations that have good potential, including (1) freezing, cold storage and ice production; (2) product processing with value added, to meet the increasing market demand for fishery products that are ready to cook (convenience products), such as IQF products, shrimps, breaded fish, surimi, and fish balls.

- *Other Fishery Product Processing* The demands of overseas markets continue to evolve. Indonesia formerly exported in the form of frozen fish, but it is now increasingly providing products such as fresh fish, fillets, smoked fish, shrimp crackers, fish oil, and even live fish.

Development potential of public-private partnerships exist for fish processing operations, including cold storage/ice production facilities and value addition of ready-to-cook fishery products (e.g., breaded fish, shrimps, fish balls).

SUMMARY TRENDS, ISSUES, & DEVELOPMENTS RAISED DURING INTERVIEWS

- Overfishing and overcapacity are the major perceived issues contributing toward observed declines during past decade in catch rates.
- Concerns regarding the long-term financial viability of capture fisheries due to lack of consistent supply of raw materials being landed, despite growing domestic and foreign demand.
- Concerns from commercial operators with increasing competition from artisanal fishers. Commercial operators report that due to political pressure and national poverty alleviation priorities, artisanal fishers are not held to the same enforcement and surveillance standards as commercial operators.
- Destructive fishing through the use of dynamite and poisons is perceived to be declining since peak use in the 1990s.
- IUU fishing, particularly by illegal migrants, is perceived as a major problem that has led to increased competition and at-sea conflict between (typically less technologically sophisticated) Indonesian fishers and (typically more technologically sophisticated) foreign fishing vessels.
- Increasing concern regarding the perceived increase in piracy and conflict/violence at sea.
- Increasing concern regarding contribution of foreign fishing vessels to the illegal shipment of small arms and trafficking of humans.

[Anonymous summaries of responses offered by participating Indonesian stakeholders through the interviewing process can be found in the Appendix.]

3.3.5 Private Sector Profiles

List of associations and companies (North Sulawesi)

Below is a listing of the primary fishing associations and a few of the major capture fishing companies operating within Northern Sulawesi (Bitung and Manado) who participated within this assessment:

- Himpunan Nelayan Seluruh Indonesia
[Indonesian Fishermen Association]
Manado, Sulawesi Utara
- Asosiasi Kapal Perikanan Nasional
[National Association of Fishing Vessels]
Kota Bitung, Sulawesi Utara
- Himpunan Pengusaha Perikanan Bitung
[Fishery Businessmen's Association of Bitung]
Kota Bitung, Sulawesi Utara

- Kelompok Nelayan Angelfish
[Angelfish Fishermen United]
Manado, Sulawesi Utara
- Asosiasi Nelayan Tradisional Bitung
[Traditional Fishermen's Association of Bitung]
Kota Bitung, Sulawesi Utara
- PT Samudra Mandiri Sentosa – cannery for skipjack and yellowfin tuna, small pelagics
Kota Bitung, Sulawesi Utara
Abrizal A. Ang, Vice President for Operations; abrizal.ang@jayakota.co.id
- PT Gloria Purse Seiner – capture fisheries; tuna, small pelagics, sharks and rays
Kota Bitung, Sulawesi Utara
Rocky Wehantouw, Captain; wehantouwrocky@gmail.com
- PT Waraney Perkasa Purse Seiner – capture fisheries; tuna, small pelagics, sharks and rays
Jl. Raya 46 Kel. Bitung Tengah Lingk. 24
Kota Bitung, Sulawesi Utara
Item I. Kojongian; waraneyperkasa@yahoo.com
- PT Bintang Mandiri Bersaudara – capture fisheries; reef fishes, tuna, small pelagics.
Kota Bitung, Sulawesi Utara
- PT Kelompok Nelayan Angelfish – handline/pole-and-line for coral reef fish, tuna, small pelagics
Manado, Sulawesi Utara
Ronny Mamesah, Owner/Head Captain

3.4 Malaysia

This profile was based on the FAO Fisheries Profile updated in 2009 (FAO 2009a) and the Coastal Zone Profile prepared by the Sabah provincial government in 1998 (Sabah Government 1998).

MALAYSIA (PENINSULAR) FISHERIES PROFILE SUMMARY

- The marine fisheries are both small-scale inshore and offshore commercial.
- It is generally well accepted that the coastal fishery resources have been fully exploited.
- Small vessels below 10 GRT constitute nearly half of all fishing vessels.
- Most of the larger vessels are either trawlers or purse seiners
- The trawlers are the most efficient vessels, obtaining 56 percent of the catches, followed by the purse seiners, with a share of 22 percent
- The bulk of fish is sold in fresh and chilled form.
- The Fisheries Development Authority of Malaysia (FDAM) has fish landing complexes in major landing points throughout the country
- Fish caught in the sea are landed at major landing points in chilled form. Commercial vessels are fitted with refrigerated seawater systems, while most traditional fishermen use ice.
- Small family processing facilities are being replaced by large scale processing operations.
- The United States is the main market for Malaysian exports of fish and fishery products with a share of 24.5 percent, followed by Singapore (13.2 percent), Italy (9.3 percent), Japan (7.2 percent), China (6.2 percent), Australia (5.0 percent) and others.
- There are 87 fishermen's associations (FAs) operating throughout Malaysia - 74 area fishermen's associations, 12 state fishermen's associations, and the National Fishermen's Association.
- The State and Area Fishermen's Association are also members of the Malaysian Investment Cooperative that serves as an investment arm to help promote savings, investment, and business.

MALAYSIA (SABAH) FISHERIES PROFILE SUMMARY

- The marine fisheries are both small-scale inshore and offshore commercial.
- There are 20 licenses for deep sea fishing but only 8 have started operation; purse seiners; accounts for 30% of total fish landings. While the commercial vessels fish primarily in the Sabah EEZ, some do move into the South China Sea.
- For coastal fisheries, trawling continues to be the main activity for prawns and finfish
- 65% of total landings are exported
- Principal fishing grounds are near Kudat-Kota Marudu, Sandakan, Tawau, Semporna, Kota Kinabalu and Kota Belud
- In the past, processed fish were solely dried/salted fish but recently downstream processors have diversified to semi-processed fish (de-headed, scaled, gilled and gutted) and value-added fish products
- There are about 40 processing plants of various size and capacities in Sabah. 20 are primarily prawn-processing plants. Most process prawns and demersal fishes. 6 plants process food-fishes for the markets and the by-catch into fishmeal.
- The major foreign markets for fish and fish products are Brunei, Philippines, Japan, Singapore, Hong Kong and Taiwan while the secondary markets are in Europe, Australia and USA. A substantial volume is also sold to Peninsular Malaysia
- Fishermen in Borneo are calling on the authorities to stop foreign fishermen coming from Sabah from fishing in the state's waters off the coast here
- Seafood from the Philippines is landed and transhipped from Sabah
- Live reef fishes are exported to Hong Kong, Singapore and Taiwan.

3.4.1 Production sector

Overview

The fishery sector has for decades been playing an important role as a major supplier of animal protein to the Malaysian population. In 2007 the total fishery production of the country amounted to 1 563 942 tons. The fisheries are generally considered to consist of two major components, namely marine capture fisheries and aquaculture. The majority of fish landings has always come from the capture fisheries, constituting 88.3 percent of the total production for the year 2007, with the rest coming from aquaculture. Production from the inland fisheries is small, standing at around 0.3 percent. The production pattern has not changed much over the last couple of years.

Catch Profile

The marine capture fisheries are further sub-divided into coastal fisheries and the offshore sub-sector. Production from the marine capture fisheries was estimated to be 1,381,423 tons in 2007. The contribution from the coastal fisheries has remained fairly static lately at around 1.0 million tons. It is generally well accepted that the coastal fishery resources have been fully exploited. There is possibly some extent of overfishing. Over the years the Department of Fisheries (DOF) has tried various measures in an attempt to reduce the coastal fishing effort.

Further expansion of capture fisheries would need to come from the offshore sub-sector, namely the South China Sea. It has been estimated that the potential yield from the offshore areas is slightly over 400,000 tons. Given the present level of landings, the scope for an increase in landings is quite limited.

Landing sites

For the purpose of collection of landing statistics, the Department of Fisheries divides the coastal belts into fisheries districts. There are 41 fisheries districts on the West Coast of Peninsular Malaysia, 18 on the East Coast, 15 in Sarawak and 12 in Sabah, giving a total of 68 fisheries districts. Landings data are gathered from all these districts, but the details are left out in the compilation of the Annual Fisheries Statistic published annually by the Department of Fisheries.

Within each fisheries district there can be several landing sites, so there are hundreds of landing sites throughout the country. Information on the quantity of fish landed at each of these landing sites is not available.

Fishing practices/systems

In the year 2004, there was a total of 36,136 licensed fishing vessels in the country, 15,651 of which consisted of small vessels powered by outboard engines or non-motorized (2 697). The remaining vessels are powered by inboard engines. Nevertheless, small vessels below 10 GRT constitute nearly half of these vessels. The remaining vessels have GRT ranging from 10 to over 70, with decreasing number towards the high GRT end. Nevertheless, there are 833 vessels with 70 GRT or above. Among these vessels over half, or 18,439, were licensed to fish with drift/gill nets. Most of these were small coastal vessels below 10 GRT. The trawlers constitute the next dominant group of vessels (6,055). Most of the larger vessels are either trawlers or purse seiners. The purse seiners were also a major group with 1,025 vessels. Vessels licensed to fish with hooks and lines numbered 4,731, most of them being small coastal vessels. Other minor fishing gears used include lift nets, stationary traps, portable traps, bag nets, barrier nets, push nets and scoops for shellfish collection. There is also a significant

number of small unlicensed fishing vessels operating in the inshore waters with some of the so-called traditional gears (gears other than trawling or purse seining).

The trawlers are the most efficient vessels, taking up 56 percent of the catches, followed by the purse seiners, with a share of 22 percent. Despite their greater number, only 10 percent of the landings are taken by vessels operating drift/gill nets. The remaining catches are taken by vessels operating hook-and-line, bag nets and other miscellaneous fishing gears.

The above description is based on data for the year 2004.

Main resources

A great variety of fish species is caught from the warm tropical waters off the country. For the purpose of statistical collection, DFO categorizes species caught into over 100 “groups”. A “group” may include over 10 species. Hence, over a thousand fish species could occur in the catches.

Several “groups” of pelagic fish consistently dominate the catches, with just one or two demersal fish “groups” appearing in the list of dominant groups. Shrimp catches have always been significant. The pelagic Indian mackerel (*Rastrelliger* spp.) has always been the most dominant group, with landings of 156,687 tons in 2007. The landings come mostly from the purse seiners and drift/gill netters, trawlers apparently taking the most of remaining landings.

The round scad (*Decapterus* spp.), also pelagic, is the next dominant group with landings of 89 958 tons in 2007. Fish are mostly caught by purse seiners, with less than 10 percent contributed by the trawlers. Lift nets come at a distant third.

The squids (*Loligo* spp.) generally come in third on the list of dominant groups, with catches of 59,730 tons in 2007. Trawlers generally contribute nearly 90 percent of these catches, with the balance coming from a wide range of other fishing gears.

Tunas and tuna-like species (*Thunnus* spp., *Euthynnus affinis*, *Auxis thazard*, *Katsuwonus pelamis*) are usually quite prominent, with landings of 52,909 tons in 2007. Most of the catches come from purse seiners, followed by drift/gill netters. Hooks and lines come in a distant third.

Threadfin bream (*Nemipterus* spp./*Pentapodus* spp.) is one of the few demersal fish groups landed in substantial amounts. The landings were 36,201 tons in 2007. The greater portion of the landings has always come from trawlers, followed by portable traps, drift/gill nets, and hooks and lines.

The anchovies (*Stolephorus* spp.), ox-eye scad (*Selar boops*), hardtail scad (*Megalaspis cordyla*), lizard fish (*Saurida* spp./*Trachinocephalus* spp.) and jewfish (*Pennahia* spp./*Johnius* spp.) are other important fish groups with landings over 20,000 tons.

The landings of marine shrimp as a group have always been significant, with landings of 71,729 tons in 2007. However, there has been a slow decline in shrimp landings lately. The annual landings used to be over 90,000 tons in the 1990s, with a record catches of 126,405 tons achieved in 1992. Most of the landings come from trawlers, while drift/gill netters come in a distant second.

Management applied to main fisheries

For the purpose of regulating the fishing activities the marine waters are divided into four fishing zones, namely:

- Zone A (from the shoreline to 5 nm): Zone A is generally reserved for small vessels operating traditional fishing gears. Commercial fishing operations (trawling and purse seining) are not allowed.
- Zone B (5 –12 nm): Commercial fishing activities (trawling & purse seining), with vessels below 40 GRT, are allowed to operate in the area.
- Zone C1 (12 –30 nm): Zone C1 is for the operation of vessels below 70 GRT. The majority of such vessels are trawlers with some purse seiners.
- Zone C2 (beyond 30 nm): Zone C2 is for the operation of the fleet of offshore vessels of 70 GRT and above. For each Zone the optimum number of fishing vessels has been determined based on estimation of maximum sustainable yield. The issuance of new fishing licenses for the inshore waters has been suspended. A limited number of licenses is still being issued annually to offshore vessels.

A series of marine parks has been established in the coastal waters. Fishing within two nautical miles from the marine parks boundaries is prohibited. Surplus fishermen are diverted to the tourism sector, ferrying tourists to the parks, acting as tour or dive guides.

During recent years, the Sabah Fisheries Department within Sabah's State Government has focused on building national capacity to implement an ecosystem approach to fisheries management (EAFM), as well as strengthening its State system of marine protected areas (MPAs). The Sabah State EAFM strategy follows off of the Coral Triangle Initiative's Regional EAFM Framework, and adheres to the international EAFM guidance outlined by FAO.

Fishing communities

Out of the total fishing population of about 90,000 fishers in 2006, more than 55,200 were in Peninsular Malaysia, 13,200 in Sarawak, 29,850 in Sabah and 232 in Labuan. Malays make up nearly half of them. The next prominent group is the immigrant workers (31 percent), followed by the Chinese (17 percent). There are very few Indians in the fishing industry, constituting less than 1 percent of the fishing population.

The greatest numbers (29,500) of these fishermen operate drift/gill nets. This is followed by those working on trawlers (25,018), and purse seiners (16,426). There are 8,258 of them utilizing hook-and-line, with the remaining fishermen working on other traditional fishing gears.

3.4.2 Post-harvest sector

Fish utilization

The bulk of fish, especially that from the marine capture sector, is sold in fresh and chilled form. Mud crab, mollusks, and freshwater fishes from the inland areas, however, are more likely to be sold in live form. A small amount of shucked cockle and mussel meat is available in the market.

Most aquaculturists prefer to market their products in live form, especially directly to restaurants, hoping to obtain higher unit prices than in other markets. However, the market for live fish is small, and most farmed fish is now marketed in chilled form. The anchovies are always sold in dried form. The fish is usually cooked in brine on board the vessels, and dried on land before being marketed. A significant portion of small marine shrimp, especially that caught by coastal drift-nets and bag-nets, is also processed into the dried form for marketing.

Fish processing such as the making of shrimp paste (belacan), pickled shrimp (chincaluk), salted fish, dried cuttlefish, jelly fish, fish sauce, fermented fish (budu), fish crackers, fish balls and fish cake, has traditionally been family operations in fishing villages. However, there has been an increasing trend towards commercial operations lately, with industrial scale set-ups. The trend is likely to continue with the small family businesses being slowly phased out in the coming years. The making of fish balls and surimi is for example mostly industrial in nature now.

Fish satay (flavored dried fish) is a specialty of the Pankgor/Lumut area from the state of Perak. The quantity, however, is small. A small quantity of boiled mackerel is also available in the fresh fish market occasionally.

The greater amount of exported shrimp and tuna is frozen in processing plants. Shrimps are usually de-headed, peeled and de-veined before being frozen.

There is some canning of fish, cockle meat, and – but to a much lesser extent - mussels and cuttlefish.

Most of the trashfish is generally converted into fishmeal to be incorporated into animal feed, including fish and shrimp feed. The marine cage culture industry has also been dependent on the supply of trash fish for its feeding regime. With an estimated fish production of slightly over 10 000 tons annually, and assuming a feed conversion ratio of 8 to 1, up to 100 000 tons of trash fish could be needed. However, the actual amount utilized is likely to be less. Some fish farmers prefer formulated feed, while others are likely to use a mixture of trash fish and formulated feed.

Fish Markets

Fish caught in the sea are landed at major landing points in chilled form. Commercial vessels are fitted with refrigerated seawater systems, while most traditional fishermen use ice. At landing points fish are generally auctioned to wholesalers. Some fishermen, however, are committed to sell their catches to specific wholesalers as a result of credits acquired earlier, or for the convenience of getting credit later when required. The Fisheries Development Authority of Malaysia (FDAM) has fish landing complexes in major landing points throughout the country. It also serves as fish auctioneer to ensure fair prices to the fishermen on those premises.

From the landing complexes, chilled fish are sent to major urban centers for retailing in the wet market. However, with greater urbanization, an increasing amount is being channeled to the supermarket chains in major cities/towns to cater for the needs of a more sophisticated urban population.

However, in times of excess/glut some fish is frozen and put into cold storage. Quality fish and shrimp also tend to be put into cold storage a month or two before the festive seasons, such as the Chinese New Year, when demand for such commodities is considerably higher, and so the prices.

A significant amount of cultured fish and shrimp is sent to Singapore both in live and chilled form. Some of the marine fish raised in coastal cage culture units are sold live to Hong Kong. Subsequently, a portion of this fish is re-routed to China in live form. Vessels from Hong Kong, equipped to transport fish live, ply the areas regularly for collection of fish. Small quantities of live coral fishes are regularly air freighted from Sabah to Hong Kong. There is generally quite a high movement of fish among the various states of the country, depending on the supply and demand situation. During the monsoons, for example, when the fishing effort is considerably reduced in the East Coast of Peninsular Malaysia, and in the State of

Sabah and Sarawak, there can be substantial movement of frozen fish from the West Coast of Peninsular Malaysia to these areas.

3.4.3 Socio-economic contribution of the fishery sector

Role of Fisheries in the National Economy

In 2004 the contribution of the fishery sector to GDP amounted to 1.73 percent. The fishery sector has always been a source of foreign exchange. Though the economic value of a wide range of diversified supporting industries cannot be quantified, it could possibly be in the same order of magnitude.

The fishery sector also provided direct employment to 111,000 people in 2006. As indicated below under the sub-title of “Employment”, the figure is an under-estimate. Additional employment opportunities are also created in the supporting industry.

Fisheries have always had a role in eradicating poverty and as a source of cheap animal protein to the rural communities.

Supply and Demand

Malaysia has always been a net importer of fish in the sense that the total fishery production, both from capture fisheries and aquaculture, has not been able to cater for the demand of fish in the country. The situation is worsened by the fact that a significant amount of high-value fish species, such as shrimp and tuna is exported. The shortfall in supply over demand is usually made good by the import of cheaper fish from the neighboring countries. Nevertheless a small quantity of high-value exotic fish species is also imported.

Nevertheless, over the years the self-sufficiency level has been quite high, in the region of 94-95 percent. With the growing population, increasing affluence, and the recognition that fish is actually the healthier source of animal protein, the demand for fish has been on the increase. *Per capita* consumption of fish was estimated to be 52.1 kg (live weight equivalent) in 2005.

Trade

Malaysia has always been a net importer of fish in term of volume and an exporter in monetary terms. Based on statistics from 2007, in value terms, the greatest portion of the imported fish came from China, with a share of 21.0 percent, followed by Thailand (19.8 percent), Indonesia (15.1 percent), Viet Nam (8.6 percent), Myanmar (5.1 percent) and India (4.8 percent). The rest of the imported fish came from the United States, Taiwan Province of China, Pakistan, Japan, Norway and a long list of other countries.

In the same year, in value terms, the United States was the main market for Malaysian exports of fish and fishery products with a share of 24.5 percent, followed by Singapore (13.2 percent), Italy (9.3 percent), Japan (7.2 percent), China (6.2 percent), Australia (5.0 percent) and others.

Food Security

Although Malaysia is a net importer of fish, the self-sufficiency level is always on the high side (over 90 percent). Furthermore, with the export of high-value fish and shrimp species, the foreign exchange earnings acquired from such exports are generally more than sufficient to offset the expenditure for fish imports.

The trend is likely to continue in the coming years. Production of high-value fish/shrimp species in the aquaculture sector is a major thrust of the Third National Agriculture Policy (NAP3). The policy is to continue the production and export of such quality commodity for export earning, and utilizing the foreign exchange acquired for the import of relatively cheap fishery products to cater for the protein requirement of the general public. However, there is nothing to prevent those with the means to spend on luxurious seafood should they so desire.

Also in the rural areas many villagers probably get some of their protein requirement from catches from the river systems, irrigation canals, water impoundments and rice fields. Such catches generally are not reported and are therefore not included in the national production figures.

Employment

The fishing industry provided direct employment to 90,700 fishers in the year 2006. There were 51,480 of them working on coastal waters and 39,200 operating in deep-sea. About 41 000 fishers work on trawlers and purse seiners, with the rest working on traditional fishing vessels. In addition, there was a significant number of fishermen working on small unlicensed inshore fishing vessels.

The operation of the offshore vessels was largely dependent on the employment of foreign workforce, and possibly will continue to be so in the near future. To a lesser extent this is also true for the bigger trawlers and purse seiners. There were 28,150 registered foreign fishermen in 2004. Probably there was an additional number of them unregistered.

The aquaculture sector provided direct employment to 20,100 fish culturists in 2006. However, the word "culturists" is synonymous with "farm owners" for the purpose of statistics collection by the Department of Fisheries. While many farms are small and do not employ extra workers, most shrimp farms may have several paid employees helping out with the farming operation. An integrated shrimp farm may have up to a hundred employees. These employees are not included in the count of "culturists" by DOF. Hence, the size of the workforce in the aquaculture sector is actually bigger than the official count of "culturists". Again, some of these employees are foreign workers.

The younger generation of Malaysians, even those from fishing villages, are not interested in fishing or aquaculture, unless as boat/farm owners. Fishermen are not held in high esteem.

There is no reliable count on the number of workforce in the secondary or supporting industry. However, it has to be fairly high and possibly in the region of tens of thousands.

Rural development

As noted earlier, the younger generation of Malaysians no longer find working as employees in the fishery sector attractive. With better educational background, many prefer to move to urban centers to get better paying and more comfortable jobs. However, the existing fishery industry is still big enough to attract services from a wide range of supporting services. It is these supporting services that have been contributing to the growth of fishing villages.

3.4.4 Trends, issues and development

Under Malaysia's National Agricultural Policy (NAP) 3 formulated in 1996, and valid for the period 1998 – 2010, fish production targets for the country were set at 1,930,000 tons for the year 2010, with 900,000 tons coming from the coastal fisheries, 430,000 tons from the offshore sector and 600,000 tons

from the aquaculture industry. It is interesting to note that the then estimated optimal yield of 900,000 tons from the coastal waters has been exceeded.

Constraints and opportunities

It is generally well accepted that the coastal fishery resources have been fully exploited, or possibly over-exploited. There has been consistent effort on the part of the Department of Fisheries to reduce the fishing effort in the coastal zone through various measures, though such attempts have not always been successful. The DOF is committed to the rational exploitation and management of the resources to ensure the present optimal yield can be sustained. There is no potential for further increasing the yield from the sector.

It is recognized that any development of the capture fisheries would need to come from the offshore sector, namely the South China Sea, where a potential yield of over 400 000 tons has been estimated. However, offshore fishing requires considerable capital investment. Many coastal fishermen who are keen to venture offshore but do not have the required financial capital, find it difficult to get credit from financial institutions. Lack of trained and willing local fishing hands for such fishing activities is another major challenge.

With long coastlines, vast expanses of coastal belt, inland areas, and water bodies suitable for aquaculture development, aquaculture provides the best avenue for greater fishery production in the coming years. The NAP3 targeted an aquaculture production of 600,000 tons for the year 2010 for the country. Based on the 1996 aquaculture production of 109,062 tons, the annual compounded growth would need to be in the region of 13 percent continuously over the period for the target to be met. However, the recorded production increases during the late 1990s and early 2000s have not been of the size needed to attain the stated targets.

As already stated, production of cockle, the dominant aquaculture activity in the country, has declined and most of the mudflat suitable for its culture has been fully utilized. Hence, there is little room for further expansion. Productivity has remained static or even on the decline lately.

To some extent shrimp farming, over the years, has acquired the reputation of being destructive (being linked to mangrove clearing) and unsustainable. With greater public awareness of the ecological importance of the mangrove, high-lighted by an increasingly vocal environmental movement in the country, many state governments are being much more cautious in the allocation of large parcels of coastal land for such venture and the long process of land application is more of a constraint towards further development of this industry than the existence of suitable lands.

Expansion of the traditional coastal marine cage culture system is made difficult by lack of suitable sheltered waters. Therefore, and starting in the early 1990s, the Department of Fisheries has attempted to create an offshore cage culture industry. However, after over a decade of research and development effort, the industry has yet to take off in a big way, plagued by lack of quality seeds and disease infestation. There is no indication of a likely major breakthrough in either of the areas in the coming years.

Low consumer acceptance and hence market value for some of the cultured freshwater fish species, such as the various Chinese carps, catfish and tilapia, are also to a certain extent a constraint towards large scale expansion of the culture system, although the technology for such culture is well established.

3.4.5 Sabah

Overview

Sabah is a maritime state with more than three-quarters of its boundaries abutting the sea (Sabah Government 1998). These seas, as commonly found in the Southeast Asian region, possess some of the world's richest ecosystems characterized by extensive coral reefs and dense mangrove forests. Endowed with warm tropical climate and high rainfall, these coastal waters are further enriched with nutrients from land that enable them to support diverse and bounteous marine life. There are also abundant fisheries resources in the wide expanse of the deep seas off Sabah. Furthermore, there is a great potential for aquaculture to be developed in the mangrove forest, coastal wetlands and freshwater swamps that compose 75 % of the coastline. With these resources, the state of Sabah has a thriving fishing industry and potential for future development.

The local fisheries produced 180,000 metric tons (MT) valued at RM 590 million in 1997. The value of this production makes up about 2.4 % of the state GDP or some 10% of the GDP produced from the agriculture and forestry sectors. This fish production is projected to increase annually by 10% in the next 3 years. The bulk of this increase will come mainly from fish production from deep sea fishing operations.

Prior to the EEZ claim of 1984, the expanse of Malaysian fisheries waters was only 47,000 square nautical miles but since then has increased to 160,000 square nautical miles. The portion of the deep-sea fisheries waters contiguous to Sabah's coast is in the region of 25,000 square nautical miles.

Deep Sea Fisheries

Deep sea fishing operations were already being carried out in Sabah in the early 1960s but these became active only about the mid-1980s (Sabah Government 1998). Deep sea fisheries have seen major developments in the last 3 years. Although before this there have been fishing activities beyond the 30 nautical mile-limit, these have been using mainly traditional gears (especially hooked gears) which are inefficient and of low economic viability and thus not considered as true deep sea fishing operation.

Landings: Deep-sea fish production accounted for about 30% of the total fish landings in Sabah. The main types of fish landed are the shoaling pelagics such as tuna, rumahan, selar, cencaru, etc.

Vessels: Most of the deep-sea fishing is carried out by vessels of 50 GRT and bigger. There are 8 licensed deep-sea fishing vessels over 70 GRT in size, operating close to the 30 nautical mile limit. Only 4 bigger vessels (100 GRT or more), that can operate far out in the 200-mile EEZ, operate off the West Coast. There used to be similar fishing operations in the EEZ near Semporna but these have since been scaled down or entirely stopped.

Gear: The primary and effective gear used in deep-sea fishing is the purse seine. Traditional gears (especially hooked gears), which were used in the 1960s, are inefficient and of low economic viability and thus not considered as true deep sea fishing operations.

Licenses: Presently, there are 20 licenses for deep sea fishing but only 7 have started operation. Licenses are given to vessels weighing 70 GRT or larger. However, there are also many unlicensed vessels, weighing less than 70 GRT that are fishing in this zone.

Fishermen: Deep-sea fishing is a large commercial venture. Foreign skilled workers are operating off-shore operations.

Coastal Fisheries

At present fishing activities in the state are concentrated with the 30 nautical mile limit and thus Sabah's fisheries may be termed as predominantly coastal. For coastal fisheries, trawling continues to be the mainstay activity (Sabah Government 1998). Although finfish trawl fisheries is significant, in terms of value, the prawn fisheries is a large contributor. In 1997, most of the 7000 tons of prawn productions were exported, earning a value of RM135 million. This represents 65% of the total export value of marine fisheries products.

Landings: In 1996, the total fish production from marine capture was 167,000 MT (Table 5). Of these, commercial gears contributed about 70 % (117,427 MT) of the total marine fish landings. The bulk of the commercial landings were contributed by 25-40GRT trawlers (24% of total marine landings), bottom gillnets (10%) and 10-4 GRT purse seiners (9%). Landings from traditional gears which represent 27% of the total marine fish landings were mainly contributed by hook & line (hardlines contributed 10% of the total marine landings), bagang (static liftnet) (7%) and selambau (active liftnet) (4%).

Table 5. Marine Fish Production and Projection for Sabah, Malaysia (1995-1999)

Production	1995	1996	1997	1998	1999
Quantity (Ton)	180,000	167,000	175,300	183,000	191,000
Value (Million RM)	583	509	530	543	583

Vessels: The number of vessels appears to increase every year. In 1997, there were approximately 9,100 fishing vessels that are less than 60 GRT in size and nearly all of these operated in the coastal zone. Of these, it is estimated that there were more than 7,127 artisanal fishing crafts that are less than 5 GRT in tonnage. It is estimated that there were 9,154 fishing vessels plying Sabah fisheries waters in 1997. Of these 20% were in the non-motorised category and approximately another 50% were powered by outboard engines. The breakdown of the numbers of these vessels by tonnage are as follows: less than 5 GRT - 7127; 5 to 10 GRT - 797; 10 to 20 GRT - 750; 20 to 40 GRT - 406; 40 - 70 GRT - 61.

Gear: Demersal fishes and prawns were caught with gears such as gill-drift nets, hooked gears, bubu and traps in Sabah before trawling was introduced in the early 1960s. Five years after the trawling was introduced, there were 350 trawlers (which produced some 25,000 tons of prawns and demersal fish). By 1992, the number of trawlers has increased to 1,548 units.

The other most commonly used licensed gears in coastal fisheries are gill-drift nets, hooked gears, lift nets (bagang and selambau), and seine nets (including purse seines). There are many unlicensed gears of the traditional types such as rambat, bubu, hook and line and near-shore gill nets currently being operated.

Licenses: Licenses are issued to vessels and gears. Un-motorized vessels are generally not licensed.

Fishermen: The number of full-time fishermen in Sabah employed in the marine capture fisheries industry in Sabah is in the region of 20,000 persons. Of these, commercial operators number about 30% while the rest are artisanal fishermen and small-scale operators. The number of part-time fishermen is unknown. The majority of the artisanal fishermen are found in Semporna, Sandakan-Beluran, Tuaran-Kota Belud and Tawau.

Fishing areas

Coral reefs: The coral reefs of Sabah, found mainly in the east coast, support a fishery (Sabah Government 1998). Coral reef fisheries contribute from 7.08 % to 11.50 % of total marine fish production during the period 1980-1993. This is equivalent to RM \$ 3.30-RM 5 M.

Fishing grounds: The bays in Sabah are important fishing grounds for prawns and demersal fishes since the 1960s. These are (i) Marudu Bay, near Kudat, (ii) Labuk Bay, near Sandakan, (iii) Darvel Bay, off Lahad Datu, and (iv) Cowie Bay, near Tawau, and (v) Brunei Bay. Trawling is done mainly within the 3 nautical mile-belt. Based on the number of fishing boats, the principal fishing grounds are near Kudat-Kota Marudu, Sandakan, Tawau, Semporna, Kota Kinabalu and Kota Belud. On the West Coast of Sabah, the trend now of finfish trawl fisheries is towards undertaking fishing operations around the outer reaches of the coastal fisheries zone.

Potential Yields

Catch of deep-sea fisheries: This fish production is projected to increase annually by 10% in the next 3 years (Sabah Government 1998). The bulk of this increase will come mainly from fish production from deep sea fishing operations.

Yield of deep-sea fisheries: The marine fisheries resources of the waters of Sabah have an estimated potential yield of 251,500 MT. The coastal waters of Sabah have about 112,000 MT of demersal fish resources while pelagic stocks may make be about 40,000 MT. Table 5 shows the marine fish production and projection (1991 – 1995).

Deep-sea resources are estimated to be 139,500 MT and comprised of the about 68,000 MT pelagic fishes and about 11,000 MT demersal fishes which are commercially exploitable. The above figure is definitely an underestimation because the resources of the deep seas off the East Coast of Sabah, especially the Semporna waters, have not been included. (No data are available about the resources there because there had no stock assessment work done so far.) However, fish landing reports from the few fishing vessels operating in this area revealed that this place is rich in tuna and other deep-sea pelagic fishes. Trial fishing done around the Terumbu Layang-Layang area off the west coast of Sabah indicated that some 50,000 MT of pelagic fishes (especially tuna) can be exploited in an area of 35,000 square nautical miles around this area (including Sarawak's portion of the EEZ).

Prior to the EEZ claim of 1984, the expanse of Malaysian fisheries waters was only 47,000 square nautical miles but since then has increased to 160,000 square nautical miles. The portion of the deep-sea fisheries waters contiguous to Sabah's coast is in the region of 25,000 square nautical miles.

Catch of coastal fisheries: Coastal fisheries are mainly the catch of prawns and finfishes from trawlers. The production from the prawn trawl fisheries amounted to 7,964 MT in 1992. By the mid-1980s, coastal fisheries saw an increase in finfish trawl fisheries and at present this fisheries has become just as economically significant as the prawn fisheries.

Yield of coastal fisheries: The yield of coastal fisheries has yet to be estimated.

Consumption and Processing

Consumed: Based on the national average consumption of 35 kg per person, Sabah's population consumes about 50,000 MT of fish (Sabah Government 1998).

Processed: About 60,000 MT of fishes are processed. In the past, processed fish were solely dried/salted fish but in the last few years, downstream processors have diversified to semi-processed fish (de-headed, scaled, gilled and gutted) and value-added fish products such as fish fillet, shark's fins, surimi, katsuobushi and fishmeal. Also, apart from fish and prawns, processors have processed squids and octopus (cephalopods, whole, cleaned or fillet), jellyfish, slipper lobsters and coral lobsters.

Facilities: There are about 40 processing plants of various size and capacities in Sabah. 20 are primarily prawn-processing plants. Most process prawns and demersal fishes. 6 plants process food fishes for the markets and the by-catch into fishmeal.

Export: The major foreign markets for fish and fish products are Brunei, Philippines, Japan, Singapore, Hong Kong and Taiwan while the secondary markets are in Europe, Australia and USA. A substantial volume is also sold to Peninsular Malaysia. Fish products are exported to trading houses, importers, reproducers, canneries and wholesalers while a small amount is sold directly to suppliers of restaurant or supermarket chains. Fisheries exports and projection for 1995-1999 is shown in Table 6.

Quantity: The overall quantity and value of fisheries exports were 35,960 tons with a wholesale value of RM216 million in 1996. This compare favorably with the 26,930 tons exported (value RM147 million) in 1992. In 1996 this accounted for a trade surplus of roughly RM223 million. Prawn exports contributed 50 % or more of the yearly total export of fishery products. In 1996, prawn exports amounted to 8,771 MT and accounted for slightly less than 50% of the wholesale export value. In the same year fresh, frozen and chilled fish exports totaled about 10,030 tons worth about RM13 millions while the live fish export trade raked in about RM19 million and live lobsters about RM3.5 million. The other significant exports are fishmeal, seaweed products and brined, salted or dried fish.

Revenue: The export of fish and fish products from Sabah was already a million-ringgit business in the late 1950s and by the time of the boom of the prawn trawl fisheries in the early 1960s Sabah had become a net value exporter of fish. The overall quantity and value of fisheries exports were 35,960 MT with a wholesale value of RM216 million in 1996. This is more than an eight-fold increase from the 4,219 MT recorded 1985.

In 1997, the export of prawns was valued at about RM135 million (7,000 tons) while the fresh and frozen fishes at RM 16 million. The live fish export trade earned about RM19 million and live lobsters about RM3.5 million. The other significant exports are fishmeal, seaweed products, and brined, salted or dried fish.

Table 6. Fisheries Exports and Projection for Sabah, Malaysia (1995-1999)

Export	1995	1996	1997	1998	1999
Quantity (Tons)	28,000	35,000	35,960	38,000	41,000
Value (Million RM)	175	210	216	228	246

Trade/Import

Live fish trade: The live products export trade started in the early 1980s with the advent of the export of breeder tiger prawns to Taiwan (Sabah Government 1998). These prawns were exported for the hatcheries and it was a lucrative business. The export of breeder prawns was banned in 1985 by which time the live food fish export trade picked-up. The live fishes exported include greasy grouper, spotted

coral grouper, trevally, seabass and red snapper. The majority of these live fishes were exported to Hong Kong, Singapore and Taiwan. In 1997 about 400 MT of live fish (including lobsters) was exported.

Imports: The fisheries imports of Sabah for the 1996 period totaled some 36,702 MT with an estimated value of RM37.5 million. The import of non-processed fishery products into Sabah is a small volume at 1,100 M. The products, which were mostly highly valuable chilled fishes (kurau, bawal, tenggiri, senangin, etc) and prawns are mainly from Indonesia and are mainly for in-state processing and re-export. Of the processed imports, canned fish products are mainly sardines, mackerels and tunas.

Information Issues

Catch statistics: The catches of fisheries are considered an underestimation and it is necessary to know the accuracy of the statistics for a better estimation of exploitation rates (Sabah Government 1998). Nevertheless, statistics on catches from 1981 to present are available. These time series data remains to be analyzed, as was done for coral reef fisheries, to know the trends in the catches and yields of the fisheries.

Number of vessels in the deep-sea: The numbers of vessels operating in the deep-sea zone is 7, although an indeterminate number are comprised of small vessels.

Live fish trade: Catch of coral reef fishes for the live fish trade is limited.

Number of fishermen: The number of full-time fishermen is an underestimation. It is believed that a greater number are illegal immigrants. Likewise, the number of part-time fishermen involved in coastal fisheries is unknown.

Effort: Estimates of effort based on number of boats are considered an underestimation. As such, exploitation rate is likewise underestimated. This need to be noted by resource managers.

Issues

Coastal waters and fisheries: There are many issues raised in developing the fishing industry in Sabah (Makajil, 1995). Only those pertaining to coastal zone management are outlined below:

Environmental issues: The resource base of fisheries are threatened by various activities; the coral reefs by destructive fishing practices and mining; the mangrove forests, seagrass beds, and coastal wetlands by developments along the coasts. In particular, dynamite fishing has resulted to damaging 90% of coral reefs surveyed by the University of Malaysia at Sarawak. In addition, the exploitable populations are also affected by chemical pollution and increased sedimentation. Protection of these ecosystems and living resources are urgently needed.

Operation of fishing vessels from Peninsular Malaysia and BIMP-EAGA: There is a need to monitor the number of vessels and catches of out-of-state vessels to monitor the exploitation and to manage the stocks. It was suggested that joint operation of vessels by local operators and permission to land catches in local facilities would allow close monitoring and provide significant economic spin-offs. However, this will require careful planning to avoid environmental threats (in terms of oil and organic pollution, solid waste).

Inadequate fishing infrastructure: Landing facilities are inadequate or absent in major fishing areas such as Sandakan, Semporna, and Kudat. Onshore services are available in Kota Kinabalu, Sandakan, Tawau, Semporna, Lahad Datu, and Kudat. In other areas, these services are either inadequate or poor. Clearly,

with the increasing fishing fleet and maximise the economic benefits from the fishery, there is a need to build fish landings, processing plants, and slipway facilities onshore. The construction of these facilities should be built with proper planning.

Illegal immigrants in Sabah: The long-standing and pressing issue on the illegal immigrants in Sabah needs a comprehensive and effective solution and must not merely be shouldered by the security forces (New Straits Times, 2014). Director-General of Eastern Sabah Security Command (ESSCom) Datuk Mohammad Mentek said efforts to contain the influx of illegal immigrants would not be fruitful, unless there was full cooperation from all parties. "We need to tackle this problem as a whole and provide for a long-lasting and effective solution," he said at a security briefing to Sabah Fishermen Association (Pengasah), here today.

Sabah fishermen fishing illegally in Borneo: Fishermen in Borneo are calling on the authorities to stop foreign fishermen coming from Sabah from fishing in the state's waters off the coast here (Abdullah, 2014). These foreigners not only have no fishing permits but use illegal fishing methods, Jamali Basri chairman of Miri Fishermen Association said during their last annual general meeting on March 2, one of the resolutions brought up was to call on the authorities to stop foreign fishermen from Sabah fishing and living illegally here. "We have sent a letter to the Maritime Agency and Immigration Department on the problem faced by local fishermen but no action has been taken as of today," Jamali said. He said it was unfair for local fishermen depending on fishing as a sole income to compete with foreigners who took advantage of the lack of enforcement in the state. Jamli said he had received several reports from local fishermen that foreign fishermen from Sabah were fish-bombing at a coral reef between Niah and Suai.

Evaluation of TEDS for Sabah fishermen: Marine turtles are integral components of the Sulu-Sulawesi marine ecosystems, and provide tangible eco-tourism related services as well as supporting cultural and traditional values (Pilcher, 2009). Marine turtles also possess, through their charismatic qualities, an ambassadorial value to wider conservation issues. The conservation of marine turtles is thus a critical step in promoting conservation of the wider Sulu-Sulawesi Marine Seascape. Turtles are currently being decimated indirectly through mechanized fisheries, at an alarming rate – recent estimates in Sabah alone project mortalities of upwards of 2000 to 3000 animals per year (Pilcher et al. 2009). The reduction of mortality in fisheries, particularly trawl fisheries, is thus a top priority. Work on the introduction of Turtle Excluder Devices (TEDs) in Sandakan has been ongoing now since 2007 through the Marine Research Foundation and the Sabah Department of Fisheries, primarily dealing with awareness and pilot trials, and this project contributes towards this effort. This work was funded initially by the GEF Small Grants Programme (SGP) Malaysia and continues now with support from CI Philippines. Following the outcome of the WTO trade issues and the US requirements for compliance with P.L. 101-162 with regard to TEDs and shrimp trawling operations, this project was developed to evaluate the use of TEDs in Sabah, Malaysia in such a manner as they did not conflict with fisher needs and income generation capacity. The project is now implemented by the Marine Research Foundation and the Sabah Department of Fisheries, with the blessing of the Sabah Fishing Boat Owner's Association, to evaluate the effects of TEDs installed on Malaysian trawlers on catches. Bycatch reduction and turtle conservation, and to investigate the obstacles that might arise in their use, and enforcement of their use in Sabah trawl fisheries. Project designed to develop awareness and participation amongst fishers in Sabah, Malaysia of the value of TEDs in conserving sea turtles.

SUMMARY TRENDS, ISSUES, & DEVELOPMENTS RAISED DURING INTERVIEWS

- Overfishing and overcapacity are the major perceived issues contributing toward observed declines during the past few decades in catch rates.
- Concerns regarding the long-term financial viability of capture fisheries due to lack of consistent supply of raw materials being landed, despite growing domestic and foreign demand.
- Concerns from commercial operators with increasing competition from artisanal fishers.
- IUU fishing, particularly by illegal migrants, is perceived as a major problem that has led to increased competition and at-sea conflict between (typically less technologically sophisticated) Indonesian fishers and (typically more technologically sophisticated) foreign fishing vessels.
- Increasing concern regarding the perceived increase in piracy and conflict/violence at sea. This is particularly true for eastern Sabah, where kidnappings and murders of tourists and fishers during recent years has led to national government intervention through the establishment of the Eastern Sabah Security Zone (ESSZ) with increased maritime security presence and operations. Commercial fishery stakeholders report that such efforts are insufficient to curb a declining security situation.
- Increasing concern regarding contribution of foreign fishing vessels to the illegal shipment of small arms and trafficking of humans. Related to this is increased concern of radical, ideologically-driven foreign intrusions into and violence within Malaysian waters.

[Anonymous summaries of responses offered by participating Malaysian (Sabah) stakeholders through the interviewing process can be found in the Appendix.]

3.4.6 Private Sector Profiles

List of companies and associations

a. Sabah Fishermen Association (Pengasah)

Chair – Encik Jaini Ating

Lot 38, Tingkat 1, Ruang Grace 2,

Jln. Sembulan Pantai,

88100 Kota Kinabalu

Tel & Fax : 088 240400

State Fishermen's Association: <http://www.lkim.gov.my/sabah.html>

National Fishermen's Association: http://nekmat.com/BI_version178/BI_index5.html

b. Gabungan Persatuan Perikanan Dan Kapal Nelayan Sabah (Sabah United Fisheries and Fishing Boat Association)

1st Floor, Block G, Lot 6,

Shoplot No 14, Phase 10^o,

Taman Seri Kepayan Ridge,

88200, Kota Kinabalu

Or,

TB451, Blok L, Lot 6, Tingkat 2,

Bandar Sabindo, Peti Surat 60664,

91016 Tawau.

Chair : Arsani Hj. Arsat (013 8861944)

Fax: 089 773336

c. Kiang Huat Seagull Trading Frozen Food SDN. BHD.

Mr. Hing Chiau Chin
Jln. Tombovo, Off Km 14,
Kg. Meruntum-Lembising, Putatan,
88858 Kota Kinabalu.
Tel: 088 761200 / 762130
Fax: 088 764780

d. QL Marine Products SDN. BHD

Mile 6.5, Off Jln. Tuaran,
P.O box A158, Inanam,
88450 Kota Kinabalu.

Tel: 088 791833
Fax: 088 421943

<http://www qlmp.com.my/index.html>

QL Marine Products Sdn Bhd is a subsidiary of QL Resources Berhad , listed on the Main Board of Bursa Malaysia Stock Exchange (KLSE) that specializes in upstream and downstream processing of surimi, fish fillet and fishmeal. The company's surimi production maintains high quality control system in accordance to the requirements of recognized certifications such as Good Manufacturing Practice (GMP) and Hazard Analysis Critical Control Point (HACCP). Every production goes strictly under the microscopic monitoring system of the company's Quality Control department. Its surimi export markets span across Japan , Korea , Singapore , United States , Taiwan , Australia , and Philippines.

Based in Kampong Bolong, in the district of Tuaran, Sabah, the company is notably the biggest Surimi producer in Asia and a leading fishmeal manufacturer in Malaysia commanding 25 percent of the national production. The company has a fleet of ten fishing trawlers that go out for fresh catch at two locations namely the South China Sea off the West Coast of Sabah and the Sulu Sea off the East Coast side.

Aside from sea fishing, QL Marine Products Sdn Bhd also purchases fish products from all the major landing ports in Sabah in order to meet its huge customer demand. It also operates in own private jetty in Sepanggar. With years of experience in marine-based industry, the company guarantees high quality products and complies strictly with international standards of quality control.

e. Atlantis Super Shrimps

TB2971, Sedco Light Industrial Estate
Tawau, Sabah State: (91000)
Telephone: +0 +6019-8817319
Fax: +0 +6089-915633

f. Asian Fisheries Society

Asian Fisheries Society
c/o Laboratory of Marine Biotechnology, Institute of Bioscience
University Putra Malaysia
43400 UPM Serdang,
Selangor, Malaysia
Ms. Jocyntha Joseph, Executive Officer
Email: info@asianfisheriessociety.org
Phone: +603-8947 2216
Fax: +603-8947 2217
<http://www.asianfisheriessociety.org/index.php>

The Asian Fisheries Society (AFS) is a non-profit scientific society founded in 1984 by fishery professionals in Asia. The society aims at promoting networking and co-operation between scientists, technicians and all stakeholders involved in fisheries (including aquaculture) production, research and development in Asia. Its ultimate objective is to enhance food security and income generating opportunities for fisheries workers via sound management practices, environmentally sustainable development and efficient utilization of the aquatic resources. More information on the objectives, highlight, past and present activities of the Society are given in the subsequent sections.

3.5 Myanmar

The following marine capture fisheries profile is based on FAO Fisheries and Aquaculture Profile for the Philippines last updated in 2006 (FAO 2006).

MYANMAR FISHERIES PROFILE SUMMARY

- Fishery primarily inshore; offshore boats foreign owned
- 300 exporters and processors; 60% in Yangon
- Export markets are Japan, China, Thailand, Singapore, Malaysia
- Myanmar Fisheries Federation (MFF) is the highest national level non-profit organization with a mandate to encourage, support and promote the development of the seafood sector. Furthermore, the MFF is responsible for bridging the gap between the policy makers at the DoF and the seafood sector. It has its head-quarters in Yangon and regional and local offices throughout the country. The MFF consists of a number of associations that represent stakeholders from all seafood sectors.

3.5.1 Production Sector

Overview

The marine capture fishery comprises coastal or inshore fisheries, and offshore or deep-sea fisheries (FAO, 2006). Various types of fishing gear are used to exploit the large diversity of marine species found in Myanmar waters. The fishing gear is classified into commercial, such as trawl net, purse seines, driftnet and gillnet, and traditional, including hook-and-line, cast net, bag net, trammel gill net, lift net and traps. However, the bulk of landings derive from trawls, purse seines, drift nets and gill nets. There were 29,791 inshore fishing vessels and 1,757 offshore fishing vessels licensed by DoF in 2004–2005, compared with 29,861 and 2,121, respectively, in 2003–2004. In 2011 inland capture fisheries contributed 1.15m (27%) tons and marine capture fisheries 2.15m (52%) tons to the total seafood production.

The challenge for the country is to manage its fisheries in such a way as to ensure optimum and sustainable use of aquatic resources, as well as economic efficiency in their use and ensuring transfer of benefits in social terms. Myanmar has formulated a fishery development policy that respects national and international agreements and the conditions and nature of the resources. One of the goals of fisheries management is to achieve sustainable coastal fisheries. To achieve this goal, various management strategies have been formulated and implemented to control fishing effort and to promote rehabilitation and conservation of marine resources and marine ecosystems.

Catch profile

In 2012 Myanmar will produce almost 4.5m tons of seafood, which is more than Thailand (4.2m tons). The main source is marine capture fisheries (52 percent) but inland capture fisheries (28 percent) and aquaculture (20 percent) are also important sources.

Although landings are currently declining, the marine fisheries resources potential is high and a wide variety of commercially interesting species including white pomfret, ribbonfish, pink shrimp, sea eel, Hilsa and Croaker are captured by small-scale and commercial fishing boats and vessels.

Landing sites

The main landing sites are around Yangon, at Pazuntaung Nyaungdan and Annawa for landings, with a fish market at San Pya in Alone township. Other major landing sites are found along the coast, at Thandwe, Mawlamyine, Myeik and Kawthoung.

Fish landings in Myanmar are well organized. Each boat has a registration number from the DoF and is allocated to one specific fish landing site (or jetty). These landing sites are located throughout the country where fresh water and marine fish are landed. Capture fish are sold through an auction system at the jetty.

Currently only three landing sites have been approved by the EU, two for marine capture fisheries and one for inland capture fisheries. These landing sites are located close to Yangon and organize the landing and marketing system according to EU food safety standards. The fish landed here is auctioned per product per boat. The Yangon office of the DoF issues Product Movement Documents (PMDs) that include the species, fishing vessel, fishing ground, landing site, etcetera. With a PMD, exporters can comply with traceability and Illegal, Unreported and Unregulated fishing (IUU fishing) regulations.

Fishing Practices and Systems

Marine capture fisheries in Myanmar can be divided in small-scale inshore and offshore marine fisheries. In 2011 there were 28,350 small-scale fisheries boats registered by the DoF of which 15,100 (53%) were non-motorized. In addition, there were 2,450 offshore vessels of which 400 (16%) were owned by foreigners. The off-shore vessels mainly use the following fishing catching methods: trawling (41%), driftnet (32%) and purse seine (7%).¹³ Interestingly, while other countries try to diversify their trawling fleets with longline vessels which are more suitable and more sustainable for catching yellow fin tuna, Myanmar currently has only one vessel that is equipped with longline technology. Although there are a few purse seine vessels, tuna catches are limited.

Trawl fisheries: Otter bottom trawl nets are the main gear for demersal finfish and penaeid prawns. The trawl fishery contributed more than 40% to marine landing in 2002–2003. The trawlers landed a large number of fish species. When demersal species were still the main catch, the trawl nets caught pelagic finfish, mainly the short (Indo-Pacific) mackerel (*Rastrelliger brachysoma*). This resulted in the Indo-Pacific mackerel being caught mainly by bottom trawl nets. Penaeid shrimps are important for trawlers operating in inshore waters, particularly on the coast of Rakhine. They are the mainstay of the trawl fishery by virtue of their high commercial value and market demand. The rapid development and concentration of the trawl fishery within coastal waters has result in the current intensive exploitation of the coastal demersal finfish and penaeid shrimp resources. There were 21 offshore fishing vessels and 13,452 inshore fishing vessels operating in Rakhine state in 2004–2005, between 1 September 2004 and 4 May 2005.

Purse seine fishery: The purse seine is a major fishing gear, used to exploit the pelagic fish resources. The two main types of purse seines nets employed in Myanmar waters are the fish purse seine, which is used to catch small pelagic species, and the anchovy purse seine, for anchovies in coastal waters, especially in the northern sector of Rakhine state. The fish purse seine nets are operated in a traditional manner, without fish aggregating devices (FADs). Catching efficiency of this gear has not improved through the years. There are no new fishing techniques to increase fishing pressure on stocks of small pelagic species. Most purse seiners have a skipper with expertise in seeking out fish schools relative to the “fish

lures”, and at night, free-school scouting purse nets using lights. The purse seine fishery mainly harvests small mackerels and sardine species, such as *Rastelliger* spp. and *Sardinella* spp.

Anchovy purse seines: Anchovy purse seines nets are operated in very shallow waters and target mainly anchovies of the genus *Stolephorus*. No landing data are available. The fishery is important, particularly along the northern coast of Rakhine. Post-harvest techniques are primitive, relying on sun-drying on the shore.

Driftnet and gillnet fishery: Driftnet and gillnet are also important in coastal fisheries, and used selectively. The finfish drift net and gillnets mainly target higher valued commercial pelagic fish species, although the gillnets set by coastal fishermen mainly catch demersal fish species like marine catfish and jewfish. The shrimp drift and gillnets are actually trammel gillnets, and are employed to catch the more valuable species of shrimp, like *Peneaus merguensis*.

Main resources

Myanmar is the largest country in main land Southeast Asia comprising a land area of over 676,577 square kilometers. It shares a common maritime boundary with Bangladesh in the north-east of the Bay of Bengal and with Thailand and India in the Andaman Sea which is a part of the Bay of Bengal. Myanmar’s continental shelf covers approximately 230,000 km² with a relatively wider portion in the central and southern parts. The Exclusive Economic Zone (EEZ) is about 486,000 km². The coastal zones of Myanmar can be subdivided into three main areas, namely Rakhine Coast, Ayeyarwady Delta and Tanintharyi Coast. Many rivers flow into the coastal zones such as the "Mayu" and "Kaladan" rivers in the Rakhine Coastal area: the "Ayeyarwady", "Sittaung" and "Thanlwin" rivers in Delta coastal area and the "Ye", "Dawai", "Tanintharyi" and "Lenya" rivers in the Tanintharyi coastal area.

Coastal and marine ecosystems, such as mangroves, coral reefs, seagrass beds, estuaries, upwelling areas, and migratory route areas for marine organisms, play a prominent role in the productivity of coastal and marine waters, biogeochemical cycling, and geomorphological stability of the coastal zone. More than 2000 kilometers of the southwestern land boundary of Myanmar interacts with seas and thereby creates very complex ecological and socio-economic systems, which make administration and resource management relatively more difficult than proper mainland areas. Coral reefs, seagrass beds and mangrove flourish are mainly in the Myeik archipelago. Estuaries and mud flats are common at the Ayeyarwady delta while beach and dunes occur throughout the coastline.

Management applied to the main fisheries

The government of Myanmar aims to develop the seafood sector further because it recognizes its significance for local food security, poverty alleviation and the potential contribution to foreign exchange earnings. The primary objective is to increase seafood production for domestic consumption and to export the surplus to overseas markets. The main focus for the further development of the seafood sector is marine and freshwater aquaculture, as production from capture fisheries is declining.

The Ministry of Livestock and fisheries is responsible for regulating and supporting the seafood sector. All responsibilities are appointed to the Department of Fisheries (DoF). The DoF employs a total of around 1,800 staff members and is organized into five divisions. The most important division for seafood exports is the division for fish inspection and quality control. DoF has also entered into several joint ventures with the private sector (both local and foreign companies) for fisheries operations.

DoF has established an appropriate legal framework and formulated and implemented various strategies for the sustainable development and management of marine fisheries. Fisheries management is pursued by proper licensing, prescribing exploitable species, designating environmental friendly fishing gears and methods, imposing closed areas and seasons, etc.

Myanmar's marine fishery activities consist of three distinct fishing zones namely, onshore, inshore and offshore. From 1994-1995, the Department of Fisheries regulated the onshore area as inshore fisheries of marine fisheries according to the Myanmar Fishery Law. The inshore area starts from the lowest tide level to about 8 fathoms in depth (approximately 5 –10 miles from shore). As for the offshore fishing management, DoF had divided the Myanmar coastal line into 140 fishing grounds of 30x30 nautical miles block by using latitude and longitude lines and designated 4 fishing areas, such as Rakhine, Ayeyawady, Mon and Tanintharyi, which encompass 40,44,14 and 52 blocks respectively. The offshore areas are described the zone from 8 fathoms-line and beyond.

Fishermen communities

Most of fisher communities are located along the coast, and includes significant numbers of poor and vulnerable people and a high proportion of people dependent on fisheries activities and aquatic products for income and food security. The development of coastal fisheries and coastal aquaculture is quite limited, but already the livelihoods of perhaps several thousand of people are directly and indirectly involved in the fishery sector.

3.5.2 Post-Harvest Sector

Fish Utilization

Seafood exports consist mainly of higher value products such as Black tiger prawn (*Penaeus monodon*), Giant freshwater prawn (*Macrobragium rosenbergii*), pangasius (*Pangasius Hypophthalmus*), tilapia (*Oreochromis niloticus*) and sea bass (*Lates calcarifer*).

According to the Department of Fisheries (DoF) there are more than 300 exporters, of which 120 are seafood exporters with processing and cold storage establishments. More than 60% of the processing and cold storage establishments are located in Yangon. The others are located across the country close to the main fish and shrimp landing sites in Rhakine (7), Ayeryawady (6), Mon (7), Shan (1) and Thaninthayi (20). At this moment only thirteen processing establishments have an EU approval number. The seafood sector currently does not reach its full potential as a result of a variety of technical, political and financial constraints that result in a weak competitive position of primary producers, processors and exporters in the global seafood market.

After an EU inspection in 2009, Myanmar lost its approval for exports to the EU. Only in 2010, after new EU inspections, Myanmar regained approval for the exports of captured seafood products. However, until now the EU-approved processing establishments cannot export aquaculture products to the EU. To get this approval the DoF is currently developing its 'National Plan for Monitoring of Residues of Veterinary Medicine and Environmental Contaminants'. The EU and the ADB (Asian Development Bank) are supporting the DoF to develop this plan, to train staff and to improve the infrastructure of the EU-accredited lab which has to issue export certificates for aquaculture products. It is expected that Myanmar might regain approval for the exports of aquaculture products after the upcoming EU inspection of the Department of Fisheries in 2013.

In 2008 there were about 43 EU-approved processing establishments. Currently, only 13 of the processing establishments have applied for re-approval for exports to the EU. In 2008 there were EU-approved processing establishments in Rhakine (2), Ayeyarwady (1) Yangon (35), Tanintharyi (5). Currently, all EU-approved establishments are located in the industrial zones of Yangon (12) and in Ayeryawadda (1). The number of workers in the factories varies between 250 and 1,000. In general, shrimp exporters have more workers than fish exporters.

Fish Markets

The main wholesale fish markets are located in Yangon, namely Sanpya Fish Market, Pazuntaung Naungdan Fish Market and Annawa Fish Market. There are others in the states and divisions. Lower value fish is marketed mainly on the local market.

3.5.3 Socioeconomic Contribution of the Fisheries Sector

Role of Fisheries in National Economy

The fishery sector in Myanmar is the fourth largest exchange earner after agriculture, timber, and minerals.

Demand and Supply

The coastal waters of Myanmar have been heavily exploited since the introduction of trawling in the 1970s. Several signs of over-fishing are visible and there is considerable concern, particularly because of demand for fish for local consumption and because the vast majority of fisherfolk are artisanal fisherfolk dependent on coastal waters for their livelihood.

Food Security

Seafood is the main source of animal protein and an important part of the local diet. In 2011, the average supply of fish per capita (total fish supply – non-consumptive use of fish) was 51 kg and this figure is increasing steadily. This is much higher than the world average, which according to FAO was 18.8 kg in 2010. The fisheries resources of Myanmar can play a crucial role in the production of food, improvement of income and generating of employment.

Trade

In 2011 international trade data only show seafood exports of around USD300m, while the DoF reports total seafood exports of USD653m or 387,000 tons. Fish accounted for USD396m (61%) and 283,500 tons (73%), shrimp accounted for USD86m (13%) and 18,000 tons (5%) and other products like crab and sea eel accounted for USD171m (26%) and 85,500 tons (22%). The difference in the figures is likely to be caused by border trade with Bangladesh, India, China and Thailand) that is not fully reported by the DoF.

Seafood products are exported in various forms. The largest part is exported chilled through border trade for the regional market. Smaller volumes are exported in frozen form. If the products are frozen, large-size shrimp is generally packed IQF while small-size shrimp is generally block frozen. Frozen fish is mainly exported as whole gutted fish and in some cases also as fillet products.

Although some of the fish that is exported is only interesting for the intraregional trade and expat communities around the world, there are also many products (like pomfret, ribbon fish, croaker, tilapia,

Indian carp, and various shrimp species) that have a large demand in high value markets in China, Japan, Australia, the EU and the US.

China and Thailand are by far the most important trading partners for Myanmar. However, other markets are increasing in relevance. While shrimp exports are mainly oriented towards Japan which accounts for almost one third of total shrimp exports, fish exports are more targeted towards the Middle East. Besides Saudi Arabia and Kuwait, also Jordan, Dubai, Bahrain and Qatar import fish from Myanmar. It is important to realize that there are signals that part of the products are exported through border trade is processed and re-exported from Thailand, China and Bangladesh. Now sanctions from the EU and

Shrimp is the most important fisheries export. Although no data is available with the breakdown of products, shrimp may account for nearly 50% of the total value of fishery export. Recently some marine fish such as barramundi (*Lates calcarifer*), red snapper, Chinese pomfret (*Pampus spp.*), and hair tail have been exported, Australia being the principal market. Frozen shrimp are exported mainly to Hong Kong and the United States and dried shrimp to the Far East. According to DoF, the value of fisheries exports reached US \$95 million during the April-May 1999-2000 against total exports of US \$ 828 million. This is a result of increased harvesting of brackish water shrimp. Privatization of processing plants and the marketing system has also been a major stimulating factor in seafood exports. Most of the products are exported through the port of Yangon.

Employment

The seafood sector employs approximately 3 to 4 million people.

Rural Development

In many rural areas poor roads and a lack of electricity make the storage and transportation of fisheries products difficult.

3.5.4 Trends, Issues, and Developments

Thirty years ago there were only a few local boats fishing off the waters around Burma. In the late 1980s the then military government started to sell fishing permits to foreign companies. In the last fiscal year the government earned an estimated US\$12 million from selling these permits. Htan Htun, vice chairman of Myanmar Fishery Federation (MFF), said that the unchecked and unregulated fishing industry has caused fish stocks off the coast of Burma to fall dramatically. "There may be more than a thousand foreign fishing boats, operating legally and illegally. The local boats also increased. So the resources reduced," he said. No one knows the extent of overfishing on Burma's coastline, or what damage to marine life has been done. However, there could be hope on the horizon for local fishermen. In an attempt to ease overfishing, earlier this month Burma banned foreign fishing vessels from its waters. Burmese fishing companies also have to reduce their operations by 35 percent during April and May to allow fish stocks to replenish. Enforcement of the new rule is something only the government can ensure.

The seafood sector in Myanmar has a large potential to contribute to food security, employment and economic development. Natural resources are widely available and fisheries are an important source of income and animal protein for the domestic population. Some products, like Indian Carp and Hilsa, are mainly aimed for ethnic minorities in regional and overseas markets. Many products, like shrimp, mud

crab and sea bass have a large commercial potential in high value markets in overseas markets. To reach its full potential many constraints at the production and export level need to be overcome. As a result of years of isolation the seafood sector is currently focused on regional markets and not comparable with seafood sectors in Vietnam, India and Indonesia. It is expected that increased exports to the EU and to the US will contribute to the modernization of the seafood sector.

The trawl fisheries are considered the most destructive. Environment degradation, especially in the estuarine regions, is also a concern. The need for managing the coastal fisheries has been recognized and several efforts have been undertaken. Licensing of vessels and banning trawl fishing within 5-mile in Rakhine and Tanintharyi Coastal Region and 10-mile in Ayeyarwady Delta Coastal Region have not been successful due to inadequate monitoring and enforcement and this need to be addressed.

A main constraint to the development of marine capture fisheries is that the DoF does not permit deep-sea fishing for Myanmar vessels, but restricts fishing activities to inshore waters. Deep-sea fishing grounds are allocated to foreign vessels that have been granted a permit by the DoF. As a result, valuable seafood products like yellow fin and skipjack tuna are landed in Thailand instead of Myanmar. Moreover, although foreign vessels are only allowed to fish in allocated fishing grounds, this is often not enforced by the coast guard and the DoF. Local fishermen complain that foreign vessels do not comply with the regulations and illegally capture large volumes of fish in inshore waters that are formally allocated to Myanmar vessels.

Myanmar could produce more from capture fisheries if it would restrict fishing activities of foreign vessels or require them to land the captured fish in Myanmar instead of in Thailand. To achieve this, policy must be reconsidered and law enforcement by the Myanmar Navy or coast guard should be strengthened. Although there are no figures available, it is likely that if all the fish is landed in Myanmar, considerable volumes of high value fish like tuna would become available and could contribute to export earnings. However, the government and private sector should then also invest in fishing technologies and fishing vessels to develop more deep-sea fishing capacity. Although there is some potential to increase catches in marine fisheries, it is likely that inland fish stocks are already fully exploited.

To reduce post-harvest losses in capture fisheries it is crucial to invest in the quality of the infrastructure along the supply chain. The quality of fish landing sites, facilities for the production of good quality ice, and the availability of transport are crucial for food safety and for the reduction of post-harvest losses. If the Department of Fisheries is able to increase the number of approved jetties, this would not only reduce post-harvest losses but also increase the volume of the products that are available for exports to the EU. This will also contribute to the sustainable management of fishery resources and long-term prospects of the seafood sector because fishing vessels that land their products at jetties are better monitored than other vessels.

3.5.5 Private Sector Profiles

Myanmar has a very strong network of sector associations headed by the umbrella organization UMFCCI, which is 'the Republic of the Union of Myanmar Federation of Chambers of Commerce and Industry'. Almost every sector has its own federation under the UMFCCI, which operates as an NGO and is responsible for representing and safeguarding the interests of the private sector. Services provided by the UMFCCI include human resources development and training, commercial courses, management and accounting, providing trade information and participation in international trade fairs.

Myanmar Fisheries Federation (MFF) is the highest national level non-profit organization with a mandate to encourage, support and promote the development of the seafood sector. Furthermore, the MFF is responsible for bridging the gap between the policy makers at the DoF and the seafood sector. It has its head-quarters in Yangon and regional and local offices throughout the country. The MFF consists of a number of associations that represent all seafood sector stakeholders:

- a. Myanmar Shrimp Association (MSA);
- b. Myanmar Fish Farmers Association;
- c. Myanmar Fishery Products Processors and Exporters Association;
- d. Myanmar Aqua-feed Association;
- e. Myanmar Marine Fisheries Association;
- f. Myanmar Freshwater Capture Fisheries Association;
- g. Myanmar Crab Entrepreneurs Association;
- h. Eel Entrepreneurs Association; and
- i. Ornamental Fish Entrepreneurs Association

MFF Mr. Han Tun Vice President fishfed.mff@gmail.com

Mr. Mya Than Tun Deputy Director, DoF myathantundof@gmail.com

All the associations have their office in the MFF building in Yangon. Each association has a representative in the board of the MFF and board members emphasize that cooperation between the different member associations is strong and that they work together to strengthen the entire seafood sector.

3.6 Philippines

The following country profile is based largely on the FAO Fisheries and Aquaculture Profile for the Philippines, last updated in 2005 (FAO, 2005a).

PHILIPPINES FISHERIES PROFILE SUMMARY

- In 2007, the fisheries sector had a total value of over US\$ 2.1 billion, accounting for 2.2% of GDP. The Philippines ranked 11th among the top fish producing countries in the world for 2007, accounting for 2.2% of global production, with production of 2.63 million tons of fish, crustaceans, mollusks and aquatic plants (including seaweed).
- Philippine fisheries industry comprises marine fisheries, inland fisheries, and aquaculture. Marine fisheries can be further divided into municipal fisheries and commercial fisheries. The principal stocks exploited in the Philippines are small pelagics, tuna and other large pelagic fishes, demersal fishes and invertebrates. Reported marine fisheries production in 2007 was 45% from municipal and 55% from commercial fisheries.
- A variety of fishing gear is used by commercial and municipal fisheries to exploit the small pelagic resources. Commercial fisheries use mostly purse seines (61.6%), ringnets (15.7%) and bag nets (12.4%). The small pelagic catch of the municipal fisheries is taken using gillnets (45.5%), hook-and-line (15.3%), ringnet (11.5%), beach seine (8.3%), purse seine (3.7%), fish corral (2.9%) and bag net (2.9%), based on 1995 statistics.
- Fish is consumed as fresh, fermented, dried, smoked or canned. Data on the disposition of catch in the Philippines are inadequate. Around 70% of the total catch is consumed fresh or chilled, while 30% is processed into cured, canned, frozen products or disposed of live. The bulk of cured fish and fishery products are consumed locally, while only a small quantity is exported as ethnic products.
- There are 7 tuna canneries – 6 in General Santos, 1 in Zamboanga; 2 Philippine owned and operated canneries in Papua New Guinea.
- The Philippines is an exporter as well as importer of fish and fishery products. In 2007, total exports of fish and fishery products amounted to 202,016 tons, valued at over US\$ 525.4 million. Leading fishery products were tuna, shrimp and seaweed. The major export destinations of tuna were Japan and the United States of America. The major export destinations of shrimps were Japan, Spain and the United States of America. The major export destinations for dried seaweed were China, France, Republic of Korea and the United States of America, while the major export destinations for carageenan were Denmark, France and the United States of America.
- For the past several years, the Philippines has been importing large quantities of pelagic species such as tuna (mainly from Indonesia).
- Commercial fishing companies are primarily located in General Santos City, Zamboanga City, Iloilo, and Navotas.

3.6.1 Production Sector

Overview

The Philippine fisheries industry comprises marine fisheries, inland fisheries, and aquaculture. Marine fisheries can be further divided into municipal fisheries and commercial fisheries. Recreational fisheries have not developed in the country.

Municipal marine fisheries operate in coastal waters within 15 km from the coastline (“municipal marine waters”), using vessels ≤ 3 GRT, as well as fishing without the use of vessels. Commercial fisheries operate outside municipal waters, using vessels > 3 GRT.

Inland fisheries operate in inland waters such as lakes, reservoirs and rivers, including estuaries. Aquaculture involves aquatic organisms in fresh, brackish and marine waters.

The Philippines ranked eleventh among the top fish producing countries in the world in 2003, with production of 2.63 million tons of fish, crustaceans, molluscs and aquatic plants (including seaweed).

As an archipelagic state with over 2.2 million km² of highly productive seas, the Philippines is fortunate to have vast fishery resources at its disposal. However, all of the country's main fish species and marine organisms are showing signs of overfishing.

Catch profile

Total volume of fisheries production in the Philippines from January to December 2011 reached 4,973,588 metric tons. Fisheries production fell by 18.46% from 4.41 million metric tons in CY 2006 to 4.974 million metric tons in CY 2011. Average annual production growth rate within that period was registered at 3.08%. In terms of value, the 2011 fisheries production was valued at 224.7 billion pesos as compared with the 163.37 billion pesos in 2006, an average yearly increment of 7.62 billion pesos. The 2011 fisheries production also showed a 3.6% decrease from the previous year's production of 5.16 million metric tons. The 2011 production was valued at 224.7 billion pesos. The annual performance of the fishing industry was attributed to the production of the three (3) sectors. The aquaculture sector posted an increase with 52.4% (2.608 million MT) followed by the municipal sector with 26.8% (1.33 million MT), and the commercial sector with 20.8% (1.03 million MT). The growth in aquaculture, however, underscores the importance of the sector in maintaining the supply of fish. At the regional level, the Autonomous Region for Muslim Mindanao (ARMM) registered the highest production among all regions with its 18.3% or 909,370 metric tons share to the total fisheries production, where seaweed was the major commodity produced followed by Region IV-B (MIMAROPA) with a 14.7% share or 728,972 metric tons. Region IX recorded an output of 619,557 metric tons or 12.5% to the total fisheries production. In terms of value, the industry has contributed P224.7 billion in 2011 as compared to P221.05 billion in 2010. The top three (3) regions were Region VI with P27.61 billion, followed by Region III with P25.39 billion and Region IX with P21 billion. The Aquaculture fisheries sub-sector contributed the highest value of about P86 billion or 38.3%. Next is municipal fisheries sub-sector with a total production of P 80.1 billion. Total fish caught by marine fishermen was valued at P72.03 billion while inland fisheries production was valued at P8.05 billion. The commercial sub-sector contributed P58.62 billion or 26% to the total fishery output.

In 2003, reported marine fisheries production was 2 169 164 tons: 45.38% from municipal and 54.62% from commercial fisheries. Table 7 and Table 8 show catches of the major species in municipal and commercial fisheries in 2003. In the catch from municipal fisheries in 2003, small pelagics, tunas, demersal fishes and invertebrates constituted 54.5%, 22.9%, 7.4% and 15.2%, respectively. The commercial fisheries catch in 2003 comprised small pelagics (59.6%), tunas (36.2%) and demersal fishes (4.2%).

**Table 7. Catches of main species in the municipal marine fisheries sector in the Philippines in 2003
(Source: BFAR 2005)**

Species	Volume (tons)	As % of total
Big-eyed scad	64 354	7.0
Frigate tuna	64 326	7.0
Roundscad	55 980	6.1
Indian mackerel	45 083	4.9
Anchovies	42 447	4.6
Indian sardines	40 051	4.3
Yellowfin tuna	39 767	4.3
Squid	37 735	4.1
Slipmouth	33 528	3.6
Blue crab	31 433	3.4
Other	467 147	50.7
Total	921 851	100.0

**Table 8. Catches of main species in the commercial marine fisheries sector in the Philippines in 2003
(Source: BFAR, 2005)**

Major species	Volume (tons)	As % of total
Roundscad	254 659	22.9
Indian sardines	130 024	11.7
Frigate tuna	114 760	10.3
Skipjack	114 077	10.3
Yellowfin tuna	87 473	7.9
Big-eyed scad	39 621	3.6
Fimbriated sardine	36 358	3.3
Slipmouth	36 313	3.3
Indian mackerel	32 037	2.9
Anchovies	28 654	2.6
Others	235 660	21.2
Total	1 109 636	100.0

Comparing the catches given in Tables 7 and 8, of the eight top species caught by both municipal and commercial fisheries, almost two-thirds were harvested by commercial fishers compared with one-third caught by municipal fishers. This suggests that, although the commercial and municipal fisheries are purported to be two distinctly different sectors, they are in fact competing directly with each other.

Despite the continued expansion of the country's commercial fishing fleet, total fish catch leveled off at around 1.65 million tons in the early 1990s. Indeed, the country had reached the maximum economic yield from its demersal fish stocks as early as the late 1960s, except in the offshore hard bottoms around Palawan, Southern Sulu Sea and the central part of the country's Pacific coast. Studies on pelagic fisheries also indicate overfishing and declining catch per unit effort (CPUE). Exceptions are in lightly fished areas in waters off Palawan, parts of the country's Pacific coast and some parts of Mindanao. Such findings are supported by an observed change in species composition, i.e. anchovies have partially replaced sardines, scads and mackerels in the catch, an indication of gradual stock collapse (Green *et al.*, 2003).

A major fishing ground, Lingayen Gulf, reached its maximum sustainable yield (MSY) more than 20 years ago. The fishery now has four times the optimum effort for the available fish stocks. Catch rates in the gulf are only one-fifth of what they were 15 years ago, compelling fishers to invest more time and money in dwindling catches (Green *et al.*, 2003).

In some areas, not only has the volume of catch been reduced, but also quality. For example, in Central Visayas, there has been an overall shift in catch composition, away from coastal pelagic to oceanic pelagic species and away from demersal to pelagic species. In the Visayan Sea, one of the most productive fishing grounds of the country, a major change in composition of catch took place in the 1980s, with coastal pelagics replacing the demersals as the most abundant catch, and invertebrate species shifting from shrimp-dominant to squid-dominant, reflecting a shift in the ecosystem due to fishing pressure and a shift away from trawling to purse seine and ring net. These changes indicate that the Visayan Sea was exhibiting signs of overexploitation as far back as the 1980s (Green *et al.*, 2004).

Landing sites

Other fish ports are either jointly managed by the PFDA and the local government units (LGUs) or solely managed by LGUs. The biggest fish port (Navotas Fish Port Complex) had 16.74% of total landings from commercial fisheries in 2003 (Table 9).

Table 9. Landings in 2003 Fish ports managed by the Philippine Fisheries Development Authority

Fishing port	Location	Landings (tons)
Navotas Fish Port Complex	Navotas, Metro Manila	185 835
Lucena Fish Port Complex	Lucena City	16 202
Camaligan Fish Port Complex	Camaligan, Camarines Sur	237
Iloilo Fish Port Complex	Iloilo City	28 038
Zamboanga Fish Port Complex	Zamboanga City	20 095
Davao Fish Port Complex	Davao City	6 157

Fishing port	Location	Landings (tons)
General Santos Fish Port Complex	General Santos City	61 516
Sual Fish Port Complex	Sual, Pangasinan	676

Fishing Practices and Systems

Philippine fishing boats are classified into municipal (≤ 3 GRT) and commercial (> 3 GRT). Municipal fishing boats may further be classified into non-motorized and motorized types. Commercial fishing boats have three categories: small (> 3 – 20 GRT), medium (20 – 150 GRT) and large (> 150 GRT) (Aguilar, 2004).

A majority of boats are double-outrigger craft, consisting of a narrow main hull with two attached bamboo outriggers, commonly called *banca*.

The non-motorized municipal fishing boats use either paddle or sail as means of propulsion, and carry from one to several people, depending on the fishing gear used. During favourable monsoon weather, popular fishing gear used by sail-powered craft include trolling, handlines and gillnets. It is also usual for fishers to sail to *payao* (bamboo rafts, a fish aggregating device), moor their boats to these and fish using handlines.

The motorized municipal fishing boats are equipped with 3–6 hp gasoline or diesel engines. Gillnets, handlines, traps, small ringnets and other small gear are usually operated from these boats.

The small commercial fishing boats are outrigger boats ≥ 3 GRT and use trawls, skim nets, ringnets, liftnets and Danish seines. Currently, many still operate within municipal waters, depending on the municipality.

Medium commercial boats are mostly outrigger boats, which include the *basnig* or liftnet boats; the large Danish seiners or *super hulbot*; medium trawlers; and old monohulls fitted with outriggers. The monohulls that exist (both wooden and steel) are mostly engaged in ringnet or baby purse seine operations. The operations of fishing craft in this category are those most affected by the 15-km ban on commercial fishing (in terms of number affected and increased cost of operations).

Large commercial fishing boats mainly engage in purse seining, with most catchers targeting tuna or seasonal small pelagic fishes such as mackerels and roundscad. The mode of operation is mostly fleet-type, where a carrier boat is dispatched to several catcher boats located in the fishing grounds. The carrier boat loads fish from the catchers and brings it to a port or processing facility. Large commercial vessels travel all over the archipelago to fish.

A variety of fishing gear is used by commercial and municipal fisheries to exploit the small pelagic resources. Commercial fisheries use mostly purse seines (61.6%), ringnets (15.7%) and bag nets (12.4%). The small pelagic catch of the municipal fisheries is taken using gillnets (45.5%), hook-and-line (15.3%), ringnet (11.5%), beach seine (8.3%), purse seine (3.7%), fish corral (2.9%) and bag net (2.9%), based on 1995 statistics (Zaragoza et al., 2004a).

A variety of fishing gear is used to catch tuna. The purse seines, ringnets and handlines usually account for over 80% of the annual tuna catch, with nearly half the commercial tuna catch in 1995 taken by purse

seine. The municipal fisheries employ a variety (over 20 types) of fishing gear for tuna. In 1995, two-thirds of the municipal fisheries tuna catch came from line gear (Zaragosa *et al.*, 2004b).

The *payao* fish aggregating device (FAD) has been singled out as the most important factor triggering the phenomenal development of the tuna fishing industry. The effectiveness and efficiency of *payao* in attracting tuna (especially yellowfin and skipjack) greatly reduced the time spent in searching and fishing for commercial volumes. The extensive use of *payao*, however, may be rapidly removing undersized juveniles from the stocks and altering migration and feeding patterns of tunas in Philippine waters (Zaragosa *et al.*, 2004b).

Bottom trawl was the major fishing gear used for demersal fishes from the late 1940s until the mid-1980s. However, due to increases in fuel prices and depletion of demersal resources, trawl operations dwindled and have been replaced by more fuel-efficient Danish seines (Armada, 2004).

There is a great variety of fishing gear employed in municipal fisheries. In Central Visayas municipal fisheries, for instance, there are about 50 generic types of fishing gear, with about 200 specific variations (Green *et al.*, 2004).

According to the 2002 Census of Fisheries (NSO, 2005) the most common fishing gear used by municipal fishing operators in 2002 was hook-and-line, with 9.45 million sets recorded. Other types of gear, including cast nets, cover pots and crab hook, numbered 4.51 million, with 1.19 million gillnets.

Municipal fishing operators use boats of 3 GRT or less, and rafts. The number of such boats doubled between 1980 (388,200) and 2002 (777,700). Likewise, rafts doubled over the same period, from 13,600 in 1980 to 32,500 in 2002.

In 2002, hook-and-line gear, at 54,900 sets, was also the most common fishing gear used by commercial fishing operators. Second was a group of other types of fishing gear (50,600 sets), followed by gillnets (22 700 nets).

The number of fishing vessels licensed in the commercial sector tripled in the period 1980 to 2002, from 3,400 to 10,900.

There is evidence of overcapacity in the commercial fishing fleet. For example, in 1988, the total tonnage in the sector was 150,260, but that had increased to 216,090 GRT in 1994 and to 270,281 GRT by 2000. In 1997, the commercial fishing effort in the Philippines, at 2.09 million hp, was estimated to be 192% of the optimum level of 1.14 million hp. The commercial fisheries sector has continued to receive both direct and indirect subsidies, tax breaks and even a rebate on fuel oil tax through the Department of Finance, which are intended to improve their capacity to travel farther offshore and explore underdeveloped fisheries, especially in the Philippine EEZ. Imports of boats over 40 GRT, sonar, fish finders and other fishing equipment are exempt from taxes and other import duties. The owner of a 30 GRT commercial fishing boat pays a minimal “license fee” of P 1,000–3,000 every three years to the government to have access to millions of pesos worth of fish in one of the world’s most productive fishing grounds (Green *et al.*, 2003).

Analyses of CPUE in six coastal provinces in the Philippines for the common hook-and-line type of fishing reveal alarming results: fish catch is in some cases less than 5% of the levels of only a few decades ago (Green *et al.*, 2003).

Research conducted by the WorldFish Center in 1998–2001 found that, overall, “the level of fishing in the grossly modified stock [in the Philippines] is 30% higher than it should be”. This excess fishing is resulting in economic costs conservatively estimated at about P 6.25 billion (US\$ 125 million) per year (Green *et al.*, 2003).

Fishers, getting little or no catch, and believing they have little choice left, use illegal and destructive fishing gear to improve their catch. In the Philippines, illegal and destructive fishing practices include compressor fishing, spear fishing and blast fishing.

Main resources

The principal stocks exploited in the Philippines are small pelagics, tuna and other large pelagic fishes, demersal fishes and invertebrates.

Small pelagic (surface- and mid-water-dwelling) fishes as a group comprise predominantly roundscads (*Decapterus* spp., Carangidae), anchovies (*Stolephorus* spp., Engraulidae), sardines (*Sardinella* spp., Clupeidae) and mackerels (*Rastrelliger* spp., Scombridae). Also included in this group are the round herrings (Clupeidae), flying fishes (Exocoetidae) and halfbeaks (Hemiramphidae).

The small pelagic fisheries comprise an important segment of the country’s fisheries industry. Small pelagics are considered the main source of inexpensive animal protein for lower-income groups in the Philippines.

The large pelagic fishes consist of tunas and tuna-like species, such as billfish, swordfish and marlin. The tuna fisheries became the largest and most valuable fisheries in the Philippines during the mid-1970s, when *payao* was introduced. The country became the number one producer of tunas in Southeast Asia in the 1980s. When the catch rate of tunas in the Philippines started declining in the late 1980s, Filipino fishing companies started to fish in international waters. This made the Philippines one of the distant-water fishing nations in the Pacific, in addition to the United States of America, Japan, Republic of Korea, Taiwan (Province of China) and China (Zaragosa *et al.*, 2004b).

Twenty-one species of tuna have been recorded in Philippine waters but only six are caught in commercial quantity and form the basis of the tuna fishing industry. Of the six species, only four form the bulk of catches and are listed in Philippine fisheries catch statistics, namely yellowfin (*Thunnus albacares*), skipjack (*Katsuwonus pelamis*), eastern little tuna or *kawakawa* (*Euthynnus affinis*) and frigate tuna (*Auxis thazard*).

The oceanic large pelagics, such as marlin, swordfish and sailfish, are not fully exploited at present (Barut, Santos and Garces, 2004)

Demersal (bottom-dwelling) fishes include slipmouths, spadefishes, groupers and catfishes. In 2003, slipmouth was the only demersal species included in the top ten species caught, from both municipal and commercial fisheries. The state of demersal stocks in the Philippines is clearly shown by the decline in trawlable biomass during the past five decades. The need to manage exploitation of the demersal fishery resources was already recognized as early as the 1960s, and echoed for several decades afterwards. Since the major cause of overextraction is the high fishing effort, its reduction would have been the logical course of action. In its current state, it will take a long time to re-build the stock of demersal species that have been practically eliminated by uncontrolled fishing (Armada, 2004).

A live reef food fish trade (LRFFT) in the Philippines developed in response to a demand for live food fish, initially from Hong Kong and Taiwan (Province of China), and later on from mainland China. Live food fish is conventionally caught using hook-and-line fishing gear. However, LRFFT has been closely associated with the problem of cyanide fishing, which was first detected in the aquarium trade. In 1999, there were at least 24 species of marine vertebrates and invertebrates being harvested for LRFFT in the Philippines. The leopard coral grouper (*Plectropomus leopardus*) was dominant in the catch.

Among the invertebrates, crabs are one of the most important invertebrate resources taken, and contribute significantly to global food supply. There are 51 species of swimming crabs reported in the country, but only about 7 are considered marketable. The blue crab (*Portunus pelagicus*) is the main species exploited, comprising over 90% of crab landings. Crab fisheries in the country have shown a boom and bust history (Ingles, 2004a). Other important invertebrates are squid and *Acetes* shrimp.

The marine aquarium or ornamental fish trade in the country involves harvesting many targeted coral reef fish and invertebrate species that are valued for their aesthetic appeal. The prospects of better resource management in this subsector are considerably brighter than those for many other fisheries. There is now a relatively high level of environmental awareness in the ornamental trade market (Ochavillo *et al.*, 2004).

The deep-sea fisheries resources in the country are in many cases uncharted and unknown, and are believed to be relatively underexploited. The only deep-water fisheries resource that has a documented history of large-scale exploitation is the dogfish shark (family Squalidae). The dogfish shark fishery is another case of boom and bust. There is an urgent need to manage the deep-water fisheries resources because they are the country's very last marine frontier (Flores, 2004).

There are some specialized fisheries in the Philippines targeting postlarvae or early juveniles of certain fish species that are very marketable since they are considered delicacies, including goby fry; postlarvae or early juveniles of anchovies of the genus *Stolephorus*; and early juveniles of rabbitfish (Siganidae). Others are targeted as seed stock for aquaculture production (e.g. milkfish (*Chanos chanos*) fry). The by-catch of these fry collection activities is usually abandoned on the shore (Hermes, 2004).

The Philippines is located in the most biologically diverse marine area in the world in terms of coral and tropical reef diversity. Aliño *et al.* (2004) gave an integrative assessment of the critical fisheries habitats in the country, such as coral reefs, seagrasses and mangroves. Alava and Cantos (2004) reviewed the status of vulnerable or endangered marine species in the country, such as sea turtles, dugongs, cetaceans, whale sharks, mantas and seahorses. The results from these assessments reflect the combined effects of intense exploitation and habitat degradation on these resources.

Management applied to the main fisheries

In the Philippines, critical issues affecting fisheries (Green *et al.*, 2003) include: open access; overfishing and excessive fishing pressure; lack of management; inappropriate exploitation patterns; post-harvest losses; small- and large-scale fisheries conflicts; habitat degradation; lack of research and information; and inadequacy of technical and human resource capabilities, particularly among managers and the agencies concerned in analyzing fisheries.

In February 1998, the Philippine Fisheries Code (Republic Act 8550) was signed into law. The Code consolidates all laws pertaining to the fisheries sector and repeals or modifies previous statutes that are inconsistent with it. It declares as a state policy that achieving food security is the main consideration in

the development, management, and conservation of fisheries and aquatic resources. Its provisions reflect a strong adherence to long-term sustainability, fully recognizing its multiple dimensions and complex elements in the fisheries context through several prohibitive and regulatory measures seeking to balance protection with reasonable and responsible use (Ingles, 2004b).

Earlier, in 1991, the Local Government Code (LGC) devolved authority over the management of municipal waters to Local Government Units (LGUs) within the parameters set by national fisheries legislation and policies.

The establishment of Fisheries and Aquatic Resources Management Councils (FARMCs) at the national, provincial and municipal levels has established a legal commitment by the government to involve stakeholders in the development and management of the fisheries industry.

The Government of the Philippines' most significant policy shift in the past decade has been the introduction of joint management mechanisms of the fisheries sector, involving both the central government and the municipalities, and the government and the fishers (through the FARMCs). The Philippine Community-Based Coastal Resource Management (CB-CRM) programme has been very successful at awareness building, with notable pockets of success in implementation. The Philippines has been a leader in devolution of authority for coastal resource management through the LGC and has thus become an example for such actions. However, the challenges of managing fisheries resources in a sustainable manner still remain in most areas.

Silvestre and Pauly (2004) outlined seven main categories of management intervention that the authors believed to be appropriate, given the status of coastal fisheries in the developing countries of Asia. These management interventions are:

1. Limited entry and effort reduction.
2. Gear, area and temporal restrictions.
3. Improvement of marketing and post-harvest facilities.
4. Enhancement of awareness and participation of stakeholders.
5. Reduction of environmental impacts.
6. Institutional strengthening and upgrading.
7. Enhancement of research and information.

Some of the fisheries management measures in the Philippines are considered below, using the above categorizations.

Limited entry and effort reduction: Licensing in the Philippines is still generally viewed as a statistical and revenue generating exercise rather than as an effective management tool to limit entry and control fishing effort. The frameworks for municipal and commercial fisheries registration and licensing have now been prepared and efforts have already commenced to put them in place.

Gear, area, and temporal restrictions include measures influencing composition of catches in terms of species and size, and to a certain extent the sex and maturity stage, include: (1) technological controls or limitations, e.g. gear restrictions, including mesh regulations, hook size control and trawl bans; (2) spatial restrictions, e.g. marine sanctuaries and area closures; and (3) temporal restrictions, e.g. seasonal closures (Table 10).

During recent years, the National Bureau of Fisheries and Aquatic Resources (BFAR) has focused on building national capacity to implement an ecosystem approach to fisheries management (EAFM), and strengthening its national system of marine protected areas (MPAs). The national EAFM strategy follows off of the Coral Triangle Initiative’s Regional EAFM Framework, and adheres to the international EAFM guidance outlined by FAO.

Table 10. Regulatory instruments influencing selectivity of fishing operations in the Philippines

Regulatory instrument	Legislation	Specifications
Technical controls		
mesh regulation	§ 89, Philippine Fisheries Code of 1998	Prohibition on the use of nets with mesh smaller than that which may be fixed by the Department of Agriculture (DA).
gear ban	§ 90, Philippine Fisheries Code of 1998	Prohibition of fishing in municipal waters and in all bays using “active” fishing gear.
	§ 92, Philippine Fisheries Code of 1998	Prohibition on the use of <i>muro-ami</i> , other methods and gear destructive to coral reefs and other marine habitats.
	§ 93, Philippine Fisheries Code of 1998	Prohibition on the use of <i>superlights</i> in fishing.
Spatial restrictions		
area closure	§ 95, Philippine Fisheries Code of 1998	Prohibition of fishing in overfished area.
	§ 96, Philippine Fisheries Code of 1998	Prohibition of fishing in areas declared by the DA as reserves, refuge and sanctuaries.
Temporal restrictions	§ 95, Philippine Fisheries Code of 1998	Prohibition of fishing during closed season.
Other	§ 98, Philippine Fisheries Code of 1998	Prohibition on the capture of <i>saba</i> (full-grown milkfish) and other breeders and spawners.

Improvement of marketing and post-harvest facilities: Post-harvest support facilities (i.e. access to salt, ice and cold storage) are lacking in strategic locations in many areas. There is a need for more private-sector participation in providing such facilities.

Enhancement of awareness and participation of stakeholders: There can be considered to be adequate legislation on fisherfolk empowerment in the country. There are some pockets of success in sustainable coastal resource management (e.g. Apo Island, Cebu, and San Vicente Bay, Palawan), which should be replicated throughout the country.

Reduction of environmental impacts includes the passage of laws on the protection of the marine environment are in place and there is growing environmental awareness in the country. However, much still needs to be done.

Fishermen communities

Municipal fisherfolk are considered the “poorest among the poor”. In 2000, households whose heads were fishers had a significantly higher poverty incidence than households in general. Their daily income was roughly the retail value of 2 kg of fish. Low incomes can be attributed to declining fish catch, estimated to be about 2 kg per day, down from the 20 kg per day that was the average catch during the 1970s.

Households of fishers and those in the fishing industry also had heads with relatively lower education levels compared with households in general. Fishers’ households had lower access rates to basic necessities like safe water, sanitary toilets and electricity than other households, and were more likely to live in makeshift houses or were squatting. Also, the average size of households of fishers and of those in the fishing industry was greater than the national average (Israel, 2004).

According to the 2002 Census of Fisheries, there were 1.8 million municipal and commercial fishing operators. This was a three-fold increase from the 584,000 fishing operators recorded in 1980. Municipal fishing dominated the fishing industry in terms of numbers of operators. In 2002, 1.78 million operators (99.6%) were engaged in municipal fishing compared with only 7,800 in commercial fishing operations.

The vast majority of municipal fishing operations (1.752 million or 98.4%) were individual operations. At 1.7 million, male operators accounted for 94.5% of the municipal fishing operators, with a median age of 41 years.

In 2002, out of 7,200 commercial fishing operations, 7,190 were operated by individuals, and almost all (98.6%) were males, with a median age of 39 years.

Women have a role in fisheries and helping in the livelihood of the family (Siason, 2004). Their roles include: (1) fish marketing or vending, (2) fish processing, (3) fry gathering, (4) gear preparation, (5) fishing, (6) net mending, and (7) fishing boat ownership and operation.

3.6.2 Post-Harvest Sector

Fish Utilization

Espejo-Hermes (2004) provided an overview of the trends in and status of fish processing technology in the Philippines.

Fish is consumed as fresh, fermented, dried, smoked or canned. Data on the disposition of catch in the Philippines are inadequate. Around 70% of the total catch is consumed fresh or chilled, while 30% is processed into cured, canned, frozen products or disposed of live. The bulk of cured fish and fishery products are consumed locally, while only a small quantity is exported as ethnic products. Canned products, particularly tuna, are consumed locally in small quantities compared with the export volume, and most of the frozen products are for export.

There is a growing trend towards increased mechanization in operations in the fish processing industry, brought about by the need to reduce cost and to manufacture products of consistent quality. Most of the processing plants manufacture traditional products, such as dried and smoked fish for both foreign and domestic markets. Several plants are engaged in processing of frozen and canned products, mainly

tuna for export purposes. Some manufacture miscellaneous fishery items, including value-added products.

Old ways of handling the catch are still current in many fishing communities. However, in areas where the demand for good quality fresh fish, particularly for export, is high, improved methods of handling (proper icing and use of insulated containers) are widely practiced. In general, aquaculture products are better handled than those caught in municipal fisheries.

There is a growing demand for modern freezing equipment in processing plants that cater to the export market. Contact plate freezers are commonly used for processing shrimps, while air blast and brine freezers are usually employed for tuna. The main frozen products for export are tuna loins, cephalopods and shrimps.

The majority of the canneries in the country meet international standards in terms of product quality, styles of pack and packaging. New equipment is being used in production lines to improve canned products. Variations for canned fish, particularly tuna that suit the local taste have been made to attract local consumers and to maximize use. By-products from the canning industry find their way into flavouring, pet food and the fishmeal industry.

Value-added products in the form of fillets, comminuted and surimi-based products and ready-to-heat main fish dishes are growing in demand. Locally, comminuted or minced products, such as fish balls, fish sausages, squid balls and fish nuggets, are becoming common in many supermarkets. The industry absorbs by-catch and market surpluses, including farmed species. To date, a shift to the use of farmed species, such as milkfish and tilapia, is occurring due to scarcity of raw materials from capture fisheries. A number of processors of de-boned milkfish are also converting their by-products to value-added products, such as fish rolls and dumplings, to minimize waste. In general, the value-added-product industry needs to upgrade its technology and quality standards, including in-plant hygiene and sanitation.

Processing into traditional products, such as salted, dried, smoked and fermented fish, is still widely practiced. These products are mainly manufactured where there is a guaranteed supply of raw material. The processors are generally small-scale, family establishments that have limited capital and do not receive assistance from government agencies and financing institutions. The processing methods they employ vary considerably, resulting in inconsistent quality and limited shelf-life of finished products. There are very few local processing plants that make use of modern technology (mechanized smokehouses and dryers) and have made progress in improving quality standards. Only those that export their products have improved processing practices, equipment, hygiene and sanitation in the plants.

The primary problem in the industry is shortage of raw material. Other problems of the fish processing industry include poor quality of raw material; inconsistent quality of products; lack of appropriate safety standards for traditional products (e.g. inappropriate use of additives); insufficient capital to improve the enterprise; and lack of appropriate infrastructure (e.g. chilling or cold storage facilities) for product storage.

The extent of losses in the post-harvest phase of fisheries is difficult to quantify. Locally, there is an estimated loss of 25–30% of the total catch due to improper handling.

Fish Markets

The Philippines is an exporter as well as importer of fish and fishery products. In 2003, the balance of trade was positive in terms of quantity and value.

In 2003, total exports of fish and fishery products amounted to 202,016 tons, valued at over US\$ 525.4 million. The products consisted mainly of fresh and processed fish, crustaceans and molluscs. Leading fishery products were tuna, shrimp and seaweed. The major export destinations of tuna were Japan and the United States of America. The major export destinations of shrimps were Japan, Spain and the United States of America. The major export destinations for dried seaweed were China, France, Republic of Korea and the United States of America, while the major export destinations for carageenan were Denmark, France and the United States of America.

For the past several years, the Philippines has been importing large quantities of pelagic species such as tuna (mainly from Indonesia). Large quantities of fishmeal are also imported (mostly from Peru and the United States of America) for feed preparations.

3.6.3 Socioeconomic Contribution of the Fisheries Sector

Role of Fisheries in National Economy

The fishing industry's contribution to the country's Gross Domestic Products (GDP) were 1.9 % and 2.2% at current and constant 2000 prices, respectively. This translates to some P183.1 billion for current prices and P130.77 billion for constant prices of the country's GDP of P9,735.52 billion (current prices) and P5,924.4 billion (constant prices). The industry also accounted for 14.7% (P183.1 billion) and 19.2% (P130.77 billion) of the Gross Value Added (GVA) in Agriculture, Hunting, Forestry and Fishing Group of P1,245 billion and P680 billion at current and constant prices, respectively, the largest share next to agricultural crops.

In 2003, the fisheries sector had a total value of US\$ 1 832 million, accounting for 2.2% of GDP. The Philippines ranked 11th among the top fish producing countries in the world for 2001 accounting for 2.2% of global production. The Philippines is the world's largest producer of carageenophyte seaweed.

However, globally in the last 20 years, the Philippines' ranking in world aquaculture production steadily slid from 4th place in 1985 to 12th at present. From 5% of global farmed fish supply, the Philippines now contributes only a little over 1% of world production.

Demand and Supply

Fish demand is robust in the Philippines, with three main uses.

- Domestic human consumption is by far the largest single use (2,335 474 t in 2003). The most important species consumed are roundscad, Indian sardines, frigate tuna, big-eyed scad, fimbriated sardines and anchovies, which originate from marine waters and are augmented by imports and milkfish and tilapia from aquaculture and inland fisheries.
- Fish exports are the second largest use of supply (155,129 t in 2003). The main exported products are tuna, which originate from commercial and municipal marine fisheries, and shrimp from aquaculture.

- The smallest portion of demand (332,268 in 2003) is for non-food uses. This consists mainly of imported fishmeal for animal feeds, and snails caught in inland waters for duck feed.

The supply divides as about 83% for human consumption and 17% for exports and non-food uses.

Fish contributes around 22.4% of the total protein intake of the average Filipino. It is the main source of animal protein in the diet, contributing 56% to animal protein intake (Espejo-Hermes, 2004). The Philippine per capita fish consumption was 28.8 kg in 2003.

Food Security

Bernacsek (1996), writing on the role of fisheries in food security in the Philippines, stated that: “There are clear indications that fisheries quantity production is approaching real limits to further growth. Government of the Philippines fisheries policy should re-orient and re-focus to emphasize growth in product value added and increase in profitability, rather than the historical focus on quantity output. A new development climate needs to be created which will facilitate active entrepreneurial exploration of new markets for fish products and new export opportunities. Parallel to this policy shift, sustainability of domestic production needs to be achieved through effective management in order for producers to be able to provide a secure source of raw materials for processors and marketers.”

Trade

The foreign trade performance of the sector for 2003 recorded a trade surplus of US\$ 445 million. Total fishery exports showed a 3.6% growth in value terms compared with the previous year. Combined, the earnings of the top three fishery exports (tuna, shrimp and seaweed) contributed US\$ 363.2 million (69.3%) to total fishery products exports of US\$ 524.3 million.

Significant changes in international trade policy, quality and safety criteria have put pressure on the fish processing industry to improve the products that are being manufactured. Many countries, including the Philippines, have adopted the Hazard Analysis Critical Control Point (HACCP) system for food safety management. The Philippines continues to face challenges regarding access of its fishery products in international markets.

Foreign trade performance of the fishery industry in 2011 registered a net surplus of 654 million dollars – total export value of 871 million US dollars and import value of 217 million US dollars. Export volume declined by 3.14% from 220,992 MT in 2010 to 214,055 MT in 2011. The three major export commodities (tuna, seaweeds, shrimp/prawn,) combined for 61% (130,802 MT) of the total export volume (214,055 MT) and 65% (US\$566.7 million) of the total export value (US\$ 871 million) in 2011. Tuna remained as the top export commodity with a collective volume of 76,888 MT for fresh/chilled/frozen, smoked/dried, and canned tuna products valued at US \$294.114 million. Canned tuna, though, constitutes bulk of tuna products being exported. In general, tuna export is down by (28%) in terms of volume and (26%) in terms of value. Major markets for this commodity include USA, Japan and Thailand. Seaweeds came 2nd on export value with 34% increase from US\$155.61 million in 2010 to US\$ 212.13 million in 2011 or 24% share to the total export earnings for that year. Carrageenan remains the major product being shipped abroad comprising 73% of the total seaweed export value. USA, China and Belgium are among the major markets for Philippine seaweed products. Shrimp/Prawn ranked 3rd with a total contribution of US\$60.5 million to the total export value, higher than last year’s export earnings of \$52 million. Most of the shrimps/prawns are exported in fresh/chilled/frozen form with a total value of US\$ 60.5 million or 98% of the total shrimp/prawn export

revenue. The 2011 shrimp/prawn exports, however, fell by (12) % in volume (MT) but gained 16% in value (USD) from the previous year's export. Japan, USA and Taiwan are among the major destination of shrimp/prawn products. Other major fishery exports e.g. crabs/crab fats, octopus, lapu-lapu, cuttlefish/squid, ornamental fish, roundscad and sea cucumber constitute 83% or US\$ 723.5 million of the total US\$ 871 million export revenues. Other commodities accounted for the remaining 17% of the total export value/earnings. Among the major destination of Philippine fish and fishery product exports (in terms of value) with percentage share are USA, 27.8%; Japan, 11%; Germany, 6.5%; Hong Kong 6.6%; UK, 4.5%; Spain, 2.9%; France, 2.4%, , Taiwan (ROC) 2.6%, Canada, 1.7%, and China, Rep Of 2.7%; . Other countries have a cumulative share of 31%.

Employment

According to the 2002 Census of Fisheries (NSO, 2005), there were 2 009 300 fishing operators and aquafarm operators. Municipal fishing operators, commercial fishing operators and aquafarm operators constituted 88.6%, 0.39% and 11.0%, respectively. Estimates of the employment generated from ancillary industries are not available, but it is accepted that they provide jobs for many people.

Rural Development

Various socio-economic data indicate that the ability of the sea to provide a cheap source of food and income for the Filipino masses has been severely compromised. The Philippines – one of the world's 40 largest fish-producing nations – is also among the 10 low-income, food-deficit countries of the world (Green et al., 2003).

With regard to aquaculture, its full potential for rural development has yet to be realized.

3.6.4 Trends, Issues, and Developments

In their 2004 paper, Luna *et al.* identified the following issues confronting Philippine marine fisheries today:

- depleted fishery resources;
- degraded coastal environment and critical fisheries habitats;
- low catches and incomes, and dissipated resource rents;
- physical losses and reduced value of catches due to improper post-harvest practices and inefficient marketing;
- inequitable distribution of benefits from resource use;
- intersectoral and intrasectoral conflicts;
- poverty among small-scale fishers; and
- inadequate systems and structures for fisheries management.

Open access is one of the main interconnections among all the issues identified.

Luna *et al.* (2004) recommended six critical actions to reverse the decline in Philippine marine fisheries:

- reduction and rationalization of fishing effort;
- protection, rehabilitation and enhancement of coastal habitats;

- improved utilization of harvests;
- enhanced local stewardship and management of resources;
- supplemental and alternative livelihoods for fishers; and
- capacity building and institutional strengthening.

On the proposed re-structuring of the aquaculture subsector into an efficient and sustainable agribusiness, Bernacsek (1996) recommended that the Government of the Philippines should withdraw from the fishpond ownership business. All ponds should be privatized, with existing landholders having first right of option to purchase at market prices (minus depreciated value of investment).

SUMMARY TRENDS, ISSUES, & DEVELOPMENTS RAISED DURING INTERVIEWS

- Overfishing is the most commonly cited major concern of commercial fishers. IUU fishing by small-scale (“traditional”) fishers and unlicensed foreign national vessels is the second most commonly cited concern of commercial fishers.
- The suki relationship (credit-market relationship between fisher and buyer) is important. However, it also can be the source of issues and problems relating to sustainability.
- The mobile phone is an important business tool to manage prices and fish supply
- Supply in the Philippines is becoming more erratic especially in relation to tuna and sardines
- In general, commercial fishers are pessimistic about the ability of commercial fisheries to grow and persist in the future, due to these and other trends and issues. As a result, commercial operators are typically worried about the future viability of their capture fishing businesses.
- Stakeholders recognize the need to reduce level of effort and number of fishing boats. They recommend significantly curbing the number of traditional fishers while ‘capping’ or limiting the growth of commercial operations.
- Fishermen contribute most to the success or failure of the WCPFC.

[Anonymous summaries of responses offered by participating Filipino stakeholders through the interviewing process can be found in the Appendix.]

3.6.5 Private Sector Profiles

List of companies/associations

a. Alliance Select Foods International

Suites 1206 & 1405 East Tower Philippine Stock Exchange Centre Exchange Road,
Ortigas Center Pasig City, Metro Manila, PHILIPPINES 1600

Tel No: (+632) 6355241 to 44

Fax: (+632) 635 5235

info@allianceselectfoods.com

Profile: The ALLIANCE SELECT FOODS INTERNATIONAL, INC., mission is to manufacture, in partnership with our global customers and local stakeholders, high quality food products from naturally sustainable sources by using globally acknowledged best practices. From only the freshest fish to the finest selection of ingredients, and high quality cans, we aim to provide our customers with the right

products at the right price. It is our vision to select the best that nature has to offer and turn it into healthy food for a growing world. Our factories produce over 200 metric tons of processed seafood daily, supplying hundreds of successful brand name companies across 60 countries around the world. Alliance is one of the leading top notch seafood processing companies in Southeast Asia.

FDCP Incorporated (Subsidiary of Alliance Select Foods International)

FDCP Inc. is our state-of-the-art can manufacturing facility. As one of the most modern in the Philippines, it provides us with an uninterrupted supply of sanitary packaging materials. The can manufacturing plant produces 2-piece and 3-piece cans to serve our retail and food service customers. Our processing plant for canned tuna is located in General Santos City. We employ 2,000 workers who help us fulfill our production capacity of 140 metric tons per day. Our factory is strategically located in the "Tuna Highway", the Western Central Pacific Ocean, where 48 percent of the world's tuna is harvested. This allows us to provide our customers with the freshest fish, at the most competitive prices. BGB Salmon and Seafood, a joint venture between Alliance and PFNZ, is presently under construction in General Santos City, Philippines and will be up and running at the end of the year. The plant will be producing smoked salmon from New Zealand and Norway, at a capacity of 600 MT per year. These products will all be exported, widening our global reach.

<http://www.allianceselectfoods.com/index.php/about/#>

b. RD Fishing Industry

1st Road, Calumpang, 9500 General Santos City Philippines

Phone Number (s): (63) (83) 552-4595; (63) (83) 302-4595

Telefax Number: (63) (83) 552-3590; (63) (83) 552-2743; (63) (83) 552-3767; (63)(83) 552-7628

E-mail: info@rdcorp.com.ph

Profile: RD Corporation holds five (5) fishing companies: RD Fishing Industries Inc., RD Tuna Ventures, Inc., South Sea Fishing Ventures, Phils. Inc., Asia-Pacific Allied Fishing Ventures, Inc., and RD Fishing PNG Ltd. RD's fishing fleet operates in the rich fishing grounds of the Philippines, Papua New Guinea and Indonesia. RD's fishing fleet counts 102 vessels - 20 catchers, 9 reefer carriers, 6 carriers, 48 rangers/light boats, 1 tanker, 1 tugboat and other support vessels. The fish holding capacity of the fleet's super seiners ranges from 450 to 1,200 metric tons; while the reef 2,800 metric tons.

RDEX Food International Phils. Inc., processes fresh frozen fish and prawn, for export and domestic market. The processing plants can each process up to 10 mt of raw fish daily. In the Philippines, RDEX is known for its Tuna Shop that offers fresh frozen, value added products, canned tuna as well as milkfish and prawns. RDEX products are widely distributed in supermarkets.

http://www.rdgroupph.com/products_services.htm

c. Frabelle Fishing Corporation

1051 North Bay, Blvd., Navotas Metro Manila

Tel# 281-2909; 281-3122

Fax# 281-2839; 282-8771

Email= frabelle@mazcom.com

Regino G. Cabana reggie.cabana@frabelle.net

Profile: Frabelle Fishing Corporation is a fishing company established in the Philippines in the 1960's. From the Philippines, the operations of Frabelle have expanded into: Indonesia, Vietnam, China, Papua New Guinea and South Africa. The company's market has also includes: Japan, Thailand, Iran, France, United Kingdom, Italy, Middle East and the United States.

Reference: http://www.securities.com/Public/company-profile/PH/Frabelle_Fishing_Corporation_en_1671805.html

Founded in Navotas, a fishing municipality now a city north of Manila, Frabelle has more that 40 years of deep sea fishing experience. The vertical and horizontal growth of its fishing operations has made the Frabelle Group of Companies one of the most recognized company in both the fishing and food processing industries. From the Philippines, the operations of Frabelle have expanded into: Indonesia, Vietnam, China, Papua New Guinea and South Africa. Its market has also includes: Japan, Thailand, Iran, France, United Kingdom, Italy, Middle East and the United States.

Today, Frabelle is recognized as one of the remaining original fishing companies established in the Philippines in the 1960's. It has consistently been among the top 500 corporations of the Philippines despite the ups and downs of the economy. It's work force of more than 5000 continues grow.

Reference: <http://frabelle.com/fishing/>

Concord Fishing and Canning Corporation (Division of Frabelle Fishing Corporation)

Manuel M. Penera - Company Position Section Manager

1051 Northbay Boulevard

Navotas, Metro Manila 1485 PHILIPPINES

Tel +63 2 283 0991

Mobile (Cell) Phone +63 891 78476476

Fax +63 2 283 0992

manny.penera@frabelle.net

Concord Fishing and Canning is in-charge of the importation of seafood products to be distributed to local markets including:

- Round Scad
- Hard Tail Scad
- Bonito (Auxis Rochei)
- Pacific Mackerel
- Ribbon Fish (Trichiurus Lepturus)
- Loligo Squid (Loligo Opalescens)
- Giant Squid Fillet (Dosidicus Gigas)
- Giant Squid Trimmings

Reference: <http://www.trade-seafood.com/directory/seafood/importers/concord-fishing-canning-corporation-ph.htm>

Frabelle in the News. LAE, PNG --- Lae-based Frabelle Fishing Corporation is one of the major partners behind the Majestic Seafood venture, which opened earlier this year. The company has big expansion plans of its own too. Frabelle is one of three joint venture partners in Majestic Seafoods, the new tuna processing plant which was opened in Malahang, near Lae, earlier this year.

While tuna from the joint venture cannery will be sold by Majestic, primarily to the European Union, Frabelle itself will concentrate on selling to the local PNG market, through local wholesaler, Seeto Kui. At the same time, Frabelle has a program of investment that will see six of its 20 PNG-flagged catcher boats replaced over the next two years and the construction of a new wharf.

“This means we are much more efficient with unloading our catch, missing out a few steps,” Johnston tells Business Advantage PNG. “The second wharf will commence construction in the new year.”

Boosting tuna output will also require replacing old equipment.

“We’re doing major improvements in the factory,” says Johnston of his facility in Lae.

“In every area, we’re changing something to make it more viable—conveyor systems, new packing systems, new labelling systems. Because the processing plant is seven years old, it’s time for an upgrade.

“We put in a new blast freezer that’s going to double our output of frozen lines. There’s a new 500-tonne cold room being finished off now. That’s at minus 35 [degrees Celsius], not at minus 25, because the colder you can keep yellow fin the better the yellow fin stays.”

Frabelle also now has a 300-tonne storage area for all its sunflower, olive and soya bean oils.

The next stage will be to build a second 3,000 tonne freezer. It will store ‘rawpacks’: single-cooked fish which customers can put on salads or eat straight away.

“That’s a separate market,” explains Johnston. “It only goes to France and Germany at this time.”

Frabelle is the only plant in PNG that currently does this. It also exports stockfeed and chickenfeed to the region.

Diversification is the name of Frabelle’s game. As well as the involvement with Majestic Seafoods, Johnston has also been talking to local governments around the country to set up co-operatives to bring coral and reef fish from places like Kavieng or Manus to Lae for on-selling.

The company is also looking beyond fish processing: it is one of the tenderers for the new power station in Lae and has installed a biomass boiler in Lae for which it will be buying coconut shell for fuel.

All this is done without much fanfare, which is the way Johnston likes it.

“We’re quiet achievers. We’re like BHP and that’s the way we’d like to stay.”

Reference: <http://www.undercurrentnews.com/2013/11/11/tuna-group-frabelle-plans-expansion-beyond-processing-in-png/>

d. Aquascapes Philippines

Lolita Ty, General Manager

Denis Brian Ty, Sales and Production Manager

6 G. Araneta Avenue, Quezon City.

Tel: (63-2) 715-1036, 715-1037, 716-1223, 716-1650

Fax: (63-2) 715-1034

General E-mail: info@aquascapes.net

Profile: Aquascapes Philippines is one of first exporters of live tropical fish in the Philippines and we continue to provide the highest quality live marine tropical fish and invertebrates to clients from all over the world. We are also the Philippines' pioneer exporter of aquarium sand, natural pebbles, rocks, stones and driftwood. We maintain one of the largest and most advanced aquarium facility in the Philippines. This enables us to supply you with a good selection of high quality fishes at competitive prices. We have been serving many satisfied customers worldwide for over 30 years.. You can learn more about us in our company profile page.

Sister Companies: Oceanrich Fisheries, USA; Oceanrich Fisheries; 10 Knots Fishing Development Corp.; Seascales Development Corp.

Reference: <http://www.aquascapes.net/>

e. RBL Fishing Corporation

925 M. Naval St., Navotas Metro Manila

Tel# 282-5956; 282-8952; 282-8956

Email: rbl@info.com.ph

Profile: RBL Fishing Corporation specializes in fishing as well as processing of fish products in the Philippines.

No website

f. Trans-Pacific Journey Fishing Industry

1094-A North Bay Blvd., Navotas Metro Manila

Tel# 287-4295, 282-8812

Fax# 282-6538, 287-9542

Email= tpj@itextron.com

No website

g. Asia-Pacific Allied Fishing Ventures Corporation

1st Road Calumpang

City: General Santos City

Tele: +63 (83) 552-4595

Fax: +63 (83) 552-3590

No website

h. Trinity Home Industrial Development Corporation

Dominic R. Salazar

Tambler, General Santos City

0917-7142144

Thidcor_fishing@yahoo.com.ph

i. PERMEX Producer and Exporter Corp

Edward Lim

Ayala Industrial District, Zamboanga City

0920-9054234

edgarblim@yahoo.com

j. Southern Philippine Deep Sea Fishing Association, Inc.

Mr. Roberto A. Baylosis

Executive Vice-President

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Zamboanga City

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Email: baylosisroberto@yahoo.com

SOPHIL membership			
Eugene Yap	Vice-President(YL Fishing Corporation)	Talisayan, Zamboanga City	9088751800
Stephen Kaw	Vice-President(Zamboanga Universal Fishing Corporation)	Ayala, Zamboanga City	982-0473
Melina Requito	President(AMR Fishing Corporation)	Cawit, Zamboanga City	982-0161
William Lim	President(MEGA Fishing Corporation)	Cawit, Zamboanga City	982-0819
Julieto Daniel	President(NAMCY Fishing Corporation)	Tugbungan, Zamboanga City	991-5912
Jimmy Daniel	President(Century Fishing Corporation)	Tugbungan, Zamboanga City	992-7999
Esmael Tan	President(E&L Fishing Corporation)	Tugbungan, Zamboanga City	991-1021

Leonardo Tan	President(SOPHIL)	Tugbungan, Zamboanga City	991-1021
Mrs. Luz Flores	President(OLC Fishing Corporation)	Tugbungan, Zamboanga City	9177112878
Mr. Johny Ang	Vice-President(Zamboanga GMA Fishing Corporation)	Tugbungan, Zamboanga City	991-7320
Ely Chua	President(Jordan Fishing Corporation)	Mampang, Zamboanga City	926-2775
Christopher Teng	President(Oceanic Fishing Venture)	Sta. Catalina, Zamboanga City	991-1481
Noel De Asis	President(MCW Fishing Corporation)	Governor Camins, Zamboanga City	sec. 0918964627 9

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l. UNDP-GEF Sulu-Celebes-Sea Sustainable Fisheries Management Project

National Coordinating Unit

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3.7 Singapore

The following fisheries country profile is based on several sources of information as there is no FAO country profile for Singapore.

SINGAPORE FISHERIES PROFILE SUMMARY

- Singapore is not a major seafood-producing nation; an estimated 90-95% of seafood is imported from other countries, particularly Indonesia, Malaysia, Thailand, and Vietnam.
- Singapore is a major regional seafood processing and wholesale/distribution point.
- There are two primary fishing ports, providing 24-hour daily service to foreign and local fishing vessels for bunkering, discharging, and transshipment of fish. Approximately 200 tons of seafood are imported daily.
- Singapore's imports and exports of live, chilled, and frozen seafood in 2006 were valued at about \$500 million and \$225 million, respectively.
- Fish products are provided to foreign retailers (particularly supermarkets), local and regional hotels and restaurants, and regional and foreign wholesalers.
- Processing and export of frozen and dried/smoked seafood products includes freezing, icing/chilling, salting/drying, smoking, minced products, and surimi production.
- Primary fish products exported include swordfish, tuna, oilfish, marlin, shark, and other coastal pelagics.
- Fish product exports primarily are to China, US, Japan, Korea, EU, Australia, Russia, Brazil, and Southeast Asia (particularly west Malaysia). Singapore is the largest distributor in region of swordfish and tuna to the US.
- Singapore is home to the region's most modernized (automated and high capacity) cold storage and seafood processing facilities.
- Singapore government maintains quality control over the state-of-the-art industry, promoting HACCP and ISO22000 certified operations.
- Some processing/wholesale operations are 100% owned subsidiaries of US corporations.
- There are 94 licensed seafood-processing operations and 3 primary associations.

3.7.1 Production Sector

Overview

The Republic of Singapore is a small island country at the tip of the Malay Peninsula. It has a limited coastline of 193 km (CIA *n.d.*), with limited territorial waters that are shared with peninsular Malaysia. Singapore is one of the world's major commercial centers, home to the world's fourth largest financial services sector and one of the top five busiest seaports on Earth. In recent years, the international community has ranked Singapore as among the freest and least corrupt economies in the world. As a result, Singapore attracts a large level of foreign investment.

Singaporeans are highly affluent, with the third highest per capital income in the world and highest percentage of millionaires. Unemployment is at less than 2%, and acute poverty is nearly absent due to a generous government welfare system.

Singapore is not a major seafood-producing nation, and imports an estimated 90-95% of seafood consumptions from other nations, particularly from within the region.

Singapore plays a globally important international import/export role, being the world's 14th largest exporter and 15th largest importer. Singapore is a major global seafood processing, wholesale, and distribution/shipping point, particularly for processing and transshipment of exports of a wide array of Southeast Asian fisheries products.

Catch Profile

Singapore is not a major fishing nation or seafood producer. Singapore's domestic capture fisheries are limited to a small fishing fleet of 4 offshore and 35 inshore longline and net fishing vessels that operate within domestic and neighboring waters of Malaysia and Indonesia (AVA 2010). Domestic landings are nominal in comparison to fishery imports. Fish catch was estimated at 1,732 tons in 2010, down 22% from 2009 (UN 2013).

Landing Sites

The Government of Singapore operates two fishing ports, at Jurong and Senoko. Both ports provide 24-hour daily service to foreign and local fishing vessels for bunkering, discharging, and transshipment of fish (AVA 2010). Most fishing vessels land their catch between 2300 and 0200 hours, for auction and wholesale (AVA 2010).

The Jurong Fishery Port (JFP) is the larger (5.1 hectares) of Singapore's two fishing ports, and is centrally located at the mouth of the Jurong River on the southwestern Singapore coastline. The JFP began operations in 1969 as an international fisheries landing site, and has since expanded and been regularly modernized, today being one of the busiest and most modern international seafood centers within Southeast Asia (AVA 2010). JFP facilities include a 400 meter-long wharf, a wholesale fish market, retail space, cold storage and ice production facilities, and fishery business office space (AVA 2010).

The Senoko Fishing Port (SFP), located in northern Singapore (3.24 hectares), began operations in 1997. SFP serves as the home base for the local Singaporean fishing fleet (AVA 2010). SFP facilities include a 180 meter-long jetty, a wholesale fish market, retail space, and fishery business office space (AVA 2010).

Fishing Practices and Systems

Singapore's domestic marine capture fisheries operations primarily are limited to a few off-shore trawl and longline fishing vessels, as well as a few dozen inshore boats using longlines, surround nets, seine nets, and hook and line.

Main Resources

Primarily capture fishery targets in Singapore are tunas, grouper, sharks and rays, and small pelagics.

Management Applied to the Main Fisheries

Singapore's exclusive fishing zone is located within its territorial sea (3 nautical miles; 5.6 km), as well as areas beyond as defined in treaties and practice (NSPL 2008). Inshore net and pole and line fishers operate within 0-3 nm; offshore longline and net fishers operate beyond this (typically within 3-20 nm).

The Agri-Food and Veterinary Authority (AVA) of the Republic of Singapore oversees the licensing and management of Singapore's capture fisheries and aquaculture industry, providing regulatory oversight, management advice, and operational support to existing and future operations (NSPL 2008). The AVA is active in the growth and promotion of Singapore's aquaculture industry, assistance and regulation of

Singapore's fish processing industry to develop HACCP systems and meet international seafood quality and certification standards, and promotion of Singapore's development of value-added seafood products (AVA 2010). The AVA oversees operations at the two primary fishing ports at Jurong and Senoko. As part of its effort to promote aquaculture in Singapore, the AVA's Marine Aquaculture Centre hatches fish fry that are sold to commercial farms in Singapore, as well as other areas of Southeast Asia (AVA 2010).

The Environment Protection Division of the Ministry of Environment and Water Resources is the government authority that has oversight for the national protection of the marine environment, and works closely with the AVA (NSPL 2008).

Fishing Communities

Not applicable.

3.7.2 Post-Harvest Sector

Along with tourism and financial investment services, the export of refined, imported goods is a major sector in Singapore's economy, including electronics manufacturing, petroleum refining, and the value-addition of agricultural and fishery imports.

Singapore is one of the busiest seafood markets in the world, serving as a critical regional hub for the processing, marketing, and export of seafood products sourced from Southeast Asia (Yeap *et al.* 2001; AVA 2010; NSPL 2008). An estimated 200 tons of seafood are imported into Singapore daily (SFMA 2008; AVA 2010). Fish imports are landed by sea from Indonesia and Malaysia (particularly Sabah and Sarawak), by land (via truck) from peninsular Malaysia and Thailand, and by air from most ASEAN countries, as well as a number of other nations across the wider Asia-Pacific region, including Australia, Bangladesh, China, India, and Taiwan (AVA 2010). Singapore is a major transshipment point of frozen tuna captured within Southeast Asian waters.

Fish Utilization

Being strategically positioned in the midst of the major fishing countries in Southeast Asia, during the 1970s the Singapore government recognized the opportunity to develop and modernize its seafood processing and exporting industry (Yeap *et al.* 2001; AVA 2010). Since then, the government has transformed the nation's fish processing and wholesale/distribution industry from a predominantly domestic, labor-intensive, 'backyard' industry into one of the most modernized, automated, and high-capacity distribution points in the world (AVA 2010). The government maintains quality control over Singapore's state-of-the-art processing and distribution industry, promoting HACCP and ISO22000 certified operations (AVA 2010; NSPL 2008). Processing and export of frozen and dried/smoked seafood products includes freezing, icing/chilling, salting/drying, smoking, minced products, and surimi production (AVA 2010).

Fish product exports primarily are to China, US, Japan, Korea, EU, Australia, Russia, Brazil, and Southeast Asia, particularly peninsular Malaysia (Yeap *et al.* 2001; AVA 2010). Export market destinations include regional and distant wholesalers and retailers (including supermarket chains), and local and regional hotels and restaurants (AVA 2010). Singapore is the largest distributor in the ASEAN region of swordfish and tuna to the US (Yeap *et al.* 2001; AVA 2010). Some processing and wholesale operations are 100% owned subsidiaries of US corporations.

Fish Markets

JFP's Jurong Central Fish Market is one of the busiest and most modern seafood centers in the world, and is where 80% of all fish imports into Singapore are sold (AVA 2010). There are about 100 fish merchants licensed by the AVA conducting wholesale fish business at the Jurong Fish Market (AVA 2010). On average, each day between 2,000 and 3,000 fish retailers, fish processors, and institutional buyers come to JFP's fish market to buy fish. An average of 200-250 tons of fresh fish is handled each day at market, representing more than a hundred species of fish and shellfish (AVA 2010). Fish displayed for sale in the market have freshness maintained through modernized cold storage capability. Fish are sold wholesale in bulk at a negotiated price. Peak hours of sale are between 0200 and 0600 hours, except on Monday mornings when the market is closed (AVA 2010).

At the SFP fish market, there are 25 AVA-licensed fish merchants based who handle about 15,000 tons of fish per annum (SFMGA 2008). About half of this volume comprises supply landed by local offshore trawlers, in-shore vessels, and fish farms, while the rest of the fish are imported (SFMGA 2008). On average, 700 to 1,000 fish retailers, fish processors, and institutional buyers come daily to the SFP fish market to buy fish (AVA 2010). Peak hours of sale are between 0200 and 0600 hours, except on Monday mornings when the market is closed (AVA 2010).

Primary seafood products sold at market include sea bream, salmon, codfish, threadfin, white pomfret, Chinese pomfret, red grouper, Spanish mackerel, horse mackerel, big sea bream, wolf herring, rabbit fish, shrimp, crabs, and squid (SFMGA 2008). The main export products are swordfish, tuna (yellowfin, bigeye, albacore, bonito, and skipjack), oilfish, marlin, shark, and other coastal pelagics, including mahi mahi, wahoo, and mackerel (AVA 2010).

3.7.3 Socioeconomic Contribution of the Fisheries Sector

The country has the highest trade-to-GDP ratio in the world at 408%, signifying the importance of trade to its economy; in particular, trade in energy products, metals and minerals, and agri-commodities (IE 2014). There are currently about 400 global trading companies in Singapore (IE 2014). In 2012, the trading community generated offshore trade revenue of S\$1.2 trillion and S\$15.6 billion in local business spending (IE 2014).

During 2013, Singapore's total external trade declined by 0.5%, reaching S\$980.2 billion. Total exports expanded by 0.6% while imports declined by 1.6% (IE 2014). During 2013, China took top spot as Singapore's number one trading partner, recorded at S\$115.2 billion (+11%); exports to China increased 10.3% to reach S\$60.5 billion (IE 2014). This was followed by Malaysia (113.6 billion), EU (96.6 billion), the United States (77.7 billion), and Indonesia (74.7 billion) (IE 2014).

Role of Fisheries in National Economy

With limited land mass and coastal waters, Singapore's agriculture, forestry, and fisheries production together contribute less than 1% to the country's GDP (NSPL 2008). Singapore's imports and exports of live, chilled and frozen seafood were valued at about US\$509 million and US\$227 million respectively in 2006 (NSPL 2008). Aquaculture industry production value is estimated at between US\$76 million and US\$85 million per annum (AVA 2010; NSPL 2008).

Singapore is known as the "Ornamental Fish Capital of the World." It is the top exporter of live ornamental fish on the planet, supplying approximately 500 species of ornamental fish from the local

farms to retailers and hobbyists worldwide (AVA 2010). Ornamental fish account for approximately 40% of total annual fish sales (AVA 2010).

Demand and Supply

Singapore's consumption of fish is estimated to be 100,000 tons per year (AVA 2010; NSPL 2008). An estimated 90-95% of seafood consumed is imported from foreign nations, particularly Indonesia, Malaysia, Thailand, and Vietnam (AVA 2010; NSPL 2008). Approximately 5% of Singapore's seafood consumption is accounted for by local foodfish aquaculture, mainly from coastal fish farms (AVA 2010; NSPL 2008). The local aquaculture industry comprises six land-based farms and approximately 97 sea-based farming operations (NSPL 2008; AVA 2010). Locally farmed marine foodfish species include groupers, seabass, snappers, and milkfish. Marine mollusks (predominantly green mussels) and crustaceans (shrimp, mangrove crab) are also farmed. There are also a few freshwater foodfish farms that produce tilapia, catfishes, snakeheads, carps, and other cyprinids for consumption (AVA 2010).

Food Security

Singapore produces less than 5% of the total food it consumes (NSPL 2008), including seafood (estimated 95% imported). At-sea and on-land aquaculture production is increasing because of being promoted by the Singapore government (AVA 2010; NSPL 2008). This includes the development of new offshore farms to increase seafood supply as part of Singapore's overall food security policies (NSPL 2008).

3.7.4 Trends, Issues, and Developments

The Singapore government is currently trying to increase the volume of tuna that are transshipped through Changi International Airport, which is home to Southeast Asia's largest freight airfield (Park 2013; Undercurrent 2013). This is important due to increasing seafood handled from Indonesia, particularly frozen tuna, that is flown to Japan and China (Park 2013). However, increased international scrutiny of Singapore's fish market is occurring by environmental advocacy organizations, leading to negative media attention in recent years regarding the potential role that their fish markets and transshipping operations play in perpetuating illegal and overfishing, particularly with respect to Singapore's transshipment of tuna (Greenpeace 2013).

As a result, both the Government of Singapore and the private sector have begun to work with international interests in promoting regional fisheries sustainability and decreasing IUU fishing. On the government side, Singapore is working to implement FAO's Port State Measures Agreement to prevent, deter, and eliminate IUU fishing by rejecting and prohibiting known fishing vessels that have been blacklisted by the Australian government for illegally catching toothfish from Antarctic waters (FIS 2010). Both the Commission for the Conservation of Antarctic Marine Living Resources and the World Wildlife Fund have applauded the Singapore government for taking these actions (FIS 2010).

As a Singapore-based fishing company and one of the world's largest tuna producers, Tri-Marine International has responded to growing international concern with overfishing of tuna by become a private sector advocate and active partner in promoting sustainable tuna fisheries management within commercial operations (Ramsden 2013). Tri-Marine operates a fleet of 21 offshore fishing vessels, including 10 tuna purse seiners under US flag, and five purse seiners and four pole and line vessels under Solomon Islands flag (Ramsden 2013). The company is actively implementing private sector measures to

reduce bycatch, eliminate specific gear types, ban shark finning, and implement product traceability measures (Ramsden 2013).

The Government of Singapore promotes development of fish processing and transshipping, and encourages foreign investment into the fisheries sector. AVA organizes and hosts study tours, seminars, and training workshops for industry members in Singapore in order to increase technical knowledge and skills, build seafood industry networks, and increase food safety and product quality (AVA 2010). In 1969, the Southeast Asian Fisheries Development Center (SEAFDEC) established the Marine Fisheries Research Department (MFRD) in Singapore as one of the primary SEAFDEC Departments. The mission of MFRD is “to promote the development of fisheries post-harvest technology in Southeast Asia through research and development and transfer of technology to the fish processing industry in the region” (SEAFDEC 2014). In 2007, the Agri-Food and Veterinary Authority (AVA) of Singapore was authorized by the SEAFDEC Governing Council to be a ‘Collaborating Center of SEAFDEC’, allowing the AVA to implement MFRD-supported activities and programs (AVA 2010; SEAFDEC 2014). Through this arrangement, the Singapore government works with MFRD to coordinate and conduct applied research that promotes fisheries post-harvest technology and industrial development of regional fish processing operations, including within Singapore. Current Singapore-based MFDR programs include (AVA 2010; SEAFDEC 2014):

- The preparation, publication, and promotion of technical guidelines on Traceability Systems for Aquaculture Products in the ASEAN Region;
- Regional consultation and training in monitoring biotoxins (chemical and drug residues) in seafood products; and
- Promoting regional value-addition in freshwater fish products.

In addition, the AVA conducts research and development on post-harvest products, including the development of high-value smoked fish, fishball, and fishcake export products (AVA 2010).

3.7.5 Private Sector Profiles

List of companies/associations

There are three primary seafood associations in Singapore:

- Seafood Industries Association of Singapore (SIAS), representing seafood processing, manufacturing, and trading companies in Singapore;
- Singapore Food Manufacturers’ Association (SFMA), focused on upgrading local fish processing industry; and
- Singapore Fish Merchants General Association (SFMGA), representing 90% of fish merchants at the Jurong Central Fish Market, where 80% of fish imports are sold in Singapore.

Each of these associations is briefly introduced, below.

The **Seafood Industries Association of Singapore (SIAS)** was formed in 1988, through significant assistance provided by the AVA. The SIAS has 53 ordinary member companies and nine associate members. The SIAS works towards improving the image of Singapore’s seafood industry, and promoting Singapore as the primary seafood manufacturing, processing, and trading center in the Asia Pacific region. The three objectives of the SIAS are to: (1) work for the well-being of members; (2) upgrade the business quality of members; and (3) encourage members to penetrate overseas markets. SIAS

membership activities include: (a) regular dialogue meetings with AVA in achieving better understanding between public and private sectors on various trade issues; (b) attending seminars, workshops and conferences to discuss and disseminate latest industry technology and developments, such as upgrading of factory automation, mechanization and hygiene, import requirements and export health certifications; (c) working closely with the Singapore Economic Development Board and Trade Development Board to achieve better overseas market access and improve enterprise development through various assistance schemes, such as upgrading of factory automation and mechanization; (d) active involvement and participation in ASEAN Fisheries Federation and Southeast Asia Fisheries Development Centre (SEAFDEC) events and conferences; and (e) participate in regular overseas trade missions to countries such as Japan, China, Vietnam, Myanmar, Bangladesh, India and South Africa, for further enhancement of product sourcing and market penetration.

Singapore Food Manufacturers' Association (SFMA) is a trade association formed in 1967 by a small group of local food manufacturers with the purpose of developing and promoting the Singapore food manufacturing industry. Members comprise small family concerns, small-and-medium enterprises, public-listed companies, traders, and various supplier companies related to food industry. With over 300 members, SFMA is Singapore's leading body for the food manufacturing industry, and endorsed by Singapore Government bodies. The mission of SFMA is to unite local food manufacturers for mutual benefit and growth. SFMA works to enhance the co-operation between food manufacturers and supporting industries in the hope of greater economies of scale and bargaining power. SFMA acts as a bridge between the relevant government authorities and the food manufacturers so as to respond effectively to the government's policies in helping to promote the development of the food industry. SFMA also serves as the primary intermediary for local and foreign business matching and contacts.

The **Singapore Fish Merchants General Association (SFMGA)** was set up in 1969 by fish wholesalers in Jurong Central Fish Market. Approximately 90% of the fish merchants in the Jurong fish market are SFMGA members. Major SFMGA clients include retailers, supermarkets, restaurant suppliers, and seafood suppliers from west Malaysia.

The AVA works closely with SIAS, SFMA, and other government agencies to promote the growth and development of Singapore's local fish processing industry.

There are approximately 100 licensed seafood-processing businesses in Singapore (NSPL 2008; AVA 2010). Some of the largest and most influential private operators include:

- Chun Cheng Fishery Enterprise Pte. Ltd.
- Song Fish Dealer Pte. Ltd.
- Tri-Marine International Pte. Ltd.
- Pan Ocean Singapore Pte. Ltd.
- Snorre Food Pte. Ltd.
- Ben Foods (Singapore) Pte. Ltd.
- Eastern Harvest Foods (Singapore) Pte. Ltd.
- Bari Trading (Singapore) Pte. Ltd.

3.8 Thailand

The following marine capture fisheries profile is based on FAO Fisheries and Aquaculture Profile for the Philippines last updated in 2009 (FAO 2009b).

THAILAND FISHERIES PROFILE SUMMARY

- The marine fisheries are classified into small-scale fisheries and commercial fisheries
- The commercial fishing vessels contribute about 90 percent of the marine catch. Thailand commercial fishing boats fish outside the Thailand EEZ in the South China Sea area.
- Fishing gears employed are medium- to large-size trawls, purse seines, encircling gillnets and large drift nets.
- 80% of all fishing boats are small scale
- Songkhla, Pattani, Samut Sakorn, Nakorn Si Thammarat, and Trat are the largest ports
- About 81 percent of marine catch is used for human consumption, the balance of 19 percent becomes animal feed
- Most (over 85%) of the 2,500 processing are small, traditional plants (i.e. producing fish sauce or smoking and drying fish). There are 177 freezing plants 50 canning plants. There are 96 fishmeal plants.
- The growth of international fish trade has been remarkable.
- The major markets for Thai fish products are Japan, USA and the EU. In Southeast Asia this includes Singapore, Malaysia, Brunei
- The primary fisheries association is the National Fisheries Association of Thailand located in Bangkok.

3.8.1 Production Sector

Overview

Thailand is one of the top fish producing nations in the world. Its geographic advantage contributes to the high annual fish production (FAO, 2009). Thailand has a coastline of about 2,600 km. The marine fishing grounds in the Gulf of Thailand and in the Andaman Sea, within Thailand's Exclusive Economic Zone, cover a total area of about 316,000 km². In 201,007, total production was about 4 million tons, of which 58 percent came from marine capture fisheries. The balance was contributed by coastal aquaculture, freshwater aquaculture and inland capture fisheries at 23 percent, 13 percent and 6 percent, respectively.

Catch profile

Reports on marine capture fisheries distinguish fishing in Thai waters from fishing outside Thai waters. The fishing grounds that fall within Thailand's Exclusive Economic Zone lie in the Gulf of Thailand and in the Andaman Sea. It is estimated that, of the total marine catch, 60 percent is caught in Thai waters (41 percent caught in the Gulf of Thailand and 19 percent in the Andaman Sea), the rest is from waters outside the Thai EEZ. The marine catch in Thai waters in turn is broken down into commercial fishing and small-scale fishing. Both have shown a decreasing trend, especially during the period 2002-2009, when the total catch decreased at a rate of 1.7 percent per year. The commercial fishing vessels contribute about 90 percent of the marine catch, the balance is obtained by small-scale/artisanal fishing. In commercial fisheries the catch is usually reported in terms of: food fish (55 percent 2006), trash fish (28 percent), cephalopods (6 percent), shrimps (3 percent), crabs (2 percent), mollusks (1 percent) and others (5 percent).

Landing sites

In terms of quantities of fish landed, the following species are the most important: threadfin bream, Indo-Pacific mackerel, coastal tuna, bigeye snapper, squids, sardines, round scad and anchovies. Songkhla, Pattani, Samut Sakorn, Nakorn Si Thammarat, and Trat were the largest ports in terms of both quantities and value of landings.

Fishing Practices and Systems

The marine fisheries are classified into small-scale fisheries and commercial fisheries. The commercial fisheries use inboard-powered boats of over 5 gross tons, generally deploy efficient fishing gears and have the capacity to fish offshore and spend several days at sea in one fishing trip. The typical fishing gears employed are medium- to large-size trawls, purse seines, encircling gillnets and large drift nets. The small-scale fisheries use boats that are less than 5 gross tons and are either non-powered, or have outboard or inboard engines. Most small-scale fishermen live at or close to subsistence level. They operate near shore and use traditional fishing gears. The typical fishing gears are small trawls, gillnets, push nets, lift nets, set bag nets, traps, hook and line and other stationary gears that operate in estuaries, bays and inshore waters. A census survey of marine fisheries established that 80 percent of fishing boats were small-scale. The commercial fishing vessels contribute about 90 percent of the marine catch. Thailand commercial fishing boats fish outside the Thailand EEZ in the South China Sea area. The number of boats include trawlers 41 percent, stick-held falling nets 25 percent, gillnetters 14 percent, purse seiners 11 percent, and others 9 percent.

Main resources

Demersal fish are caught mainly by otter trawls, pair trawls, beam trawls and push nets. The demersal fish resources in coastal waters have been severely depleted, as shown both by estimates of potential yields of various fish stocks and by the change in catch composition towards smaller-sized fish and low-value species. Trash fish currently constitute about 60 percent of the total trawl catch and between 18 percent and 32 percent of trash fish are juveniles of commercially important fish species. Most of the trawling gear and push nets in use have cod-ends equipped with netting of small mesh size and catch fish of small size. Presently, the size of trash fish caught ranges from 3.5 to 17.5 cm total length. The bigger ones are pelagic fish e.g. sardine and Indo-Pacific mackerel, in contrast to the demersal fish, most of which are small, the exception being some long-bodied species, e.g. *Saurida elongata*. Indo-Pacific mackerel found in the trash fish ranges from 5 to 16 cm total length. Trash fish includes juveniles of commercial fish.

The amount of trash fish supplied directly to fishmeal factories is high. However, the capacity of these factories is sufficient to absorb all available trash fish. Also, during the past 30 years the mean length of Indo-Pacific mackerel has shown a decreasing trend, from 18 cm to 15 cm total length. This is further evidence of over-exploitation. The species composition of benthos has changed markedly as a result of fishing by trawlers. Trawling gears use small mesh size cod-ends, 2.5 cm stretch mesh size for fish, and 1.5 cm for shrimp trawls, and even smaller mesh on push nets. This small mesh size results in the capture of a high percentage of trash fish, which are supplied directly to fishmeal factories.

In the Gulf of Thailand, pelagic fish are caught by bamboo stake traps, purse seines (Chinese, Thai, through aggregation techniques and anchovy purse seining), mackerel encircling gillnets and drift nets. Important pelagic fish are mackerels (*Rastrelliger* spp.), round scads (*Decapterus* spp.), sardines

(*Sardinella* spp.), anchovies (*Encrasicholina* spp. and *Stolephorus* spp.), Spanish mackerel (*Scomberomorus* spp.) and tunas (*Thunnus* spp. and *Euthynnus* spp.). In the past, Indo-Pacific mackerel (*Rastrelliger brachysoma*) was the most popular fish for Thai consumers. Large quantities of Indo-Pacific mackerel were caught and accounted for about 47 percent of pelagic fish catches. However, following the development of improved pelagic fishing gear and techniques, sardines and round scads became the major contributors to the small pelagic catches, accounting for 41 percent and 26 percent of the total pelagic catches, respectively. Indo-Pacific mackerel (*Rastrelliger brachysoma*) stocks in the Gulf of Thailand have been fully exploited and sardines (*Sardinella* spp.) have been over-exploited. The penaeid prawn (*Penaeus* spp.) resources have been over-exploited. The small-sized shrimps (*Trachypenaeus* spp. and *Metapenaeopsis* spp.) have also been over-exploited. Thirty species of cephalopods from ten families and 17 genera are found in Thai waters. Squids, cuttlefishes, and octopuses are exploited commercially.

Management applied to the main fisheries

The Department of Fisheries (DOF) has played an active role in promoting fisheries and aquaculture development in Thailand. Since being reorganized in B.E. 2545 (2002), it has engaged in the study, research and development on fisheries resources management; in controlling of fishing and aquaculture; in promoting supply of sufficient fishery products having the sanitary standards required for domestic and export markets; and, it has promoted sustainable and optimum utilization of fisheries and aquatic resources.

Under the “Thai Fisheries Act”, fishery management measures have been formulated and implemented for the purpose of recovering depleted fisheries resources. The main fishery management measures are area and seasonal closures, gear restrictions and limited entry through licenses. Generally, three different types of licenses are issued to fishermen: a fishing license, a fishing gear license and a leasing area license. The owner of these licenses is subject to pay duty fees. Their rate is specified in the Fisheries Act.

The Fisheries Act of B.E. 2490 (1947); “aquatic animals” are defined as all aquatic flora and fauna. Moreover, fishing areas are divided into four types⁹, i.e., a sanctuary area, a leasable area, a reserved area, and a public area. The Act also determines penalties for any offence. The penalties are different depending on the nature of the offence. The severity of the penalty increases when the offence is related either to fishing in a sanctuary or in reserved areas or violates any associated regulation proclaimed by the Minister. After B.E. 2490 (1947), the Fisheries Act was revised twice. The first revision was done in B.E. 2496 (1953). The major modifications were (a) to prohibit encroachment on fishing grounds by any construction; (b) to prohibit the use of fishing grounds for planting lotus, rice, kenaf, and other aquatic plants¹⁰; and, (c) to prohibit anyone to remove from its natural habitat any aquatic animal or egg of any aquatic animal specified in the Decree Ordinance. The second revision was done in B.E. 2528 (1985). Its main purposes were: (a) to increase the severity of penalties; (b) to empower the authority force owners of fishing boats or fishing vessels to be responsible for any damage or expense that may occur if the boat or vessel violates laws and agreements concerning fishing in foreign fishing waters; and (c) to strengthen the definition of “aquatic animals”.

Management and development of the Thai fishing industry is the responsibility of the Department of Fisheries.

It works closely with various organizations, both governmental and private to ensure efficient management and sustainable development of fisheries as well as to promote the export of fish and fishery products. The DOF liaises with various public agencies such as the National Economic and Social Development Board, Thailand's Board of Investment, the Ministry of Natural Resources and Environment, the Department of Trade Negotiation, the Department of Marine and Coastal Resources, and the Navy's Civil Affairs Department. In terms of development of the export of fishery products, the DOF works closely with the Ministry of Commerce (Department of Foreign Trade and Department of Export Promotion), the Ministry of Finance (Department of Customs), the Ministry of Public Health (Department of Medical Services and the Food and Drug Administration). Besides, the DOF cooperates with the Ministry of Industry (Department of Industrial Works) for matters related to imports related to fisheries.

3.8.2 Post-Harvest Sector

Fish Utilization

About 81 percent of marine catch is used for human consumption; the balance of 19 percent was trash fish which becomes animal feed. Of the 81%, 24 % was consumed fresh and the remainder processed through chilling, freezing, canning, or was steamed or smoked, dried and/or salted, and/or converted into shrimp paste or fish sauce.

Most (over 85%) of the 2,500 processing are small, traditional plants (i.e. producing fish sauce or smoking and drying fish). There are 177 freezing plants 50 canning plants. There are 96 fishmeal plants.

Fish Markets

Fish marketing in Thailand is complex. There are many different types of markets and a very large number of traders of different types. Fish is sold fresh as well as in processed form. To transfer fish to consumers several categories of traders are involved; they work in either primary markets, intermediate markets or terminal markets. The primary market is the point where fish marketing starts. It occurs at the landing places. The intermediate market is the point where fish is redirected to the terminal market. The terminal market is the market where fish is sold to consumers through retail outlets including supermarkets, restaurants and hotels. It should be noted that in Thailand the intermediate market level is composed of the central assembly market and the wholesale market. The central assembly market, in turn, can be divided into the state assembly market and the private assembly market. State assembly markets are managed by the Fish Marketing Organization (FMO) located in central Bangkok, in the provinces of Samutsakorn and Samutprakarn. The Bangkok market handles both marine fish and freshwater fish, whereas the other two markets handle only marine fish. Fish is sold through registered fish agents⁶. Most selling and buying of fish is carried out through an auction. However, auctions are gradually being replaced by price negotiations. The second market type is the private assembly market. The markets of this type are run by private individuals, normally someone who owns land in a suitable location. Prices are determined either through auctions or negotiations. There are two private assembly markets where selling and buying is carried out through auction, one in the province of Samutsakorn and the other in the province of Nakhonsrithammarat.

3.8.3 Socioeconomic Contribution of the Fisheries Sector

Role of Fisheries in National Economy

The gross domestic product (GDP) of the fisheries sector was equal to about 1.2 percent and 9.9 percent of the national GDP and of the agricultural GDP, respectively. The fisheries industry has contributed directly to the growth of other related industrial activities such as ice manufacturing, cold storage, fish processing, ship building, etc. The number of people engaged in this sector was estimated at about 2 million, of which 40 percent are fishermen and fish farmers, and 60 percent are employed in other related and supporting industries. The fish produced are either consumed domestically or exported. It is an important source of animal protein and this is reflected in a per caput fish consumption fluctuating between 32 and 42 kg during the past decade. The export value of fish and fishery products has increased significantly

Demand and Supply

Fish is the primary source of animal protein for most of Thailand's population, particularly in the coastal and near coastal provinces. Price is a decisive factor influencing consumers' choice of product and in Thailand the price of fish generally is increasing compared to other sources of animal protein. However, the level of per caput fish consumption varies among Thai people. Differences may be explained by differences in household income or species preference and by geographic location.

Food Security

Fish is an important component in the diet of Thai people. There are more than 2,500 fishing villages along the Gulf of Thailand and on the Thai shores of the Andaman Sea. Over 80 percent of fishermen engage in traditional or small-scale fisheries. The fish they land is an important source of income and of food for them and neighboring communities.

Trade

Thailand ranks as one of the world's leading exporters of edible fisheries products. The annual growth in value of fisheries exports has been around 4 percent. The major markets for Thai fish products are Japan, the USA and the EU. In Southeast Asia this includes Singapore, Malaysia, and Brunei. Of the total export value, shrimp products and canned tuna contributed 36 percent and 27 percent, respectively. However, the country's balance of payment is also burdened by payments for significant quantities of tuna that are imported for processing and re-export. Thailand is the top importer of fresh, chilled and frozen tuna.

Employment

The labor force of Thailand engaged in marine capture fisheries was estimated at 50,000 households. The total population engaged in marine fisheries was estimated to be 500,000 persons.

There is an effort to stop using illegal labor, child labor, forced labor and human trafficking throughout the industry supply chain. The industry has recently implemented an action plan to address labor issues. This is being led by the Thai Fishery Producer Coalition, a private sector collaboration of nine associations. There is a push to register all labor.

3.8.4 Trends, Issues, and Developments

Those who fish in the waters of Thailand face the problems caused by overfishing. The biomass of exploitable fish stocks has fallen and this leads to conflicts among the groups that exploit these resources. The problem is amplified by the high cost of fishing, particularly fuel, and the low price of some species. Also, commercial fisheries have persistent difficulties in recruiting the crews, which leads to increasing costs for labor. Those fishing waters outside the Thai EEZ, in addition to dealing with the high cost of production and shortage of crew, must obtain assurances that they are permitted to fish before doing so in the EEZs of neighboring countries. Nevertheless, Thai fishing vessels are frequently seized by neighboring coastal states, and skippers accused of illegal fishing and/or unlawful intrusion in the EEZ of the country concerned.

Excess capacity, unstable supply of raw materials and lack of efficient control over the quality of raw materials are the major problems encountered by the commercial fish processing plants. As for the small, traditional plants, they have difficulties to develop new products to meet evolving demand, possibly due to lack of credit and appropriate technology.

Shortage of raw materials, insufficient control over the quality of imported raw materials, and several forms of non-tariff barriers are the main problems confronting Thai companies that sell fish and fish products on the international market.

3.8.5 Private Sector Profiles

The primary fisheries association is the National Fisheries Association of Thailand located in Bangkok. The address is 1st floor, NFAT Building, 96/67-68 Moo 9, Rama II Road, Bangmod Jomthong.
www.thaifishery.com

Others include:

- Thai Fishery Producers Coalition
- Thai Frozen Foods Association
- Thai Food Processors Association
- Thai Tuna Industry Association
- Thai Shrimp Association
- Thai Overseas Fisheries Association
- Thai Feed Mill Association
- Thai Fishmeal Producers Association
- Thailand Federation of Small Scale Fisherfolk Association

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3.9 Vietnam

The Vietnam profile is based largely on the FAO Country Profile (FAO, 2005).

VIETNAM FISHERIES PROFILE SUMMARY

- Fishery inshore and offshore
- In the shallow-water offshore fisheries, it is mostly small trawlers using purse seines, longlines and various traps
- Offshore fleet relatively small number (400-500 hp) using either trawlers or purse seines. Many fish outside Vietnamese waters, especially boats from the southern province of Cau Mau that fish in the South China Sea.
- Big foreign boats often penetrate into Vietnamese seawaters fishing illegally
- There are over 80 landing places for mechanized boats. However, few are fully suitable for large-scale offshore fishery use.
- Percentage use of the marine finfish catch is 20% export, 20% fresh human consumption, 25% animal feed and fish meal and 25% fish sauce
- Large number of processors and exporters; well-developed industry; export products shrimp, fish, squid, cuttlefish, dried fish. Freshwater fish are the primary export.
- Export markets include China, Hong Kong, Malaysia, Singapore, Thailand

3.9.1 Production Sector

Overview

Viet Nam has a coastline of 3,260 km that crosses 13 latitudes, from 8°23'N to 21°39'N. There are four main fishing areas: Gulf of Tonkin, shared with China; Central Vietnam; South-eastern Vietnam; and South-western Vietnam (part of Gulf of Thailand), shared with Cambodia and Thailand. Marine catches are highest in Central and Southeast Vietnam. The Mekong river delta provides over 75% of the total marine landings and therefore most of the fishing industry is concentrated in the southern provinces, from Khanh Hoa to Ca Mau.

Inshore fisheries are considered by fishers and the government to be over-exploited, causing hardship for many coastal communities. Intervention is required to improve management and performance with regard to productivity and biodiversity conservation, and find alternative livelihoods for those unable to make a living from fishing. Offshore fisheries have been strongly promoted by the Government since 1997. While the north

(Tonkin Gulf) and west (Gulf of Thailand) fisheries appear to be over-exploited, the grounds in the east and south are becoming increasingly exploited and could have some scope to support additional fishing effort. However, few data are available on the resource or optimal sustainable yield. Until further research is completed, it is considered that inshore fishing effort should be reduced and offshore limited to approximately its present level. The rationale of containing expanded exploitation of those resources from the vagaries of continued unrestricted exploitation is by itself sufficient reason to give high priority to improving the currently rather ineffective sector governance and that the benefits of such a strategy would exceed the risks. Enforcement of the recently adopted Fisheries Law, particularly the

decentralization of fisheries management and regulation, is a step specifically available to the government to take more effective action.

Catch profile

The natural resource base, particularly in inshore fisheries, has been severely overexploited. Many high value fish resources have declined to a low level. Catches of lower value species have increased and these are also being depleted. Many fishers have abandoned inshore fishing or have resorted to catching small species with fine-mesh nets, mainly for fish sauce production. Offshore fisheries are somewhat better, though generally declining nationwide. Some areas at present are still reporting reasonably high returns according to recent surveys. Nevertheless, some vessels are performing poorly and limit their fishing effort to peak catching seasons. Vessels financed under the Government's offshore fishing vessel subsidized credit scheme have performed poorly, with only around 10% meeting their repayment schedules. Repossession and reallocation of the poorly performing vessels is currently under way. The offshore fishery has the potential to develop into a sustainable fishery, but runs the risk of overcapitalization and over-fishing. Improved management is urgently required. Inland fisheries production is more limited and could benefit from the establishment of sanctuaries to protect critical natural habits, appropriate gear, and closed fishing seasons during the main spawning periods in selected areas as can offshore fisheries.

The most common fishing grounds for Vietnamese fishermen are situated in shallow maritime areas (the area with 0–100m of depth covers about 60% of the EEZ of Vietnam). These fishing grounds represent merely 11% of the EEZ. The southern waters, especially the area in the Gulf of Thailand, serve as the major fishing ground for the local fishermen who are limited to venturing no more than 10nm from the coast or islands. There are also important fishing grounds located on the south-eastern coast between Phu Quoc Island and the Cape of Ca Mau (offshore the estuaries of Mekong River), where fishing is conducted at a depth of 10–40m, not more than 50nm off the coast. Fishing off the southern coast plays an important role in the fisheries industry of the country. On the central coast, fishing is carried out along the entire length of the coast. Generally, fishing in this area is less developed than that on the northern and southern coasts. In all of the 28 provinces in the country that border the sea, there are many small fishing communities using traditional small-scale fishing methods to meet the demands of the local market. This small-scale fishing accounts for one-third of the animal protein in the Vietnamese diet. There has been a nearly five-fold increase in aggregate horsepower of the fishing fleet between 1991 and 2005, as against a catch increase of only half this amount. There has also been a decline in catch per unit of fishing effort. Reports indicate that the catch per unit of effort has decreased from 1.11 ton/hp in 1985 to 0.89 ton/hp in 1991, to 0.34 ton/hp in 2005. Based on data collected on gear structure, size of boat, fishing grounds, etc. from 1997 to 2000 by scientists of the Research Institute of Marine Fisheries, through interviews with skippers of fishing vessels operating in inshore waters (50m deep) in Vietnam, the catch rate from coastal waters (T) was estimated. The quantity T is calculated as the ratio between total catch of coastal waters within 50m deep and total catch of the whole area:

- For Tonkin Gulf: $T_1 = 95.9\%$.
- For central region: $T_2 = 72\%$
- For southeast-west region: $T_3 = 83\%$.
- For the whole country: $T = 82.1\%$.

Total catch from coastal waters in Vietnam thus constitutes some 82% of the total national marine catch. Results of an assessment of marine fisheries resources in Vietnam shows that the MSY yield in the area of 50m depth is about 582,212 tons, whereas the catch in practice has exceeded this level since 1986. For instance, in 1998, the catch was 928,272 tons or 1.6 times higher than the MSY level. The marine catch in Vietnam has increased 4.5 times during the period 1980 to 2007, from 400,000 to 1,800,000 metric tons, a yield much higher than MSY. The coastal catch has continued to be higher than the maximum sustainable yield and has continued to show growth. This indicates a situation of over-fishing in sea waters of less than 50m depth. Moreover, fishing pressure is still increasing because of the annual increase of small fishing boats. This strongly affects the sustainable development of the sector, and there is a great need for proper policies aimed at reducing fishing pressures in coastal waters.

A number of factors have led to the over-exploitation of inshore fisheries. The mesh sizes of nets are often smaller than the mesh sizes allowed by national regulation. There is a high level of by-catch and incidental catch of small-size/juvenile fish. Harmful fishing gear such as push nets, stow nets, and fixed nets are still commonly used in some places. Trawls have caused damage to seabeds. Destructive fishing techniques, such as explosives, electricity and poison, have not been phased out. Coastal fishery resources are not solely impacted by fishing activities but also by other users of coastal resources, including coastal aquaculture. Areas under aquaculture operations have increased from 491,000 ha in 1990 to 984,400 ha in 2006. Some aquaculture activities such as lobster, shrimp, mud crab, and grouper culture can be considered capture based and as such add to the pressure on coastal fisheries resources. Urban and river runoff and coastal development activities have also increasingly impacted the coastal areas

At the present time, big foreign boats often penetrate into Vietnamese seawaters fishing illegally. Those boats often have length of more than 25 m, engine of more than 200 hp, specially >400 hp in case of trawlers. According to unofficial statistics from Coast guard stations, there are 300-500 calls of foreign boats fishing illegally in Vietnamese seawaters every year. They are active off shore at day time and near shore at night time. The quantity of marine catches taken by foreign fishing boats are not small (estimated of about 100 000 tons/year).

Landing sites

There are over 80 landing places for mechanized boats. However, few are fully suitable for large-scale offshore fishery use. The bulk landings end up in local town and village markets, but high-value species are sold to professional dealers and factories. Some ports have basic facilities such as ice, water and fuel supply. Most ports serve larger offshore vessels with smaller vessels continuing to use traditional landing sites that generally have no support services. Ice supplies are now generally sufficient to meet the industry's needs, though all plants produce blocks which are less effective at fish cooling than the flake ice now used in more advanced fisheries. Processing plants have been established in several ports. In most ports, small- and medium-scale businesses have been established within the port area, providing a range of services supporting the fishing industry.

Main ports are Haiphong, Nam Dinh, Thanh Hoa, Nghe An, Ha Tinh, Quang Binh, Quang Tri, Danang, Khanh Hoa, Ninh Tuan, Binh Thuan, Ba Ria/Vung Tau, Tien Giang, Ben Tre, Tra Vinh, Soc Trang, Bac Lieu, Ca Mau, and Kien Giang.

Fishing Practices and Systems

In 2001, there were 74,495 vessels with a total capacity of approximately 3.5 million cv, capturing mainly in coastal areas with 1.5 million tons of fishing production. Until 2012, the number of fishing vessels is 123,125 (an increase of nearly 1.6 times compared to that of 2001) with a total capacity of over 7.5 million cv (nearly 2.5 times compared to that of 2001).

Vietnam's fisheries can be described as largely small scale. Approximately, 72% of the total mechanized boats in the country are less than 45 hp, and 84% are less than 90 hp. The majority of these boats operate in inshore areas up to 4–5nm from the coast and in less than 50m depth. The inshore fleet is composed of approximately 28,000 non-mechanized canoes and boats and approximately 45,000 small mechanized boats powered with long tail or stationary 1-cylinder diesel engines up to approximately 20hp. Approximately, 82% of the total catch in the country is caught at a depth of less than 50m. These areas constitute the fishing grounds for approximately 84% of the total mechanized vessels in Vietnam. The primary type of small-scale fisheries gears in use are small gillnet (mackerel, shrimp, and cuttlefish), small trawl (shrimp), longline, push net, small lift net with lights (juvenile fish), and traps.

In the shallow-water offshore fisheries, it is mostly small trawlers that are used, but also deploying many other types of fishing gear, such as purse seines, longlines and various traps. The offshore fisheries supply about 90% of the commercial landings, but less than 60% of estimated marine capture landings. The total fleet consists of approximately 20 000 vessels, almost all of them made of wood. Total engine power is approximately 1,000,000 hp, an average of 50 hp per boat. Most vessels are equipped with second hand truck engines. Among these, 6,675 vessels were fitted with engines of 90 hp or above, with a total capacity of 1,000,000 hp (on average 166.5 hp/unit). These form the offshore fleet. Only about 100 vessels (400-500 hp) have the capacity for deep-sea fishing. This fleet comprises either trawlers or purse seiners. Trawlers are used in waters 35-80 m deep in south-eastern waters, whereas purse seiners fish pelagic species in deep waters, mainly off the central region. The estimated percentage of the total catch from major types of fishing gear are; trawling 30%, purse seine 26%, gillnet 18%, lift net 5%, long line 6% and others (fixed net, push net etc.) 15%. Among the main trawling (both pair and single) predominates in the south with around 40% of vessels. Drift gillnetting is more important in the north, while fixed nets are concentrated in provinces with substantial estuaries (e.g. Tra Vinh and TT Hue). It is notable that in Tam Giang lagoon in TT Hue, DOFI and the provincial government are making strong efforts to reduce both set netting and trapping, both of which are environmentally damaging

Main resources

Mangroves are central to the sustainability of many of Vietnam's fisheries, though the provision of habitat to coastal and marine fish and crustacea. It is therefore of concern that Vietnam's mangrove forests have been significantly degraded. According to the Ministry of Agriculture and Rural Development (MARD 2004), since 1943 the national area of mangrove forests has declined from 409,000 to about 155,000 ha.

There are more than 2,000 species of fish, of which 130 are of commercial importance, 1,600 species of crustacean, 2,500 species of shellfish, and a lot of seaweeds. The most important commercial species groups are shrimp, tuna, squid sea bream, snappers, groupers and small pelagics.

Live reef fishing is also a significant sector, but few data are available on production, either of aquarium fish or of live reef fish for the Chinese market. The main species targeted include groupers, snappers and

lobster, either wild caught, or wild caught and grown in cages. Main production areas include northern and central region (Khanh Hoa and Phu Yen). In the North, the main collection and trade areas are located in Quang Ninh and Hai Phong. In Quang Ninh Province, four areas, Coto Island, Thuong Mai Island, Ha Mai Island and Halong City are deeply involved in the trade. In Hai Phong province, Cat Ba Island and Bach Long Vi, both proposed marine protected areas, are the major collection centers. Most reef fish are exported live, often unofficially through transfer to Chinese vessels at sea, at Co To Island, Cat Ba port and other locations.

A number of the fishing gears used in Vietnam result in high catches of by-catch and trash fish. Trawlers (single and pair) typically land between 50 and 70 percent of non-table species of fish, which are used (i) for direct feeding to fish or livestock; (ii) in the manufacture of fish sauce or fish meal or (iii) for conversion into fish sauce. Trash fish landings are estimated at 33 percent of total marine fish landings.

The plan for 16 marine protected areas has been approved, in which a number of marine protected areas have been established such as Nha Trang Bay, Cu Lao Cham, Con Co, Phu Quoc, Hon Cau.

Management applied to the main fisheries

The Ministry of Fisheries (MOFI) (previously) and Ministry of Agriculture and Rural Development (MARD) were merged in 2007 and as a result the fisheries sector and its sub-sectors have been in charge of MARD. The MARD is a government ministry responsible for rural development and the governance, promotion and nurturing of agriculture and the agriculture industry, in Vietnam. The purview of the Ministry includes six sub-sectors including cultivation and livestock; forestry, fisheries and aquaculture, irrigation, the salt industry and rural development; it is also involved in water management and flood control. The Ministry maintains 63 provincial department offices throughout Vietnam. The Ministry itself is located in Hanoi. In 2010, Directorate of Fisheries (D-FISH) was established (according to Decision 05/2010/QĐ-TTg dated 25/1/2010 of the Prime Minister) under the MARD with the main function to advise and assist the Minister of MARD in state management, to execute duties on state management regarding fisheries and to govern public service activities under the jurisdiction of Directorate of fisheries. D-FISH is a Law enforcement agency of Vietnam in directorate of fisheries, aquaculture, hatcheries and logistics.

The Law of Fisheries was enacted by the National Assembly in 2003. After that, the Government developed bylaws to implement the Law of Fisheries. In order to make the implementation work, MARD has issued circulars and directives on fisheries management. Currently, the Directorate of Fisheries, the unit under MARD, is in charge of assisting and advising MARD on the issue of legal documentation. The Department of Capture Fisheries and Resource Protection, which is the unit under Directorate of Fisheries, must assist the Directorate to inform the MARD in issuing legal documentation.

Provinces have a fisheries department under the direction of the Provincial People's Committee, responsible for implementing fisheries law, regulations, licensing, and national fisheries policy at the provincial level. The Provincial People's Committee can make resolutions, decisions, standards, and quotas on fisheries with the province, but not in conflict with the regulations of the Ministry. Each province allocates the allowable effort in its province. Entry rights are allocated first to fishers in their own province. Implementing regulations are established by the Ministry. Each province can make its own regulations based on adapting national regulations to local conditions. Provinces are not permitted to set

up fisheries offices at the district level. Fisheries units are often combined with a district agriculture or forestry office. In communes where fisheries are important, one or two members of the commune are appointed to be in charge of fisheries management. These local fisheries units are self-financed and insufficient funds and human resources are one reason for poor management

The Fisheries Law 2003, enacted in November 2003, came into effect since July 1st, 2004 and other regulations: The Fisheries Law is comprised of 10 chapters and 62 articles and provides for a stronger and more comprehensive legal base for management of fisheries and aquaculture. Although, the Law covers some specific regulations to some extent, further specialized technical matters will be specified in regulations guiding the enforcement of the Fisheries Law to be issued by the Government and MARD (MOFI when the Law was passed). The provincial People's Committees shall have responsibility to issue rules of fishing grounds in rivers, lakes, lagoons, and other natural waters under its jurisdiction in accordance with guidance of MOFI (Article 15).

Decree No 33/2010/NĐ-CP dated 31/3/2010 of the Government on the management of fishing capture of organizations and individuals in Vietnam's sea water. This Decree has divided Vietnam's sea water into 3 areas of fishing zones: (a) the nearshore area, limited by the edge of the coast and the nearshore line; (b) middle area: limited by nearshore line and middle line; (c) offshore area: limited by middle line and the outer limit of exclusive economic zone (see illustrated picture in the Annex). The Decree also provides some regulations on the management of capture fisheries on these zones.

Decision 1690/QĐ-TTg dated 16/9/2010 of Prime Minister on approving Vietnam's fisheries sector development strategy until 2020 (referred to as the Fisheries 2020 Strategy). In terms of marine capture fisheries sub-sector, the Decision focuses on fisheries resource assessment, fishing ground prediction and re-structuring capture vessels on the sea. The Fisheries 2020 Strategy implicitly targets very modest/flat marine fish production increases- in volume terms- over the coming years. While not explicitly detailed, most if not all of the 'increase' is implicitly seen as being derived from offshore areas given the envisaged declines in near-to-shore capacity outlined in the MARD sector plan (though nothing of this nature appears in the 2020 Strategy document). The Fisheries Strategy aims to contribute about 30 – 35% of GDP for the total agriculture-forestry-fisheries sector, with the average growth rate of about 8-10% per year.

Decision 188/QĐ-TTg dated 13/02/2012 of Prime Minister on approval of Fisheries Resource Protection and Development Program till 2020. The program aims to complete the database on fisheries resources and establish 10 MPAs and 19 Inland Protected Areas by 2015. The objectives of finalizing the fishing-closure zoning plans and destructive gear banning by 2015 are also defined. By 2020, nearshore fisheries resources are rehabilitated.

Decision 375/QĐ-TTg dated 01/03/2013 of Prime Minister on approval of the National Program of Re-structuring marine capture production. The Program aims to consolidate the cooperative linkages and collective behaviors among local fishermen in order to support each other when operating on the sea. The targets defined in the program are about 25-30% of fishing vessels operated in cooperative models and 65 – 70% of offshore fishing vessels attached with logistic supplying vessels on the sea by 2015 and; 40% and 90 – 100% by 2020 respectively. The loss of post-harvesting sea-food products is targeted to reduce to less than 15% by 2015 and less than 10% by 2020. The traceability for the whole production chain (from capture, storage, processing to marketing) will be expanded.

Decision 1445/QĐ-TTg dated 16/8/2013 of Prime Minister on approval of Master Plan for Fisheries sector development to 2020 and vision to 2030. The new Master Plan has focused strongly in long-term development of fisheries resources rather pay too much attention in short-term catch increases. This can be seen through the objective of reducing the number of fishing vessels by 1.5% per year in the period of 2010-2030. The Master Plan has also detailed all the development objectives defined in the 2020 Fisheries Strategy into specific targets by 2020 and 2030. These detailed targets are presented in the later section.

Decision 2760/QĐ-BNN-TCTS dated 22/11/2013 by the Minister of MARD on approval of the Sectoral Program on Re-structuring the fisheries sector towards increasing value-added and sustainable development. In the marine capture fisheries sub-sector, the Program aims to reduce capture catch in the nearshore areas and promote offshore catch; reduce post-harvest losses; reach the annual value growth rate of over 3% per year from marine capture and improve the earning and living standards of local coastal fishermen communities. It expects that the incomes from fisheries livelihoods of local fishermen by 2020 will increase by 2.5 times than 2010.

Fishermen communities

Due to the over-exploitation of near-shore fisheries resources, earnings from fishing activities are decreasing, and sometimes are not enough to cover fishing costs. The economic performance of various fleets is decreasing. In this situation, the competition for resources is unavoidable and intensifying—between small- and large-scale fisheries, between fleets, between fishing vessels, and between local fishing vessels and foreign fishing vessels. There is increasing levels of conflict between small and large fishing vessels, use of destructive fishing methods (e.g. explosives; small mesh-sized gear, etc.) and harmful pollution and physical damage to coral reefs and other critical fish habitats. There is an imbalance between fishing capacity (in terms of quantity of fishing vessels) and potential coastal stock abundance.

Most of the fishermen communities are poor. Fishing and aquaculture contributes an average 75% to the fisher household income. Those in the South Central Coast are particularly dependent on marine fishing. Households commonly lack access to formal credit and other fishery support services, such as high quality seed and fingerlings, professional extension, disease control and market information. As opportunities of other sources of income are quite limited, labor migration to other areas is common, including work on foreign fishing fleets, including Korean, Japanese and Taiwanese. The development of the seafood processing industry is attracting many people, mainly women (85%), to come and work in the city.

There are some initial forms of association among households, e.g., credit group and cooperative groups support each other on the sea. According to Directorate of Fisheries (2013), in 2013, there are approximately 3690 fishing cooperatives formed with about 22,850 fishing vessels and 158,720 fishers joined in the cooperatives. At the same time, nearly 50 pilot large commercial scale fishing unions have been established. Currently, those fishing cooperatives and commercial fishing unions have subsequently grown significantly. The household remains dominant in both capture fishing and aquaculture. In 2011, the total number of fisheries, aquaculture and related service households accounts for 4.0% of total households. The fisheries and aquaculture represented the main business of 4.6% of rural households and the primary employment of 5.1% of the national labor force (GSO 2012).

3.9.2 Post-Harvest Sector

Fish Utilization

Percentage use of the marine finfish catch is 20% export, 20% fresh human consumption, 25% animal feed and fish meal and 25% fish sauce

There are a large number of processors and exporters from a well-developed industry. Export products include shrimp, fish, squid, cuttlefish, dried fish. Freshwater fish are the primary export.

High value products will be handled properly. Middlemen sell them to export processing plants or export them directly to China and other countries. Products classified for the domestic market are usually transferred in frozen trucks to big cities as fresh food or to processing plants mainly for dried products. About 40-50% of the total landings of trawl fishery, almost all trash fish, and low value products are used for processing fish sauce. Vietnam produces a total of 80 million liters a year and this expected to increase. There are in total 400 processors nation-wide. The percentage of value-added products of the total processed products is growing constantly from 23% in 2003 to 45% in 2010.

Fish Markets

The marketing system for fish and other products is generally competitive and efficient for the high-value products. Marketing relies on a large number of agents or product assemblers who provide fish to retail outlets, wholesale markets or processors. Market intelligence is limited and requires urgent improvement to assist producers in their investment and marketing decisions. Threats to the seafood market include anti-dumping tariffs on catfish and imminent tariff on shrimp designed to protect some external producers and processors. Processors have done well in achieving certification for a range of products in the US, European and Japanese markets and seem set to expand their market share quite rapidly if permitted to do so. Traceability (e.g., for shrimp) is an issue which requires urgent attention if the European market is to be maintained or developed. The domestic market is less developed than the export market with inefficient and limited direct access to and knowledge of markets. Wholesale marketing capacity is highly limited with only two wholesale markets in Ho Chi Minh City, Long Bien and Phap Van markets in Hanoi. An analysis of the overall fish-marketing situation is warranted, including as assessment over whether the wholesale sector needs to be strengthened to promote competition and increase demand for fish, particularly from more remote inland areas.

As many households lack direct connections to markets, private collectors and small traders play an important role in marketing and distributing raw fishery products, including supply to processors and exporters. The collectors and traders often provide credit and supplies to households, thereby supporting production in a quite efficient manner. However, the many stakeholders and fragmented market chains may in future prove a constraint to traceability, and other increasingly stringent international market requirements.

Marine fish are normally sold to agents at the port or jetty. Fishers often develop long-term relationships with market traders or wholesalers who provide them with credit for fuel, ice and other supplies, and can provide finance for off-season needs or even assist with vessel purchase. Offshore vessels, fish may be sold at sea to buyers on transport vessels or collector vessels run by their agents. Where marine product processing plants are present, vessels may contract to supply them with product. Factories can seek product over a wide area. In the north, significant quantities of fish and other products are purchased by Chinese agents using collector vessels.

3.9.3 Socioeconomic Contribution of the Fisheries Sector

Role of Fisheries in National Economy

In the 5-year period from 1995 to 2000, GDP in fisheries sector increased from 6.664 billion to 14.906 billion and was estimated to increase up to 24.327 billion in 2003. The proportion of GDP of fisheries sector in the entire economy in 1990 was less than 3% while it was 4% in 2000 and kept stable till now. In contrast, GDP in the agricultural sector fell relatively, from 38.7% in 1990 to 24.3% in 2000 and 16.7% in 2003. In the period from 2001 to 2011, fisheries economics contributed over 3% to the national GDP and helped to restructure rural agriculture, alleviate poverty and create more job for about 4 million employees, in which 1.89 million are specialists in fisheries and the rest are fishing-combined workers, contributing to improve daily life for local communities, not only in coastal areas, but also in the Northern Central and the Western Highlands of Vietnam. According to the MARD's report, the entire GDP growth rate was 2.67% in 2013, equivalent to the growth rate of 2012 (2.68%). Particularly, cultivation rose 2.6%, livestock rose 1.4%, forestry increased 5.18% and fisheries rose 3.05%. The production value of agriculture, forestry and fisheries (in comparative price in 2010) was estimated at 801.200 billion dong, increasing 2.95% compared with that of 2012. Specifically, agriculture reached 602.300 billion, increasing 2.47%; forestry reached 22.400 billion, raising 6.04% and fisheries reached 176.500 billion, increasing 4.22%.

Demand and Supply

Fifty percent of fishing production comes from the North and Central region and 40% is from the Southeastern and Southwestern region.

The demand for fish and fish products in Vietnam is high. People consume on average 19.4 kg per year, which is more than half of their animal protein intake. Shrimp is the most favoured product with 60.9%, followed by squid, with 36.6%, and mackerel, 32%. However, consumers have a preference for fresh seafood rather than frozen products. As Vietnamese eat often out of home, restaurants are big demanders. Domestic demand for aquatic products has grown rapidly in recent years in Vietnam. With a population of over 85 million, the home market remains very promising for seafood traders, who will initially focus on large urban areas, including Hanoi and HCM City.

Food Security

Inshore waters also serve as the source of living and food for approximately 88% of the total capture fisheries labor force in Vietnam. On average, people in Vietnam get 50 percent of their dietary protein from different kinds of aquatic products. Domestic seafood consumption has steadily increased from 880 thousand mt in 1990 to 1.434 million metric tons in 2002 (VASEP). Per capita consumption of fishery products in Vietnam increased from 13.2 kg in 1990 to 18.7 kg in 2000 and 19.4 kg in 2002 (Globefish 2004), but fish consumption per capita varies considerably throughout the country from claims of 60 kg/capita in Long An to 30 kg/capita in the Mekong Delta to 12 kg/capita in the North. In the Mekong Delta, 83 percent of the low-income families catch fish in rice fields, canals and rivers.

Trade

Seafood is the third major export product of Vietnam after textile-garments and crude oil. In 2010, Vietnam exported fisheries products to 90 different countries and territories. The main export markets for fishery products are USA (35%), Japan (26%), China/Hong Kong (7%) and Europe (6%). Regional

markets include Singapore, Thailand and Malaysia. The main export products are shrimp, fish, squid, cuttlefish & octopus and dried sea fish products. Among export products, frozen shrimp is the highest earner, pulling 40% of the total revenue.

In 2013, Vietnam exported seafood products to 172 markets, increasing 15 markets more than 2012. The top ten biggest markets accounted for 87% of exporting value. Top 3 biggest markets are the US, EU and Japan, which did not change their positions in the 2012 top importers.

Fisheries sector ranked no. 3 in the list of the largest valuable industry exports in Vietnam. It's also the sector having export turnover of over one billion dollars. In 2000, the export turnover reached \$1.8 billion; \$2.7 billion in 2005 and \$6.1 billion in 2011. These figures showed the continuous growth of the fisheries sector. The total export turnover in 2013 reached \$6.72 billion, increasing 10.25% compared with that of 2012. Specifically, shrimp reached over \$3 billion, increasing 39%; Pangasius reached \$1.76 billion, increasing 1%; tuna reached \$527 million, reducing 7.2%; squid gained \$448 million, decreasing 11%. Obviously, fisheries export brings a large amount of foreign exchange for the country and attracting even difficult markets such as the US, Japan and the EU, with frozen and processed products of catfish and tuna, shrimp or squid.

Tuna exports declined dramatically in 2013 due to reducing demand of imports, after sharply raising imports from the EU and Japan at the end of 2012. On the other hand, the quality requirement was higher while the raw tuna source for processing was insufficient. In 2013, Vietnam exported tunas to 112 markets with total value of \$527 million, decreasing 7.2% compared with that of 2012. The exporting structure of tuna also changed, in which canned tunas rose its proportion from 38% in 2012 to 48% in 2013, approximately \$255 million while raw material for fresh/frozen tunas decreased from 62% to 52% (272 million), declining 23% compared with that of 2012.

Vietnam seafood exports in 2013 reached USD 6.7 billion according to recent data from the Vietnam Association of Seafood Exporters and Producers (VSAEP). The increase was attributed to a great contribution from shrimp exports with more than USD 3 billion, making up 46 percent of the country's total seafood exports. After the positive growth of 2012, exports of tuna, cephalopod and other marine products in 2013 reported a continuous reduction. Lack of domestic raw material, low demand from foreign markets caused by high inventories, hiking import duty and technical barriers led to deep dive in marine product exports, 7.2 percent reduction in tuna exports and 11 percent decline in cephalopod exports. In the second half of 2013, seafood exports to markets recovered, mainly due to a sharp increase in shrimp exports. China claimed to the fourth position in importing Vietnam's shrimp and other seafood products with year-on-year growth of 49 percent and 37 percent, respectively.

Employment

The household remains dominant in capture fishing. In 2011, fisheries represented the main business of 4.3% of households and the primary employment of 5.1% of the national labor force. Levels were highest in South Central Coast (9.9% and 11.3%, respectively) and Mekong Delta (9.1% and 9.8%). Most fishers are small-scale producers.

Fisheries economic development in Vietnam had employed a huge amount of labours, about 800 thousand people in 1991 reached to 3.4 million people in 2000 and almost got 5 million people in 2007 (both expert, occasional and services workers). Labours structure also accumulate into coastal area, from near shore fishing shift into offshore exploitation, terrestrial areas use for farming, processing and

logistic services. From 2001 to 2006, the directed fishing household in whole country raised from 512,342 to 692,197 units with approximately 1.4 million people, accounted for 4.56% of all labours work in agriculture, forestry and fishery, increased 1.11% compared to 2001 while agricultural labours reduced 10.39%.

Coastal districts of Vietnam have a population of about 30 million people, accounting for nearly 40% of the total population of the country (Nguyễn Chu Hòì, 2009). As the area of the coastal districts accounts for only 16% of the total area of the country, the population density in the coastal districts is obviously much higher than the national average. According to Nguyen Quy Duong and associates, in corresponding with the increasing number of fishing vessels, the number of employees in capture fisheries increased from 270,587 (1990) to 700,000 people (2007), in order to meet the raising demand for employees in coastal areas (around 28,000 people per year), including farmers in spare time of crop cultivation. The employees in capture fisheries tend to go up slightly. In 2010, the number of fishers in the country is about 750,000 (Tonkin Gulf: 217,800; Central Coast: 310,600; South West: 126,900; South West: 94,700), accounting for about 17% of the total fishery labor (including fishing capture, aquaculture, processing, services) in the country. Approximately, 600,000 fishers operate in the inshore fishery, with the rest in the offshore fishery (Vietnam Institute of Fisheries economics and planning, 2013). This number, in 2013, is approximately 850,000 people (VASEP, 2013).

Fisheries sector still plays a crucial role in creating jobs and stable incomes for fishermen (Tuyen, 2011). Not only can employees in capture fisheries work, people can find their own jobs in other sub-sectors such as services in-land, purchasing and processing. Furthermore, fisheries are not locally limited when people from other districts/provinces can join into it or cooperate with each other. The research result of Pham Van Tuyen and associates reflected that: offshore capture fisheries brings a more secure life with higher income for fishermen.

Rural Development

Many millions of people throughout Vietnam depend in full or part on the country's aquatic resources. Despite the problems experienced by the inshore fishery, coastal areas are not impoverished to the same degree as many inland or mountain communities. Nonetheless there are poor communities in many coastal provinces, particularly in North-Central Coast and the sand zones of many coastal provinces. Within regions that are considered better off, there are pockets of poverty, e.g., in the Red River delta and Mekong regions, which, because of their very high population density, have the highest total numbers of poor of all of Vietnam's regions. Inland fisheries and aquaculture thus have clear potential to contribute to poverty reduction in the inland and mountain areas. Overall the fisheries sector has been inadequately represented in the nation's poverty reduction strategies, and stronger lobbying by fisheries sector institutions is desirable. Moreover, Government programs in the fisheries sector would greatly foster the Government priority of eradicating poverty through supporting programs that would generate employment, particularly for low-income households, while at the same time allowing market forces to guide the investments.

Household income continuously becomes basic objective in fishery development. Main income structure of households, in 2006, rotation of households working in agriculture/fishery was 66,45%/4,38%, where the biggest income households in agriculture/fishery was 62,94%/4,59% (Mekong Delta - 11,35%, Central coast - 7,8%).

According to social and economic assessment, conducted by World Bank in 2011, in 8 out of 29 coastal provinces of Vietnam (including Thanh Hoa, Nghe An, Ha Tinh provinces in north central; Binh Dinh, Phu Yen, Khanh Hoa in south central and Soc Trang, Ca Mau in Mekong Delta), the average number of member in a household in investigation is 5,05 people, where fishing group (4,79) and low income group (4,5), these figures is the lowest number in whole sample. These figures in investigated area are much higher than average number of member in a household in overall rural areas in country (5,05 compare with 4,14) in Vietnam-Household Living Standards Survey 2008 (VHLSS). Average number of member in household of investigated sample in 3 coastal provinces (Thanh Hoa 5,21; Khanh Hoa 4,97; Soc Trang 4,97), was higher than this indicator in north central, south coastal central and Mekong delta (respectively 4,08; 4,11; 4,16). It is indicator of livelihood pressure for coastal communities and household. According to the survey, the age group of small scale fishers in Vietnam are follows: <20 years old (2%), 21-40 years olds (40%), 41-60 years old: 54 % and >60 years old: 4% and education levels of fishermen are (primary school: 62.5%) and senior high school: 37.5% SEAFDEC, 2013).

Following poor and close poor family survey data, in 2012 of Ministry of labour- invalids and social affairs in whole country, there were 22.375.863 households, where 2.149.110 poor families (occupied 9,6%) and 1.469.727 close poor family (accounted 6,57%). However, there are little research and assessment about poverty, hunger and gender in fishery currently.

The Decision 539/QD-TTg on approval of the list of poor coastal communes and islands for the period 2013 – 2015 provides the List of 311 communes in 22 provinces which are priority in essential infrastructure investment pursuant to Decision No 1489/QD-TTg dated 8 October 2012 of the Prime Minister approving National Target Program on sustainable poverty reduction in period 2012-2015.

3.9.4 Trends, Issues, and Developments

A 2008 study by WWF Greater Mekong—Vietnam, using a case study approach in three coastal communities, found that “ despite Vietnam’s overall steady and significant economic growth, unsustainable management in the fisheries sector has resulted in deepening poverty and increased vulnerability across many coastal communities and particularly those communities strongly dependent on near-shore resources”. This study further stated that threats to sustainability included: 1. Serial depletion of near-shore fisheries. 2. Overcapacity of fleet and competition from higher-equipped boats designed for offshore. 3. Lack of management controls and sustainability triggers (e.g. protective catch limits, precautionary management). 4. Continuation and proliferation of illegal fishing activities. 5. Lack of administrative capacity and human resources within fisheries authorities to address sustainability issues.

The primary issues facing the small-scale fisheries in Vietnam are to restructure the near-shore fisheries and to address over- capacity. A first step is to establish an improved fisheries statistics system at national and provincial levels to provide a base of socio- economic and biological information for research, planning, and management. Much of the innovation in fisheries management in Vietnam is now occurring at the provincial and district levels. These innovative approaches range from the fishing rights program in Tam Giang lagoon in Thua Thien Hue province to locally managed clam fisheries through fishing cooperatives in Ben Tre province to community managed MPAs supported by a local non-governmental organization, Centre for Marinelife Conservation and Community Development (MCD) in Khanh Hoa province to co-management of a lagoon system by core groups and district level government in Binh Dinh province. Stakeholder participation in management is a central focus of these management

arrangements. It is expected that the provinces and district governments will continue to lead in fisheries management innovation in the future. Resources need to be put into developing the capacity of and providing adequate budget for the provincial Department of Agriculture and Rural Development (DARD) staff to implement sustainable fisheries management.

An assessment of the Vietnam fisheries sector by FAO noted the following constraints:

- Survey data and statistics are too weak to be a foundation for managing the fishery sustainably and according to ecosystem based management approaches
- Despite the Fisheries Law (2003) the implementation and control is very difficult and limits effectiveness
- The demand (and price) for trash fish has increased and trash fish landings have become a significant source of income for many fishers
- Overcapitalization (increased fishing effort/horsepower combined with decreased catch per unit effort) is a common feature for coastal, inshore and shallow- water offshore fisheries
- Overcapitalization is aggravated by the fact that there are no regulations to exclude bigger vessels off shallow-water fishing grounds
- Boat and engine repair, and administration, has not kept pace with the development of the offshore fisheries
- Destructive fishing methods such as explosives and chemicals are still used, and have damaged already large parts of coral reef environment
- Credit for fisheries is limited and cannot meet the demand-poor fishing households' lack collateral or access to credit programs, and have not really benefited from sector support based on loans
- Coastal aquatic resources in many regions have been overexploited by and an increasing number of aquatic species are being threatened with (commercial) extinction

According to Scheme of Fisheries Restructure, till 2020, the number of fishing boats will reduce to under 110,000 units. It is expected to gradually decrease coastal fishing boats under 20CV (48.9% to 34.5%) and increase vessels over 90CV (20,7% to 27,3%). Additionally, it is necessary to develop offshore fishing team to capture in exclusive economic zone with over 4500 boats primarily from the central south and south provinces. Besides, we need to encourage some types of efficient fishing such as purse seining and angling while decrease some types of fishing which endanger marine resources such as trawl net, gill net or lift net through some policies on shifting and supporting to train career. Particularly, it is expected to decrease gillnet from 37% to 35%, trawl net from 18% to 15%, lift net from 7% to 5% and fixed jobs from 7% to 5%, but increase purse seining from 3% to 8%.

3.9.5 Private Sector Profiles

Private sector organizations and professional societies play an important role in organizing, encouraging fisheries labor and enterprises to develop their business and production, as well as participating in the sector administration.

List of companies/associations

There are four primary fishing associations:

SUMMARY TRENDS, ISSUES, & DEVELOPMENTS RAISED DURING INTERVIEWS

- Nearshore fisheries are highly overfished due to current overcapacity and competition between small-scale fishers and commercial operators
- Vietnam has a new fisheries management master plan through 2020, including a restructuring plan to move boats and fishing effort offshore.
- Stakeholders agree that there is an immediate need to increase value of fishery products along the supply chain.
- Stakeholders have concerns regarding the social resilience of fishing communities, and aim to increase resilience through livelihood support programs.
- Increased concern regarding maritime security and competition with foreign extractive interests within the South China Sea.

[Anonymous summaries of responses offered by participating Malaysian (Sabah) stakeholders through the interviewing process can be found in the Appendix.]

- a. Vietnam's Fisheries Trade Union is organized through the Vietnam General Confederation of Labor to support fishermen. Since the first Fisheries Trade Union was set up in An Hai commune, Quang Ngai province, 36 Fisheries Trade Unions with 6,000 members have been set up in 12 coastal cities and provinces helping to ensure fishermen's legitimate rights. The trade union also works with government to improve seafood quality by enabling fishermen to have better storage facilities and setting up fishing hubs, and providing support for offshore fishing.
- b. Vietnam Fisheries Society (VINAFIS) VINAFIS is a socio-professional organization established in 1992 on a voluntary basis of people from various economic components evolving in fisheries and operating in various organizations: individual organization, cooperatives and State-owned enterprises. VINAFIS plays a role as a linking organization between the Government and fishermen; it keeps with the Government's objectives and orientations to organize activities for promoting fisheries development and bring back practical benefit to all its members as well as fishermen communities. Social organization, production (raw materials) protection of fishermen concerns and benefits. Nationwide. 400.000 members, provinces network at 32 provinces, technical support for the fishermen in production, processing, other services
- c. Vietnam Association of Seafood Exporters and Producers (VASEP) Private organization, established by the membership/traders, exporters and processors. Nationwide. 15 years, 300 members, Head office in HCMC and representative office in Hanoi, 4 sub-committees (fish, seafood etc). Market development, trade promotion, training and advocacy programs, VIETFISH forum, publications
- a. Phu Yen Tuna Association. Tuna fishing in Vietnam is concentrated mainly in the three provinces of Phu Yen, Binh Dinh and Khanh Hoa. The Phu Yen Tuna Association represents the tuna fishing, processing and exporting industry in the province. The Department of Intellectual Property, Ministry of Science and Technology, recently granted the Phu Yen Tuna Association the Phu Yen Tuna trademark certificate. This is the first trademark of ocean tuna in Viet Nam. On April 24 2013, the Phu Yen People's Committee, working with the Foreign Investment Research Centre (under the University of Economics - Hanoi National University) to develop and implement a Framework Agreement for cooperation of procurement, processing and exporting of tuna with Japanese investors. According to the Framework Agreement, the two parties agreed to establish a joint venture company in Phu Yen province which specializes in purchasing, processing, preserving,

exporting and building up the Phu Yen ocean tuna brand with an aim to enhance quality, stabilize price, conserve fisheries stocks, and ensure fishermen's interests in Phu Yen and adjacent areas.

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4.0 REGIONAL STAKEHOLDER PROFILE

Regional stakeholders that have significant or the potential for playing a significant role improving sustainable management of marine capture fisheries in the Southeast Asia region include international and regional organizations and multilateral arrangements. This section provides profiles of selected regional stakeholders to understand the scope, scale, and capacity of their efforts to address overfishing and IUU. The role of multilateral arrangements in solving illegal fishing in SE Asia was recently examined for three new institutions in SE Asia (Williams, 2013). Profiles of multilateral arrangements are provided in this section, building on this analysis. Regional information presented was compiled largely from existing literature provided online, as cited.

Summary tables of completed regional stakeholder interviews/profiles are provided within the Appendix.

4.1 Partnerships in the Environmental Management for the Seas of East Asia (PEMSEA)

This regional profile was compiled largely from existing information provided online at www.pemsea.org accessed on 8 May 2014.

PEMSEA is an international organization specializing in integrated coastal and ocean governance for the Seas of East Asia (PEMSEA, 2014). It is a partnership arrangement comprised of 11 Country Partners and 20 Non-Country Partners with a collective commitment to the implementation of the Sustainable Development Strategy for the Seas of East Asia (SDS-SEA). The SDS-SEA represents a consensus among Partners on the shared vision, mission, objectives and action programs of PEMSEA for sustainable development of the Seas of East Asia. The project, started in 1994, was originally known as Prevention and Management of Marine Pollution in the East Asian Seas (SDS-SEA). PEMSEA is currently being hosted by the Philippines' Department of Environment and Natural Resources and holds its office in the DENR compound in Quezon City, Philippines. PEMSEA's areas of work include coastal and ocean governance, natural and man-made hazard prevention and management, habitat protection, restoration and management, water use and supply management, pollution and waste reduction management, as well as food security and livelihood management. One of the important tasks that PEMSEA assumes is turning the knowledge about regional coastal into action that can improve the status quo. PEMSEA capitalizes on its broad intergovernmental, financial and intellectual resources to come up with the best solutions problems of sustainable coastal management. Partners derive benefit from PEMSEA's regional partnership arrangement through:

- Joint planning among governments and collaborating organizations, providing opportunities to share perspectives, to explore new ideas and to develop priorities with respect to SDS-SEA implementation.
- Mobilization of resources, capacities and services in support of SDS-SEA implementation, including identifying sources of external resources and financing, and developing and promoting priority projects with donors, the business community and organizations within the region and outside of the region.
- Access to training and scientific and technical advice and assistance for ICM development, implementation and scaling up through the PEMSEA Resource Facility, ICM Learning Centers,

Regional Centers of Excellence, Twinning Network for Integrated River Basin and Coastal Area Management, and Regional and National Task Forces.

- Learning experiences, information- and knowledge-sharing for improved governance at the sub-national level through the PEMSEA Network of Local Governments.
- Partnerships with the business community/private sector in the scaling up of ICM programs, as well as credible and willing investors in environmental infrastructure and conservation projects.
- Inter- and intra-regional collaborations in integrated coastal and ocean management, as well as transfer of new and innovative skills, tools and expertise across projects and programs.
- State of the Coasts reporting on the progress, achievements and gaps in SDSSEA implementation, as well as emerging trends in coastal and ocean management in the region.
- National, regional and global advocacy for sustainable development of coasts and oceans, including responses, advice, standards of practice, guidelines, training and broader technical services that reflect the latest experiences, scientific and technical knowledge and best practices in integrated coastal and ocean management.

The SDS-SEA incorporates relevant international conventions, existing regional and international action programs, agreements and instruments, as well as applicable principles and implementation approaches for achieving sustainable development of the Seas of East Asia. It does not create a new set of obligations but rather complements existing ones. The strategy is designed to:

- Promote regional cooperation for addressing environmental relationships across national boundaries;
- Harmonize interactions and enhance synergies between economic development and environmental management;
- Reinforce relationships between a healthy environment and social issues, such as poverty alleviation, food security, employment and human health; and
- Provide a platform for partnerships among countries of the region, the private sector, NGOs, academe, local communities and other members of the civil society, and UN and international agencies.

PEMSEA is located at the Department of Environment and Natural Resources compound in Quezon City, Philippines.

4.2 Asian Development Bank (ADB) Support to the Coral Triangle Initiative

This regional profile was compiled largely from existing information within ADB 2011, available online at <http://www.adb.org/sites/default/files/ssme-action-plans.pdf>.

To ensure the effective protection and sustainable development of the Sulu–Sulawesi Marine Ecoregion (SSME), the governments of Indonesia, Malaysia, and the Philippines entered into a memorandum of understanding (MOU) on 13 February 2004 (ADB 2011). The three countries agreed to adopt the ecoregion approach to conservation embodied in the Ecoregion Conservation Plan (ECP) that will facilitate the realization of the four fundamental goals of biodiversity conservation: representation, sustainability of ecological and evolutionary processes, viability of species and populations, and resiliency. There are 10 objectives that the ECP hopes to attain in alignment with its 50-year vision. The signing of

the MOU led to the creation of the Tri-National Committee for the SSME. Three subcommittees were created: the Threatened, Charismatic, and Migratory Species Subcommittee; the Sustainable Fisheries Subcommittee; and the Marine Protected Areas and Networks Subcommittee. The action plans of the three subcommittees were launched in 2009.

Within ADB's Southeast Asia Department, the Coral Triangle Initiative (CTI) is a subprogram of the Brunei-Indonesia-Malaysia-Philippines East ASEAN Growth Area. ADB support to the Coral Triangle Southeast Asia focuses on the Sulu-Sulawesi Marine Ecoregion, which was declared as a priority seascape for CTI implementation during the 4th CTI Senior Officials' meeting in 2009.

Regional Cooperation on Knowledge Management, Policy and Institutional Support to the CTI (2010–2014) aims to strengthen regional policy dialogue and coordination among the six Coral Triangle countries stakeholders. The project produced the *State of the Coral Triangle Reports* (SCTRs) which provide benchmarks on the status of critical ecosystems, species, resources, threats in the Coral Triangle, and progress towards the CTI goals. It targets and provides valuable inputs to the monitoring and evaluation of the program, at national and regional levels. The project also produced the *Economics of Fisheries and Aquaculture in the Coral Triangle Report*. It consolidates primary and secondary information on fisheries and aquaculture using regional lens and analytical tools from economics.

Decision support tools were also introduced and developed (e. g. *CTI Map-Enhanced Decision*) to guide data collection, structure the engagement by site-level users. It allows policymakers to appreciate various scenarios emanating from a menu of decisions pertaining to fisheries, marine protected areas, and climate change impacts. The project helped establish sustainable financing schemes in support of CTI plans of action through the development of financial architecture and strategy for the program, setting up of a business development unit, and costing of the national plans of action. The schemes guide the Coral Triangle countries in the development of project proposals for funding, and generating knowledge products on sustainable finance and payment of ecosystem services, among others.

As this project winds down, these activities will be carried forward by the **Coastal Marine Resources Management in the Coral Triangle - Southeast Asia (CTI SEA)**. The Coastal and Marine Resources Management in the Coral Triangle-Southeast Asia (CTI SEA), is a regional technical assistance (RETA) designed to assist Indonesia, Malaysia and the Philippines (CT3) in implementing their respective Coral Triangle Initiative (CTI) National Plans of Actions (NPOAs). The RETA is being funded by the Asian Development Bank (ADB), Global Environment Fund (GEF) and contributions from the governments of the CT3. It will run for four years from 2012 to 2016. This technical assistance aims to improve the management of coastal and marine resources in the Sulu Sulawesi Marine Ecoregion (SSME) priority seascape within the Coral Triangle (CT), especially those associated with coral reef ecosystems. It will help build the resilience of these ecosystems in a period of increased threats arising from human induced and climate change impacts, thereby maintaining ecosystem integrity and productivity and ensuring the improved socioeconomic status of coastal communities. CTI SEA's expected outcome is improved management of coastal and marine resources established in the SSME priority seascape within the CT. Its three outputs are:

1. Policy and institutional framework for sustainable coastal and marine resources management (CMRM) enhanced
1. Ecosystem-based approach to coastal and marine resource management pilot-tested and
2. Effective project management established in ADB and the CT3 governments.

The CTI SEA will undertake activities on:

- Institutional strengthening towards sustainable coastal and marine resources management
- Application of the ecosystem approach to fisheries management
- Adaptation of coastal communities to climate change
- Addressing IUU of coral reef fishes
- Development of alternative livelihoods for poor coastal communities
- Coordination of stakeholders in Indonesia, Malaysia and Philippines

4.3 UNDP/GEF/UNOPS Sulu-Celebes Sea Regional Fisheries Management Project

This regional profile was compiled largely from existing information provided online at www.ssme-fishproject.org accessed on 8 May 2014.

The UNDP/GEF Project, "Sulu-Celebes Sea Regional Fisheries Management," aims to improve the condition of fisheries and their habitats in the Sulu-Celebes Sea (Sulu-Sulawesi Marine Ecoregion) through an integrated, collaborative and participatory management at the local, national and tri-national levels (SSME-FishProject.org, n.d.; UNDP, n.d.). The goal of the project is to have economically and ecologically sustainable marine fisheries in the region for the benefit of communities who are dependent on these resources for livelihood and for the global community who benefit in the conservation of highly diverse marine ecosystems and its ecosystems services. The five expected outcomes of the Project are:

1. Achievement of a regional consensus on trans-boundary priorities and their immediate and root causes by updating an earlier Trans-boundary Diagnostic Analysis (TDA) for the region and focusing on unsustainable exploitation of fisheries.
2. Agreement on regional and national legal, policy and institutional reforms for improved fisheries management through the formulation of a Strategic Action Program (SAP), which will build on the existing Conservation Plan for the Sulu-Sulawesi Marine Ecoregion.
3. Strengthening of institutions and introduction of reforms to catalyze implementation of policies on reducing overfishing and improving fisheries management. The primary target for institutional strengthening is the Sulu-Sulawesi Marine Ecoregion Tri-National Committee and its Sub-Committees, in particular the Sub-Committee on Sustainable Fisheries.
4. Increased fish stocks of small pelagics through the implementation of best fisheries management practices in demonstration sites.
5. Capture, application and dissemination of knowledge, lessons and best practices within the region and other LMEs.

The project began in June 2010 with the Project Management Office (PMO) located at the National Fisheries Research and Development Institute-Bureau of Fisheries and Aquatic Resources, Quezon City, Philippines. The PMO is staffed by a Project Manager, Senior Fisheries Expert, Finance & Administrative Officer, with additional staff seconded from the Government of the Philippines.

Project partners include:

- Ministry of Marine Affairs and Fisheries - Indonesia
- Department of Fisheries, Sabah, Malaysia

- National Fisheries Research & Development Institute, Philippines
 - Conservation International – Philippines
 - United Nations Development Programme
 - Global Environment Facility
 - United Nations Office for Project Services
 - NGOs
 - Local governments and coastal communities
 - Universities and national research institutes
- Summary results of the Transboundary Diagnostic Analysis (TDA) to identify and prioritize transboundary environmental problems. The prioritized transboundary problems are: (1) unsustainable exploitation of fish; (2) habitat loss and community modification; (3) climate change; (4) marine pollution; (5) freshwater shortage; and (6) alien and invasive species.

Results of the iterative consultations and workshops with key SSME stakeholders to develop targets and activities and indicators for the Strategic Action Program for the SSME. The Theme 1 is science based, social, and management interventions; Theme 2 is resource valuation; Theme 3 is monitoring, control and surveillance (MCS); Theme 4 is information, education and communication; Theme 5 is livelihood development; and Theme 6 is capacity building.

4.4 Illegal, Unregulated, and Unreported Regional Plan of Action (RPOA-IUU)

This regional profile was compiled largely from existing information provided online at www.afma.gov.au/managing-our-fisheries/compliance-activities/illegal-foreign-fishing/rpoa-iuu/ accessed on 7 May 2014.

In 2007, Australia, working with Indonesia, led the establishment of a world-first Regional Plan of Action against IUU fishing (RPOA-IUU) (Government of Australia). The RPOA-IUU is a ministerial initiative of eleven countries: Australia, Brunei Darussalam, Cambodia, East Timor, Indonesia, Malaysia, Papua New Guinea, The Philippines, Singapore, Thailand and Vietnam. The objective of the RPOA-IUU is to enhance and strengthen the overall level of fisheries management in the region, in order to sustain fisheries resources and the marine environment, and to optimize the benefit of adopting responsible fishing practices. The actions cover conservation of fisheries resources and their environment, managing fishing capacity, and combating illegal, unreported and unregulated (IUU) fishing in the areas of the South China Sea, Sulu-Sulawesi Seas (Celebes Sea) and the Arafura-Timor Seas.

The RPOA-IUU is a voluntary instrument and takes its core principles from already established international fisheries instruments for promoting responsible fishing practices, including the 1982 'United Nations Convention on the Law of the Sea' (UNCLOS), in particular Articles 61 through 64, 116-119 and 123, the 'United Nations Fish Stocks Agreement' (UNFSA), the Food and Agriculture Organization (FAO) 'Compliance Agreement' and the FAO 'Code of Conduct for Responsible Fisheries'. The RPOA is consistent with existing treaties, agreements and arrangements and all other plans and programs relevant to the sustainable management of the region's living marine resources.

The RPOA-IUU also draws upon the FAO International Plan of Actions, (IPOA) for the Conservation and Management of Sharks', the 'IPOA for the Management of Fishing Capacity', and the 'IPOA to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing', the 'IPOA for Reducing the

Incidental Catch of Seabirds in Longline Fisheries ', which contain internationally agreed measures, applicable to national and regional plans to promote responsible fishing practices and, more recently, the FAO 'Model Scheme on Port State Measures to Combat IUU Fishing'.

The RPOA-IUU encourages countries work closely and collaboratively with regional organizations and to:

- Work toward ratification, accession, and/or acceptance and full implementation, of UNCLOS and UNFSA;
- Work towards ratification and/or acceptance of regional fisheries management instruments, where appropriate; and
- Work toward acceptance and full implementation of relevant regional and multilateral arrangements, where appropriate.

4.5 Coral Triangle Initiative on Coral Reefs, Fisheries, and Food Security (CTI-CFF)

This regional profile was compiled largely from existing information provided online at www.coraltriangleinitiative.org/about-us accessed on 8 May 2014.

The Coral Triangle Initiative on Coral Reefs, Fisheries, and Food Security (CTI-CFF) is a multilateral partnership of six countries working together to sustain extraordinary marine and coastal resources by addressing crucial issues such as food security, climate change and marine biodiversity. Recognizing the need to safeguard the region's marine and coastal resources, Indonesian President Yudhoyono inspired other leaders in the region to launch the Coral Triangle Initiative on Coral Reefs, Fisheries and Food Security (CTI-CFF) in 2007. The CTI-CFF is a multilateral partnership between the governments of Indonesia, Malaysia, Papua New Guinea, Philippines, Solomon Islands and Timor-Leste (the 'CT6').

At the Leader's Summit in 2009, these governments agreed to adopt a 10-year CTI Regional Plan of Action (CTI RPOA) to safeguard the region's marine and coastal biological resources. The RPOA has five goals: strengthening the management of seascapes, promoting an ecosystem approach to fisheries management, establishing and improving effective management of marine protected areas, improving coastal community resilience to climate change, and protecting threatened species.

Through the CTI-CFF, the Coral Triangle countries have agreed to support people-centered biodiversity conservation, sustainable development, poverty reduction and equitable benefit sharing. The CTI-CFF seeks to address both poverty reduction through economic development, food security, sustainable livelihoods for coastal communities and biodiversity conservation through the protection of species, habitats and ecosystems.

The CTI EAFM Working Group is focused on promoting and providing guidance to ensure that an ecosystem approach to fisheries management and other marine resources is fully applied within the Coral Triangle through regional frameworks, strong legislation as well as community and private sector engagement.

4.6 Southeast Asian Fisheries Development Center (SEAFDEC)

This regional profile was compiled largely from existing information provided online at www.seafdec.org accessed on 8 May 2014.

The Southeast Asian Fisheries Development Center (SEAFDEC) is an autonomous inter-governmental body established in 1967. The mandate of SEAFDEC as endorsed by the 41st Meeting of the SEAFDEC Council is “to develop and manage the fisheries potential of the region by rational utilization of the resources for providing food security and safety to the people and alleviating poverty through transfer of new technologies, research and information dissemination activities.” SEAFDEC comprises 11 Member Countries: Brunei Darussalam, Cambodia, Indonesia, Japan, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Vietnam. The Center operates through the Secretariat located in Thailand and has four Technical Departments, namely: the Training Department (TD); the Marine Fisheries Research Department (MFRD); the Aquaculture Department (AQD); and the Marine Fishery Resources Development and Management Department (MFRDMD).

The SEAFDEC Secretariat is mandated to coordinate and oversee the general policy and planning of the Center, and acts as the focal point for channeling and implementing the decisions and resolutions of the SEAFDEC Council of Directors. In addition, the Secretariat also organizes regular SEAFDEC meetings to obtain directives and guidance from the Member Countries on the operation of the organization, as well as regional technical consultations and meetings on issues as recommended by the Member Countries.

Established in Thailand in 1968, TD has been focusing its efforts on the development of modern fishery techniques to aid regional fisheries in a more sustainable approach through the promotion of responsible fishing technologies and practices, exploration of resources, and advancing the coastal fisheries management approach. Under the new Strategic Plan which was endorsed in 2006, the structure and activities of TD have been adjusted to emphasize on the promotion of coastal fisheries management to ensure responsible resource utilization and sustainable livelihoods in coastal communities, and the promotion of off-shore fisheries through the development of best fishing practices and energy optimization technology to ensure stable supply of food fish and reduce fishing pressure in coastal areas.

MFRD was established in Singapore in 1969 and is responsible for promoting, undertaking, and coordinating research in fisheries post-harvest technology and furthering the development of the fish processing industry in the region. Its task includes research and development on fisheries post-harvest technology and practices, such as fish processing technology to optimize the utilization of harvested fish and enhancing the quality and safety of fish and fishery products. MFRD also develops technology-based analytical methods to assess seafood safety and quality, and publishes several manuals as reference materials for the Member Countries.

MFRDMD was established in Malaysia in 1992 to conduct activities on marine fishery resources focusing on biological studies of commercially-important fish species, resource assessment and management, and conservation and management of aquatic species under international concerns, e.g. sharks and marine turtles. MFRDMD also implements activities that support the Member Countries in gathering information on inland capture fisheries, and developing of indicators to be used for the sustainable development and management of fisheries.

Comparative Studies for Management of Purse Seine Fisheries in the Southeast Asian Region.

The project involves compilation and comparison of annual and/or monthly CPUE where data are available for the last three decades in the region, comparison of TAC systems in the world, the genetic study of a commercially important pelagic species, and construction of management strategies for sustainable purse seine fisheries in the Southeast Asian region. Since catch-effort statistics are available in the region and CPUE is an indirect measurement of abundance of a target species in fisheries, MFRDMD will make its first attempt to examine the trend of resource level using CPUE for the last three decades. At the same time, MFRDMD will review and compare TAC systems in the world to examine which TAC system is applicable for management of small pelagic fishery in the region. In addition this project will include genetic study to understand extent of admixture of a targeted pelagic species between South China Sea and Andaman Sea and/or within South China Sea for small pelagic fishery management. At the end of the project, MFRDMD will review available information including stock levels, and MFRDMD and member countries will examine management strategies for sustainable purse seine fisheries in the region.

Combating IUU Fishing in Southeast Asian Region through application of Catch Certification for international trade in fish and fishery products. IUU fishing was identified as the biggest threat to the sustainable development of fisheries and aquaculture in the Asia-Pacific region (29th Session of APFIC). To combat IUU, countries are asked to take actions among others to adopt on sub-regional cooperation in deterring IUU fishing in the region. In response to this, the issue on management of fishing capacity and combating IUU fishing has been seriously addressed by ASEAN, SEAFDEC and the RPOA initiative to combat IUU fishing, as well as in the “Resolution and Plan of Action on Sustainable Fisheries for Food Security for the ASEAN Region Towards 2020” adopted by the Ministers and Senior Officials during the ASEAN-SEAFDEC Conference in 2011.

In addition to the afore-mentioned regional initiatives, there have been emerging trade-related measures and requirements aiming to combat IUU Fishing and enhance responsible fishing practices, among which is the European Council (EC) Regulation No. 1005/2008. Most countries in the Southeast Asian region which are directly affected by the EC Regulation have developed their respective regulations based on the FAO Legally-binding Instrument on Port State Measures (PSM). Therefore it is also important for the countries in the region to support the efforts to use trade measures to combat IUU fishing within the region. In line with EU initiatives, this project will seek possible way to combat IUU fishing in the large- and small-scale fisheries by seeking a new catch certification system for international trade in fish and fishery products within the Southeast Asian region.

Objectives

- To provide suggestions for Member Countries to strengthen cooperation in combating IUU fishing.
- To study existing fishing and trading practices in small-scale fishery in the region.
- To analyze associated problems in compliance with the EC Regulation No. 1005/2008 in the region.
- To suggest a possible catch certification system for large- and small-scale fisheries to ensure only non-IUU/legal fish and fishery products traded in the region.

MFRDMD is the responsible SEAFDEC Department for this project to manage and coordinate all project activities. All SEAFDEC Member Countries are involved in the activities.

The project involves identification of existing mechanisms in small-scale fishery and associated problems in compliance with the EC Regulation No.1005/2008 for large-scale fishery in the region through core expert meetings. The information gathered will be analyzed and comparison among countries will provide a possible catch certification system for combating IUU fishing in the Southeast Asian region with possible expansion and/or modification of the regulation for international trade in fish and fishery products within the region.

The outputs of the project will provide basis for developing a catch certification system to ensure only non-IUU/legal fish and fishery products traded in the region. The cooperation amongst the Member Countries will be strengthened so as to facilitate trade within the region and eventually combating IUU fishing in the large- and small-scale fisheries.

This project corresponds to #8 of the Resolution at the ASEAN-SEAFDEC conference in 2011: Foster cooperation among ASEAN Member Countries and with international and regional organizations in combating IUU fishing. This project also corresponds to #67 of the Plan of Action at the conference: Strengthen cooperation among Member Countries to implement international standards with regards to trading on fish and fishery products within the ASEAN region.

The activities in 2013 are as follows:-

- Organizing a meeting with Malaysian officials from 11 to 13 June 2013 in Kuala Lumpur, Malaysia for preparation of the “Core Expert Meeting On Combating IUU Fishing In Southeast Asian Region Through Application Of Catch Certification For International Trade In Fish And Fishery Products” in October 2013.
- Information gathering on the a) existing fishing and trading practices in small and large scale fisheries of SEAFDEC member countries b) impact of implementation of EC Regulation 1005/2008
- Organizing a Regional Core Expert Meeting On Combating IUU Fishing In Southeast Asian Region through Application Of Catch Certification For International Trade In Fish And Fishery Products in Kuala Lumpur, Malaysia from 8 to 10 October 2013. The main objectives of the meeting are as follows:-
 - To discuss existing fishing and trading practices in small-scale fisheries in Malaysia.
 - To discuss impact of implementation of EC Regulation 1005/2008
 - To discuss a draft format of the regional catch certificate.

Expected Outputs For 2013

- Identified existing fishing and trading practices in small scale fisheries in Malaysia
- Impact of implementation of EC Regulation 1005/2008
- Draft minimum information require for formulation of the ASEAN catch certificate

4.7 Asia-Pacific Fishery Commission (APFIC)

This regional profile was compiled largely from existing information provided online at www.apec.org/Groups/SOM-Steering-Committee-on-Economic-and-Technical-Cooperation/Working-Groups/Ocean-and-Fisheries.aspx accessed on 7 May 2014.

The Asia-Pacific Fishery Commission (APFIC) works to improve understanding, awareness and cooperation in fisheries issues in the Asia-Pacific region (Asia-Pacific Fishery Commission, n.d.). The APFIC Secretariat is hosted by the FAO Regional Office for Asia and the Pacific, in Bangkok, Thailand. The Asia-Pacific Fishery Commission was established under the APFIC agreement as the Indo-Pacific Fisheries Council in 1948 by the Food and Agriculture Organization of the United Nations. APFIC is an Article XIV FAO Regional Fishery Body established by FAO at the request of its members. The Secretariat is provided and supported by FAO. APFIC has a more than 50-year history and is one of the longest established regional fishery bodies (or RFBs). Current members include: Australia, Bangladesh, Cambodia, China, France, India, Indonesia, Japan, Malaysia, Myanmar, Nepal, New Zealand, Pakistan, Philippines, Republic of Korea, Sri Lanka, Timor Leste, Thailand, United Kingdom, United States of America, Viet Nam.

The purpose of the Commission shall be to promote the full and proper utilization of living aquatic resources by the development and management of fishing and culture operations and by the development of related processing and marketing activities in conformity with the objectives of its Members, and to these ends it shall have the following functions and responsibilities:

- to keep under review the state of these resources and of the industries based on them;
- to formulate and recommend measures and to initiate and carry out programs or projects to:
 - increase the efficiency and sustainable productivity of fisheries and aquaculture;
 - conserve and manage resources;
 - protect resources from pollution;
- to keep under review the economic and social aspects of fishing and aquaculture industries and recommend measures aimed at improving the living and working conditions of fishermen and other workers in these industries and otherwise at improving the contribution of each fishery to social and economic goals;
- to promote programs for mariculture and coastal fisheries enhancement;
- to encourage, recommend, coordinate and, as appropriate, undertake training and extension activities in all aspects of fisheries;
- to encourage, recommend, coordinate and undertake, as appropriate, research and development activities in all aspects of fisheries;
- to assemble, publish or otherwise disseminate information regarding the living aquatic resources and fisheries based on these resources;
- to carry out such other activities as may be necessary for the Commission to achieve its purpose as defined above.

More recent sessions have elaborated that APFIC will act as a Regional Consultative Forum that works in partnership with other regional organizations and arrangements and members. It

provides advice, coordinates activities and acts as an information broker to increase knowledge of fisheries and aquaculture in the Asia Pacific region to underpin decision making.

4.8 Asia-Pacific Economic Cooperation (APEC) Oceans and Fisheries Working Group (OFWG)

APEC's Oceans and Fisheries Working Group (OFWG) was formed in 2011, following a decision to merge the former Marine Resource Conservation and Fisheries working groups (in operation since 1990 and 1991 respectively) (APEC 2014). OFWG is committed to:

- Exchange information and help foster institutional capacity building in a focused regional setting;
- Advance discussions and the development of solutions for common resource management problems and share best practices;
- Develop projects, which will be managed and evaluated by the Working Group according to Leaders' and Ministers' directives;
- Develop a regional approach with improved coordination for the implementation of various instruments (e.g. International Plans of Action);
- Facilitate trade and investment opportunities that promote the sustainable use of fisheries, aquaculture, and marine ecosystem resources;
- Cooperate and partner with other APEC working groups, international organizations, and the private sector where interests intersect;
- Ensure the conservation and sustainable use of marine resources as well as protection of marine ecosystems needed to support fisheries and aquaculture; and
- Promote a common approach to preventing illegal fishing and related trade.

APEC's focus on oceans and fisheries issues is natural, given that APEC members account for over 80 percent of global aquaculture production and more than 65 percent of the world's capture fisheries. The consumption of fishery products in the APEC region is 65 percent higher than the world average. Moreover, APEC economies represent nine of the top ten fish producers in the world. Further information is available in the report "Harvesting Currency: the Importance of Fisheries and Aquaculture for APEC Economies." Employment contributions of APEC fisheries are illustrated in Figure 3.

In Bali in October 2013, APEC Leaders called upon their economies to promote the crucial role of fishers, particularly small holders and women. Leaders also committed to pursue cross-sectoral work under the APEC Initiative on Mainstreaming Ocean-related Issues (2013 Leaders' Declaration), including those in line with priorities outlined by our ocean-related Ministers (Paracas Declaration and Paracas Action Agenda), that will maintain the health and sustainability of our oceans and coastal resources for the benefit of food security, poverty eradication, preservation of traditional culture and knowledge, conservation of biodiversity and facilitation of trade and investment.

In 2012 in Vladivostok, Russia, APEC Leaders reaffirmed their commitment to enhancing cooperation to combat illegal, unreported and unregulated fishing and associated trade; working towards sustainable management of marine ecosystems; improving capture fisheries management and sustainable aquaculture practices; and facilitating sustainable, open and fair trade in products of fisheries and aquaculture.

4.9 Regional Analysis Summary

Regional fisheries institutions—such as the Food and Agriculture Organization of the United Nations (FAO), the Southeast Asian Fisheries Development Center, the Asia-Pacific Economic Cooperation forum, and the Asia-Pacific Fishery Commission—have held several meetings to discuss the issue of fishing capacity. However, none of these organizations have provided clear leadership to address the issue, with the sole exception of FAO’s national plans of action on fishing capacity under the Code of Conduct for Responsible Fisheries, which sets out principles and international standards of behavior for fishing practice (Pomeroy, 2013).

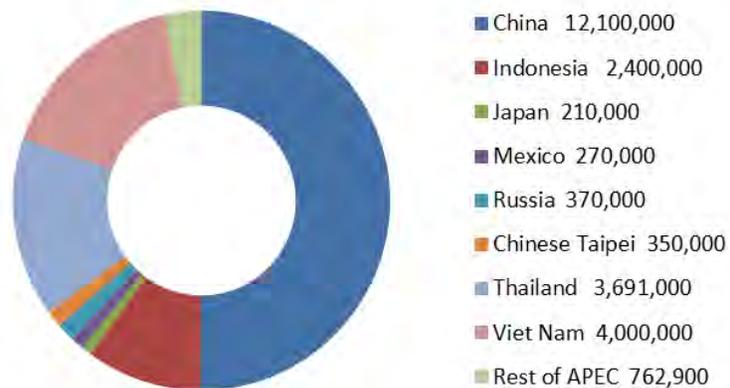


Figure 3. Employment size of the fisheries sector, by APEC Economies.

(Source: APEC 2014 - Employment figures based on data from The State of the World Fisheries and Aquaculture (SOFIA) by the UN Food and Agriculture Organization (FAO))

5.0 REGIONAL ISSUES AND TRENDS

High rates of population growth and rapidly increasing food needs are putting enormous pressures on the ASEAN region's coastal and marine resources, as are uneven levels of economic development, resource use, and technological change. It is now almost universally accepted that most of the near-shore fisheries in Southeast Asia are overfished, and that fishing overcapacity is one of the leading causes of this overfishing. IUU fishing negatively impacts environmental and civil security. Consequently, these waters are now experiencing increased levels of at-sea conflict and social unrest, affecting both regional security and environmental sustainability.

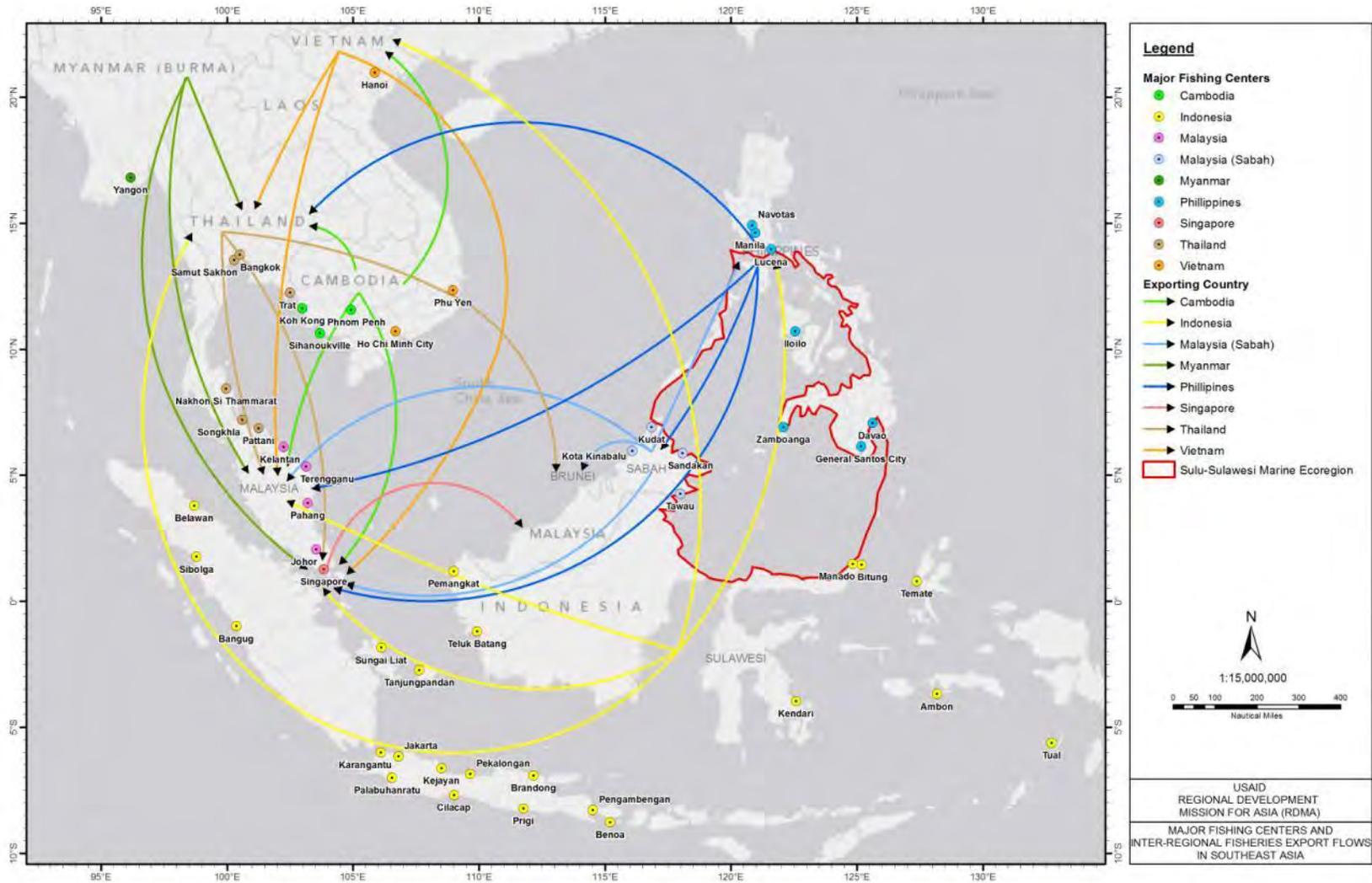
Several ASEAN member countries are among the world's major producers of marine capture fish (i.e., captured wild fish or shellfish). Indonesia is the third-largest fish producer in the world, followed by Thailand, the Philippines, and Vietnam. (China and India are numbers one and two, respectively.) Indonesia annually produces 4.7 million tons, while Thailand produces 2.8 million tons, and the Philippines 2.2 million tons. Myanmar, Malaysia, and Vietnam all produce more than 1 million tons annually.

Approximately 70 percent of the overall capture fishery production comes from waters distributed over 80,000 kilometers of coastline, about 4 million square kilometers of known shelf area, and more than 20 million square kilometers of actual or potential exclusive economic zone. These marine fish resources are concentrated in the South China Sea and the western central Pacific Ocean.

Trade in fish represents a significant source of foreign currency earnings in Southeast Asia. Regional trade in fisheries products is also growing, in part as a result of the removal of tariffs and quotas. Nontariff barriers— food safety regulations, quality standards—are becoming major factors affecting regional trade. In terms of share of gross domestic product, the contributions of fisheries range up to approximately 10 percent in Southeast Asian countries, as they do in Indonesia and Vietnam. However, these figures are frequently underestimated due to poor reporting. The share of fish exports in total agricultural exports was high for Vietnam, at 52 percent. For the rest of the countries in the region, this share was up to 38 percent. Figure 4 illustrates the estimated inter-regional export flows of marine fishery products between Southeast Asian nations.

The proportion of people employed in fishery-related jobs in Asia has doubled since the 1970s. There are estimated to be more than 30 million fishers in the ASEAN nations. With average fishing households numbering five individuals, the segment of the population directly dependent on fisheries for food and income can be roughly estimated at 150 million people. Another 60 million people work in associated industries such as boat building, manufacture of fishing gear; bait preparation, marketing, and processing. Women constitute a large proportion of such workers, employed mostly in processing. In the Philippines, fisheries provide employment to roughly 12 percent of the labor force working in agriculture, fisheries, and forestry and to about 5 percent of the country's total labor force. The importance of fisheries to food security within the region cannot be overestimated. The countries of Southeast Asia—Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Vietnam—have a total population of more than 540 million, of whom approximately 35 percent live below the poverty line. Approximately half of the people in the Southeast Asian region get more than 20 percent of their animal protein from fish.

Figure 4. Estimated inter-regional export flows of marine fishery products between major fishing centers within Southeast Asian nations
 The direction of fish flows between exporting fishing centers and importing countries have been determined based on research conducted under this study.



This figure rises to more than 50 percent in such countries as Cambodia and Indonesia. The average fish consumption for the region is relatively high at 22 kilograms per capita per year and is higher in coastal communities. In some countries and fishing communities, fish provides the main source of animal protein. In the Philippines, where per capita fish consumption was estimated at 26.8 kilograms per year, fish contributes 12.3 percent of total food intake, 22.4 percent of protein intake, and 56 percent of animal protein intake. In addition, fishing and the extraction of aquatic resources provides the main livelihood for millions of families. It is estimated that the demand for food fish in 2010, calculated at a constant per capita consumption rate of 22 kilograms a year, would be 18 to 19 million metric tons.¹³ Per capita consumption of fish in the Southeast Asian region is expected to increase by an additional 2 percent per year until 2020.

Asian capture fisheries have generally been stable or increasing over the past decade. In Southeast Asia, the trend is for consistent slight annual increases of 2 to 4 percent, with a decadal increase of 29 percent. The consistent increases in capture fishery production that are being achieved in the Southeast Asian region can be attributed to several effects, namely the increase in fishing effort, the expansion of the geographical range of fishing activities and the increase in the overall biomass of the fishery by fishing down effects (i.e. removing larger, longer-lived species and allowing a higher biomass of shorter-lived, small, fast-recruiting species). The expansion of new areas and the transshipment of fish between fishing areas complicates trend reporting by area and the determination of the status of stocks in specific localities. This may also lead to the false assumption that there remains significant potential for further expansion of fishing.

Marine capture fisheries production is not expected to keep pace with demand, creating concerns for food security in Asia. Fish are becoming less available and relatively more expensive than other food items. The increasing demand for fish from the expanding population will create more stress on the already depleted coastal and inshore fishery resources targeted by small-scale fishers. Some researchers estimate that overfishing in South and Southeast Asia has depleted coastal fish stocks by 5 to 30 percent of their unexploited levels. Among the overexploited stocks are coastal demersal (bottom-dwelling) and small pelagic (non-bottom-dwelling) species in the Java Sea and the waters between Indonesia and the Philippines, demersal and small pelagic species and prawns in the Gulf of Thailand, and green mussels and pearl oysters off the coast of Vietnam. This trend, which disproportionately affects poor people, is likely to continue. Access to or exclusion from fisheries resources may influence the vulnerability of people to both poverty and food insecurity. Production from coastal capture fisheries in the region will decline over the next ten to twenty years unless excess fishing capacity and fishing effort are greatly reduced. Prospects for increasing catches are further dimmed by some fishing methods involving the use of cyanide and explosives, methods that have had a devastating impact on coastal fisheries, fish habitats, and the health and welfare of fishing households. Although male fishers are most often the ones maimed by explosives and disabled as a result of gear-less diving, the women of these households are left to shoulder the burden of these men's care and increase their own income-earning activities to replace that previously earned by the men.

5.1 Drivers of Change

A range of forces are facing Southeast Asian fisheries and these forces can be broadly categorized as weak governance, socioeconomic conditions, and ecosystem change (R. S. Pomeroy, 2013).

5.1.1 Weak Governance

Weak governance is one of the main causes of the present poor condition of fisheries. Factors characterizing weak governance in fisheries in the region include (but are not limited to) corruption, lack of stakeholder participation, poor enforcement, weak institutional capacity, overcapacity of fishing fleets, inadequate information, and illegal fishing.

Corruption. There is anecdotal information on corrupt practices in the fisheries sector in a number of Southeast Asian countries. Demands for illegal payments for fishing licenses, permits, or access rights by politicians and public servants are probably the most pervasive form of alleged corruption in the fishery sector. Many corrupt situations are common, including politicians and permitting officers having vested interests in fishing companies, demanding bribes from fish market vendors, and allowing illegal fishing practices, such as commercial boats operating in near-shore waters.

Lack of participation in governance and management. The centralized administrative fisheries management approach used by Southeast Asian countries involves little effective consultation with resource users. This approach is not well suited to countries with limited financial means and expertise attempting to manage fisheries resources in widely dispersed fishing grounds because the government cannot effectively undertake monitoring, surveillance, or enforcement operations. A fishery cannot be effectively managed without the cooperation of fishers and other stakeholders—including both men and women—to help the laws and regulations function effectively. For example, in the Philippines, Vietnam, and Indonesia, fisher participation in co-management has led to a decrease in fisheries conflicts.

Poor enforcement. The inability to enforce regulations that have been centrally promulgated—with little stakeholder involvement—has been the downfall of many fisheries management projects. Small-scale fishers and traders are often among the poorest people in society. Therefore, the political and judicial will to enforce regulations on them is often absent, especially when the action is seen as taking food from the fishers' families. Furthermore, in most Southeast Asian countries, the judicial systems are bogged down with cases that the courts perceive as more important than enforcement of fishery regulations, thus providing limited incentives to stop illegal fishing practices.

Weak institutional capacity. In Southeast Asia, institutional weaknesses and constraints are pervasive in the fisheries resource management sector. Legal, policy, and institutional frameworks are not crafted to suit the unique features of fisheries and this has resulted in mismatches and overlaps. For example, the national fisheries policy of Vietnam contains conflicting statements concerning both conservation of fisheries resources and increasing production from fisheries. A recent study has concluded that overlapping mandates, institutional confusion, and conflict have become the dominant features in the administration of fisheries resources in the region.

Overcapacity of fishing fleets. For most Southeast Asian countries, small-scale fisheries are systematically overfished—defined as the action of fishing beyond the level at which fish stocks can replenish themselves through natural reproduction—due to high levels of overcapacity (fishing capacity greater than some optimal or desired level, in terms of catch and corresponding fleet size).

Open access. Open access fisheries (no control over numbers of fishers) remains common throughout the region. While Asian governments have agreed to restrict access to the fisheries through various management measures, implementation has been limited and sporadic.

Inadequate information. One of the greatest obstacles to decisions and policymaking with regard to fisheries is the lack of reliable data and information about various facets of the sector. Currently available statistics are often highly inaccurate and minimally useful. In Vietnam, for example, the actual number of fishing vessels is still unknown.

Illegal, unreported, and unregulated (IUU) fishing. Illegal fishing involves such practices as the use of explosives, chemicals, and use of small-mesh nets. In many countries in the region, illegal fishing by large-scale vessels, including those from other countries operating without licenses, is widespread. Such boats often come into conflict with small-scale fishers by encroaching on inshore waters, increasing competition for resources, and leaving such areas depleted and habitats degraded. For example, in the Philippines small trawlers are often falsely registered with municipalities as 2.99 gross tons, in order to be classified as a municipal fishing gear (under 3 gross tons). Illegal practices by small-scale fishers themselves are difficult to regulate, particularly in view of their scattered nature and the generally poor monitoring, control, and surveillance systems in most Southeast Asian countries.

Maritime security. Increasingly, non-traditional threats to security are linked to the issue of resource scarcity. Whether considering energy, food, climate, or water shortages, such resource scarcities exhibit common attributes. First, they share common *drivers*, or factors that influence and cause or exacerbate scarcity. Second, they are linked to each other through *feedback loops*, which create a major risk of unintended consequences when one scarcity issue is tackled without reference to other scarcity issues. Third, they have common *impacts*. That is, they disproportionately impact poor and fragile states, they cause economic stress, and they result in the potential for strategic resource competition and conflict. An overriding challenge is to address the cycle which influences or threatens maritime security and sustainability. Effective maritime governance and a smoothly functioning infrastructure ensure the viability of the ocean commons, whereas gaps in maritime security can enable the proliferation of security threats. In the absence of effective maritime governance, state and non-state actors can engage in piracy, illicit commerce (smuggling and human trafficking), illegal fishing, environmental pollution, support for insurgency, or acts of terrorism, while exploiting a country's territorial waters and exclusive economic zone. Poorly governed or ungoverned maritime spaces also invite undue influence from predatory states seeking to exploit a country's offshore fisheries, energy, or natural resources. For example, illegal fishing off the coasts of Southeast Asia not only places a hardship on local populations who depend on fish as their main source of protein, but also creates broader instability in the region.

5.1.2 Socioeconomic Conditions

A number of socioeconomic factors—including poverty, globalization of trade and market access, technological advances, population growth, health, marginalization, and gender inequity—both constrain improved fisheries management and are root causes of some overfishing problems in the region.

Poverty. Poverty among many fishing communities and households often leads to or reinforces unsustainable fishing practices. Pulling fishing households out of poverty is, in itself, constrained by few livelihood options and by high population growth rates in shoreline and coastal communities. Many rural communities have a low priority in national economic development planning and thus have been left behind as economic development has progressed in other parts of the country. Consequently, rural fishing communities generally have a higher percentage of people living below the poverty line than the national average. Other factors contributing to the poverty of these rural fishing villages include limited access to land, unsustainable land use practices and development, competition and conflicts over

resources, health burdens, and civil strife. These rural, highly resource-dependent fishing communities become even more vulnerable as resource conditions change and decline.

Globalization of trade and market access. The globalization of trade creates both opportunities and risks for the fishers of Southeast Asia. In some cases, it puts the decision-making beyond the fisher and those involved in other fishing activities. For example, in Indonesia, the high demand for live reef food fish such as grouper encourages fishers to utilize illegal fishing methods such as cyanide. The market both provides and restricts livelihood opportunities for small-scale fishers and traders. The constraints to market access for fishers in the region include weak bargaining power, poor marketing strategies, monopolies among wholesalers, poor product-holding infrastructure, difficulties meeting quality standards, and a lack of market information. For example, fishers' dependency on intermediaries for access to credit, such as under the *suki* system in the Philippines, forces fishers to engage in unsustainable fishing practices such as catching undersized fish.

Technological advances. Technological changes such as the introduction of motorization, monofilament nets, cell phones, and global positioning systems have enabled fishers to exploit inshore as well as offshore fisheries more intensively than was ever imagined a few decades ago. In the Philippines, cell phones are used by fishers to inform each other about patrol boats and obtain real-time fish price information in order to target higher value species. These technology advances have led to increased conflict between large and small fishers as larger boats using more advanced technology can overfish nearshore waters.

Population growth. In common with other poor rural populations, a fisher's socioeconomic status is usually conducive to high fertility. The population of the ten ASEAN member countries is expected to reach 650 million by the year 2020. Rapid population growth, including both intrinsic population growth and immigration to coastal areas, contributes to the increasing overexploitation of natural resources and degradation of the local environment.

Poor health infrastructure and vulnerability to HIV/AIDS. Due to their physical and socioeconomic isolation, many fishing communities often lack adequate sanitation, clean water, and health care. The rates of HIV infection in fishing communities in Southeast Asia can be five to ten times higher than those in the general population. In Thailand, 20 percent of workers employed on fishing boats are HIV-positive, while the general rate in the population is 1.5 percent. Premature death robs fishing communities of the knowledge gained by experience and reduces incentives for longer term and intergenerational stewardship of resources.

Political and economic marginalization. Small-scale fisheries have been systematically ignored and marginalized over the years. In most cases, this was not deliberate but the result of an accumulation of policies and development decisions to "modernize" fisheries. Many rural coastal communities have been left behind as economic development has progressed in other parts of the country, furthering economic marginalization. In part, the problem is related to the low priority of rural fishing communities in national economic development planning. For example, in Vietnam, poverty reduction in coastal communities was not a clear goal for the government until late 2003, when the Comprehensive Poverty Reduction and Growth Strategy elaborated the general objectives, institutional arrangements, policies, and solutions of a ten-year strategy and five-year plan into detailed, specific action plans.

Gender inequality. There is significant gender differentiation in the ways men and women utilize and perceive fisheries resources. Failure to fully understand gender roles, inequalities, and perspectives have confounded many well-intended fisheries development and conservation initiatives. For example, Bugis and Christian women in the same and neighboring communities in coastal North Sulawesi Province (Indonesia), appear to differ significantly in their level and type of engagement in fishing. In general, gender issues related to fisheries include gender division of labor and income, gendered access to decision making (representation and advocacy), gender-based rights to natural and other resources, and gender-based access to markets, market information, and trade. Women are, as a result, denied access to institutional and state support, as well as capacity-building interventions. They cannot avail themselves of development resources and programs. There is little regulation of labor conditions in fish processing work, even though such labor tends to be poorly compensated and exploitative. Finally, fisherwomen tend to be excluded from decision-making processes and governance at family, community and state levels. This lack of recognition for women's contributions in the sector also diminishes the ability of women fishworkers to organize, access and control livelihood resources, and negotiate with various actors in the sector.

Human Rights. Recent attention to gender equity, child labor, safety at sea, fair trade and rights to decent work in the fishery sector point to rising attention to human rights-based approaches. For example, while the United States Department of State's 2013 "Trafficking in Persons Report" clearly highlights the clear and high priority that the US Government places on curbing human trafficking (globally and in the region), while both a 2012 International Labor Organization study and a 2011 paper released by the United Nations Office on Drugs and Crime evidence the increasing trend in fishing vessels being correlated with the observed growth and spread of human trafficking, as well as a number of other human rights concerns, including onboard forced child labor, international trafficking of narcotics, and illegal smuggling of small arms and munitions to conflict zones. Human trafficking via IUU fishing essentially represents a modern-day form of slavery, trapping laborers on the high seas where they are out of reach of national laws and beyond the reach of law enforcement personnel. The correlation between IUU fishing and such human rights abuses highlighted within these studies have collectively resulted in the raising of this issue within Congress, who during the past (112th) legislative session have proposed passage of appropriate legislation to address these issues via the proposed "Pirate Fishing Elimination Act" (S. 1980; 112th Congress, 2011-2013, as introduced December 2011 by Sen. Daniel Inouye [D-HI] and subsequently reported out via committee in July 2012). Further, fisheries resource managers, law enforcement personnel, and decision -makers throughout the region have clearly reported their concerns to the international marine management community that illegal wildlife trafficking by IUU fishers is allegedly conducted by the same perpetrators involved with human and small arms trafficking. A recent report commissioned by the USAID-funded Coral Triangle Support Program regarding an assessment conducted in Southeast Asia regarding local compliance and community-supported enforcement documents these concerns (R. Pomeroy, 2013; R. S. Pomeroy, 2013) .

Racial and Ethnic Tensions Increasing maritime conflicts in the South China Sea region are bringing to light again the underlying racial and ethnic tensions which exist in the region between ethnic Chinese nationals, who own many of the fishing businesses, and indigenous people. Issues include human rights, economic, and conflict over use and access to the resource.

5.1.3 Ecosystem Change

Unsustainable fishing practices result in direct changes to the structure and composition of aquatic and marine ecosystems, changes that make them less resilient and less able to produce food for millions of people in Southeast Asia. However, there are also a number of indirect human activities that affect the biodiversity and productivity of fisheries ecosystems. These include pollution from land-based sources, as well as habitat degradation and destruction. From a longer-term perspective, anthropogenic climate change is expected to have significant effects as well, with several Southeast Asian nations, such as Vietnam and Indonesia, likely to face particularly heavy effects.

Habitat loss, degradation, and pollution. Coastal ecosystems (coral reefs, mangroves, sea grass, wetlands), upon which many fish species depend for at least part of their life cycle, are degraded and increasingly threatened by human activities ranging from coastal development and destructive fishing practices to overexploitation of resources, marine pollution, runoff from inland deforestation and farming, mining, and oil exploration. In Southeast Asia, it is estimated that 64 percent of the region's coral reefs are threatened by overfishing and 56 percent are threatened by destructive fishing techniques.

Climate variability and ocean change. One likely result of climate change is worsening conditions for marine fish stocks resulting from lower rainfall, increased sea surface temperatures, acidification, and sea level rise. A climate change vulnerability assessment of the capture fisheries of 132 countries identified two in Southeast Asia, Cambodia, and Vietnam, as the most vulnerable. Small-scale fishers, who lack mobility and alternatives and are often the most dependent on specific fisheries, will suffer disproportionately from such changes. Oceanographic changes, including increasing sea surface temperature, changes in upwelling frequency and timing, and ocean acidification, further increase variability within the natural system, altering fish population migration routes, movement patterns, and other behaviors.

5.2 Trends in non-governmental organizations and private donors

It is important to note that in recent months a number of international non-governmental organizations (NGOs) with strong donor support have begun work on fisheries in Southeast Asia. The largest and best funded is the Fish Forever program of RARE, Environmental Defense Fund and EKO Asset Management Partners supported primarily by the Bloomberg Philanthropies and the Rockefeller Foundation. This program is currently active in the Philippines and Indonesia. The Fish Forever program utilizes a standard approach to a turf-reserve system in all of its sites (www.fishforever.org).

Oceana is another NGO that supports fisheries management work in the Philippines:

“Oceana is the largest international organization working solely on protecting oceans. Oceana is focusing on reforming industrial fishing by advocating for national policies such as setting and enforcing reasonable catch-limits, and reducing the amount of sea life that is unintentionally caught and discarded.” (Source: www.oceana.org accessed on 8 May 2014)

“Bloomberg Philanthropies, on January 29, 2014, announced the launch of the Vibrant Oceans initiative, a commitment of \$53 million over five years to promote reforms to boost fish populations in Brazil, the Philippines and Chile. Currently, over-fishing and destruction of important marine areas are threatening the global supply of fish. Reforming fishing practices in these countries will revitalize

7% of the world's fisheries and will potentially serve as a model for future global reform efforts by providing insights into the best ways to protect the world's fish supply." (Source: www.oceana.org accessed on 8 may 2014)

A number of additional foundations/donors are currently involved in or planning support for fisheries in the region. This includes Waitt Foundation, Kingfisher Foundation, Packard Foundation, Oceans 5, Rockefeller Foundation. The Rockefeller Foundation is currently supporting a number of consulting firms to review regional and national fisheries issues and trends in the Southeast Asian region in anticipation of an investment under their Oceans and Fisheries work.

5.3 Trends in marine capture fisheries in the South China Sea subregion

Historically, there have been large and widespread changes in the fish fauna of the South China Sea (Funge-Smith, Briggs, & Miao, 2012). These changes include changes in species composition whereby the abundance of the more valuable fishes (groupers, snappers, sharks and rays) has decreased sharply and the abundance of smaller, less valuable species has increased (e.g. cardinal and trigger fishes). The production trends of the past ten years do not reveal the changes very clearly as the majority of the impact is presumed to have taken place during the massive expansion of fisheries effort between 1975 and 1985. The picture that emerges is one of a subregional fishery that has been under heavy fishing pressure for more than 30 years and which has been fished down considerably. The changes were less obvious previously, but there remains a clear trend of a declining catch of large demersal and pelagic species and a rising catch of smaller fast recruiting species. The catch from the assessed fisheries in the South China Sea subregion shows similar trends with an increasing fraction of the catch being made up of smaller sized species. Multivariate analyses by the Trawlbase project showed differences in species composition between two survey periods (the 1970s and the 1990s). The percentage composition data from the west coast of Peninsular Malaysia generally showed that large and more valuable species declined in relative abundance whereas species of small body sizes increased, thus indicating a trend of "fishing down the food web".

The Gulf of Thailand fishery, prior to 2007, contributed about 44 percent of the national total catch with another 40 percent caught outside of the Thai EEZ. The estimated trawlable biomass (estimated from research trawl results) declined from 680,000 tons in 1961 to 560,000 tons in 1995. Landing data is composed of catch from nine gears (otter board trawl, pair trawl, beam trawl, purse seine, push net, anchovy purse seine, mackerel encircling gill net, king mackerel drift gill net and bamboo stake trap). Total landings have decreased from 1,919,564 tons in 1999 to 1,447,898 tons in 2007, and this is attributed principally to overcapacity in the fishery. More recently, because of the adjustments to statistical collection and analysis starting in 2008 and the requirement of joint venture arrangements for foreign vessels fishing in waters of neighboring countries to land their catches at the designated fishing ports for domestic statistical and data collection, the total landings for the Gulf of Thailand declined to 993,148 and 1,010,657 tons in 2008 and 2009 respectively.

For a majority of the assessed fisheries (by gear) in the region the catch per unit effort (CPUE) and catch rates are declining (12 out of 15 examples). A majority of the assessed trawl fisheries show declining CPUE or catch trends. Also, a majority of the assessed purse seine fisheries show declining CPUE or catch rates. All net fisheries assessed show declining CPUE or catch rates. The CPUE for handline fisheries declined in one of the two assessed fisheries. In the Gulf of Thailand, CPUE showed a

decreasing trend until the 1990s. The heavy fishing pressure has resulted in a “fishing down” effect and the fishery has stabilized, with a shift to faster recruiting smaller species. The CPUE appears relatively stable in the Gulf of Thailand fishery, although overall rates are extremely low compared with rates 20 years ago. This perhaps suggests a relative stability in the fishery at a highly “fished down” level. In Indonesia (FMA 711) CPUE/catch per hour is decreasing, mainly for the demersal and some small pelagics. The CPUE, expressed in mT/boat/year between 1998 and 2008 see large demersals decreasing from 600 to 20; small demersals decreasing from 300 to 20; small pelagics decreasing from 40 to 20; large pelagics stable at 5 to 6; small tuna stable at 10 to 15; crustaceans stable at 400. For Viet Nam, the catch rate has declined over the last few decades, from about 1.1 tons/hp/year in 1985 to 0.3 tons/hp/year in recent years. In the Philippines CPUE has been increasing in some areas, although no data are presented for nearshore coastal demersal or reef associated resources. In Malaysia CPUE decreased over the decade (2000 to 2010) in the fisheries of Peninsular Malaysia east coast (purse seine declined 25 to 36 percent, drift/gillnet declined 21 percent). Anchovy CPUE increase in the same area (up 15 percent). In west coast Sabah, CPUE generally increased, with a significant jump in the anchovy fishery (up 40 percent), the reason for this increase is not explained although there is increased targeting of this resource, which had previously been quite under-fished.

6.0 FINDINGS AND POTENTIAL STRATEGIES

The Regional Fisheries Stakeholder Analysis provided country- and regional-level stakeholder profiles and an overview of regional issues and trends. This section will address three key questions identified in the Scope of Work and offer strategies to consider in terms of how to address priority issues and trends facing marine capture fisheries in the Southeast Asian region.

6.1 Findings to Key Questions

The scope of work involved completion of a Regional Stakeholder Analysis, which aimed to provide a comprehensive overview of national and regional fisheries related platforms that have significant or the potential for playing a significant role improving sustainable management of marine capture fisheries in the Southeast Asian region. The analysis aimed to provide a better understanding of the interplay between stakeholders identifying key points of influence as well as the system's strengths and weaknesses within the framework of promoting sustainable fisheries in a multi-stakeholder context. It is important to note that given the wide scope of actors involved in capture fisheries across the Southeast Asian region, a wide variety of stakeholder perspectives and voices is useful in addressing each of the three key questions.

6.1.1 Key Question #1

What are the most effective approaches and platforms for delivering capacity building support to regional fisheries management? Is it through an existing regional fisheries organization or technical working group, or through a different mechanism?

It is first important to identify the target audiences for the capacity building support for regional fisheries management. While audiences will vary and be more and less specific, three general regional fisheries audiences exist in Southeast Asia including: a) national government, b) small scale fisheries sector, and c) commercial fisheries sector. Each audience has their own capacity needs and approaches and platforms for delivering capacity building support.

For the national government, the most effective approaches and platforms for capacity building is through existing regional fisheries organizations such as SEAFDEC, CTI-CFF, RPOA-IUU, APFIC and PEMSEA. Each of the five regional fisheries organizations identified has specific strengths in capacity building and focuses on different audiences, although there is a good deal of overlap in the audiences. Two of these regional organizations have specific capacity building functions and units, while the other three organizations provide platforms for capacity building. Williams (2013) has pointed out that Southeast Asian states, along with other states with interests in the region, have created three multilateral fisheries relevant arrangements of agencies with overlapping but different memberships: the Regional Program of Action on Illegal, Unreported and Unregulated (IUU) Fishing; the ASEAN–Southeast Asia Fisheries Development Center Strategic (SEAFDEC) Partnership (ASSP); and the Coral Triangle Initiative. Each of these multilateral arrangements has the potential to help Southeast Asian states deal with fisheries-based issues more effectively by building polycentric coalitions and capacity. These three arrangements are principally technical support bodies rather than management organizations.

SEAFDEC, through its Training Department, provides a number of capacity building programs including training which emphasizes the promotion of coastal fisheries management to ensure responsible resource utilization and sustainable livelihoods in coastal communities, and the promotion of off-shore fisheries through the development of best fishing practices and energy optimization technology to ensure stable supply of food fish and reduce fishing pressure in coastal areas. PEMSEA, which emphasizes integrated coastal management, provides access to training and scientific and technical advice and assistance for ICM development, implementation and scaling up through the PEMSEA Resource Facility, ICM Learning Centers, Regional Centers of Excellence, Twinning Network for Integrated River Basin and Coastal Area Management, and Regional and National Task Forces.

The platforms provided by the CTI-CFF, RPOA-IUU, and APFIC allows for shared learning, training, and scientific and technical advice. The CTI-CFF has a shared vision through its Regional Plan of Action for poverty reduction through economic development, food security, sustainable livelihoods for coastal communities, and biodiversity conservation through the protection of species, habitats, and ecosystems. The CTI EAFM Technical Working Group is focused on promoting and providing guidance to ensure that an ecosystem approach to fisheries management and other marine resources is fully applied. The CTI EAFM Technical Working Group provides a platform for capacity building for fisheries leaders in the six member countries through regional exchanges, TWG meetings, and trainings. The RPOA-IUU supports actions covering conservation of fisheries resources and their environment, managing fishing capacity, and combating illegal, unreported, and unregulated (IUU) fishing. The RPOA-IUU provides a platform for countries to work closely and collaboratively through shared training and peer interaction and exchange to enhance and strengthen fisheries management. The Asia-Pacific Fisheries Commission works to improve understanding, awareness and cooperation in fisheries issues in the Asia-Pacific region. The APFIC provides a platform for capacity building through its Commission meetings and forums, publications, and training and extension activities.

At present, there is no existing regional organization or association specifically designed to deliver capacity building support to the small-scale fisheries sector within Southeast Asia. There has been limited engagement in capacity building for the small-scale fisheries sector through the five regional organizations mentioned above. Most of the capacity building by these organizations has been at the national or local level rather than a regional level. Through activities undertaken by the partner organizations of the US Coral Triangle Initiative, there was capacity building directly to small-scale fishers in the six countries on EAFM, MPAs, and climate change adaptation. SEAFDEC has undertaken capacity building for small-scale fishers through its various departments. PEMSEA has undertaken capacity building on ICM for small-scale fisheries through its activities in its partner countries. Small-scale fisheries representatives have attended, on occasion, the meetings of the regional organizations. Capacity building to the small-scale fisheries sector is usually undertaken at the national and local level by government, NGOs, or projects through national or local organizations and associations. There is a need for a regional small-scale fisheries organization/association to serve as a platform to represent the sector and for capacity building. Existing regional bodies and associations are neither functionally designed nor strategically positioned to build regional small-scale fisheries management capacity at present. Investment in supporting a new regional body or organization to do so would allow for current limitations in building small-scale fisheries management capacity to be addressed, and eventually overcome. It is notable that FAO recognizes the importance of building capacity for small-scale fisheries management and highlights how “capacity development is a key building block for creating knowledge,

empowerment, and enablement of effective participation in decision-making” of fisheries management (FAO 2012, page 20).

Similar to the small-scale fisheries sector, there is no regional organization or association specifically for delivering capacity building support to the commercial fisheries sector in Southeast Asia. There has been limited engagement in capacity building for the commercial fisheries sector through SEAFDEC. There has been some limited engagement with the commercial fishing sector through the RPOA-IUU and APFIC at their meetings. There is a need to better engage with the commercial fisheries sector in the region. This engagement could be undertaken through existing regional organizations such as SEAFDEC, rather than developing a new organization. However, existing regional organizations are not designed to deliver capacity building support to the commercial fishing sector. In each of the Southeast Asian countries studied, the commercial fisheries sector is well organized through their own associations, be it fishing, processing, exporting or trading. During stakeholder interviews and consultations, it was clearly communicated that there is low to no interest from commercial fishery operators in the creation of a new regional body through which they would access capacity building support. Rather, operators expressed that operational capacity building efforts fell under the purview of company-led internal investment strategies and ‘re-investment schemes’ within a competitive market context. As such, most commercial stakeholders believe that regionally oriented capacity services would not be pursued by individual private interests, and only engaged through commercial associations at the national and sub-national (not regional) level. This inherent commercial operator focus on engaging through the national-level commercial associations to which they are members could provide an opportunity to convene national-level associations, regionally.

6.1.2 Key Question #2

What is the potential for the establishment of sub-regional and/or species-specific and/or ecosystem specific Regional Fisheries Management Organizations (RFMOs) in the region? Through which governance systems would sub-regional management units be most effective? What sub-regions and species already have de facto trans-boundary management structures or regimes? Can these structures be strengthened, legalized, and if so, how?

Although there is some general interest among stakeholders interviewed to engage in regional fisheries management discussions, there seems to be limited potential for the establishment of sub-regional and/or species-specific and/or ecosystem-specific RFMOs within the region. Part of the low level of interest has to do with inherent disinterest by private companies and investors with increased levels of regional management and/or new layers of fisheries management engagement and oversight of the commercial sector. In addition, there is little interest to finance a new RFMO through – at least in part – funding, human resources, and time contributions provided by the private sector in designing, establishing, and operating a new, commercial fishery-focused RFMO for Southeast Asia. Instead, commercial operator stakeholders interviewed consistently suggested that this was the role of local (sub-national) and national commercial fisheries associations, not individual operators.

However, stakeholder interviews conducted with commercial fisheries associations at local and national levels indicated their interest in serving as the national-based host or clearinghouse for capacity building and/or regional fisheries management efforts, pursuant with the relevant human and financial resources being provided to them by an external source (i.e., non-commercially financed). A few stakeholders indicated that the model of an “[regional] association of [national and local] associations” could be a

possible vehicle through which regional management and commercially-focused capacity building efforts might be feasible. This finding further highlights the opportunity for a regional initiative to convene national-level commercial associations.

The live reef food fish trade (LRFFT) is an example of the difficulties in establishing a new RFMO. The CTI Regional Plan of Action in 2009 listed, as a regional action, “establishing a CTI Forum on management of, and international trade in, coral-reef based organisms”. There has been coordinated progress since 2009 towards the formation of a CTI-CFF live reef food fish trade (LRFFT) multi-stakeholder forum. A March 2014 report commissioned by WWF on consultative options for the Live Reef Food Fish Trade concluded that:

1. That the RFMO model for the consultative regional forum is not appropriate at this time for a variety of reasons relating to time (and cost) required to develop and enter into force the necessary legal Convention as its foundation, the complexity of the LRFFT itself and the number of issues to be resolved before an RFMO could be considered. Reassurance would also need to be provided concerning the level of high-level commitment and political will necessary to support the RFMO model going forward.
2. That the progress made to convene an inaugural forum in the “regional advisory body with Secretariat” format should be maintained, with SEAFDEC proceeding to be proactive in “drafting the roadmap, developing the terms of reference (TOR), and identifying the organizational requirements of the Forum”, assuming that an MOU between CTI-CFF Secretariat and SEAFDEC will be approved and appropriate instruments of cooperation signed.
3. That the national fora envisioned as key parts of the consultative forum process should be scoped and developed as soon as possible, preferably in the first half of 2014, and possibly involving Indonesia, Philippines, and Malaysia in the first instance. These fora may have local sub-divisions as required.
4. That the first regional forum be convened before the end of 2014, following all necessary approvals for partnership agreements, TOR, structure and functions, with national fora also having been convened and providing initial input to the first regional forum.

The only formal RFMO operating in the Southeast Asian region is the Western and Central Pacific Fisheries Commission (WCPFC). The WCPFC was established by the Convention for the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean (WCPF Convention) which entered into force on 19 June 2004. The WCPF Convention draws on many of the provisions of the UN Fish Stocks Agreement [UNFSA] while, at the same time, reflecting the special political, socio-economic, geographical and environmental characteristics of the western and central Pacific Ocean (WCPO) region. The WCPFC Convention seeks to address problems in the management of high seas fisheries resulting from unregulated fishing, over-capitalization, excessive fleet capacity, vessel re-flagging to escape controls, insufficiently selective gear, unreliable databases and insufficient multilateral cooperation in respect to conservation and management of highly migratory fish stocks. A framework for the participation of fishing entities in the Commission which legally binds fishing entities to the provisions of the Convention, participation by territories and possessions in the work of the Commission, recognition of special requirements of developing States, and cooperation with other Regional Fisheries Management Organizations (RFMO) whose respective areas of competence overlap

with the WCPFC reflect the unique geo-political environment in which the Commission operates. The Commission supports three subsidiary bodies: the Scientific Committee, Technical and Compliance Committee, and the Northern Committee, that each meet once during each year. The meetings of the subsidiary bodies are followed by a full session of the Commission. A Finance and Administration Committee assists the work of the Commission. Commercial stakeholders interviewed clearly expressed their view that their participation in WCPFC processes and “acquiescence” with regional fisheries management decisions and standards represented a “sufficient” or “maximum” level of regionally focused management guidance and oversight. There was little to no interest expressed by commercial operator interviewees to expand regional management efforts beyond the WCPFC.

Several trans-boundary management or regimes have been assessed or implemented. To ensure the effective protection and sustainable development of the Sulu–Sulawesi Marine Ecoregion (SSME), the governments of Indonesia, Malaysia, and the Philippines entered into a memorandum of understanding (MOU) on 13 February 2004 (Asian Development Bank, 2011). The three countries agreed to adopt the ecoregion approach to conservation embodied in the Ecoregion Conservation Plan (ECP) that will facilitate the realization of the four fundamental goals of biodiversity conservation: representation, sustainability of ecological and evolutionary processes, viability of species and populations, and resiliency. There are 10 objectives that the ECP hopes to attain in alignment with its 50-year vision. The signing of the MOU led to the creation of the Tri-National Committee for the SSME. Three subcommittees were created: the Threatened, Charismatic, and Migratory Species Subcommittee; the Sustainable Fisheries Subcommittee; and the Marine Protected Areas and Networks Subcommittee. The action plans of the three subcommittees were launched in 2009.

A potential sub-region for a trans-boundary management structure or regime could be the four large marine ecosystems in the region – Gulf of Thailand (35), South China Sea (36), Sulu-Celebes Sea (37) and Indonesian Sea (38). Governance of the Gulf of Thailand, for example, is shared with four countries (Cambodia, Malaysia, Thailand and Vietnam). The Gulf of Thailand LME falls under the UNEP administered East Asian Regional Seas Program. There are currently no LME projects underway in these four LMEs. A potential model of an LME trans-boundary management structure or regime is the Bay of Bengal Large Marine Ecosystem project currently being implemented by FAO (www.boblme.org).

Through a sub-regional approach, the SEAFDEC-Sweden project has been providing avenues for the SEAFDEC Member Countries bordering the Gulf of Thailand, namely: Vietnam, Cambodia, Thailand, and Malaysia, to discuss and look for effective ways of improving the management of fisheries to sustain the fisheries resources in the sub-region. Meetings have been convened among the countries to discuss their mutual interest in developing a collaborative fishery resources management, understanding that the nature of fisheries, migration of fish, and mobility of people and vessels in the fisheries sector. Information on transboundary/shared stocks, systems, and procedures of vessel registration and deregistration, as well as issuance of licenses to fishers and landing of catches by foreign fishing vessels, among others, were shared.

6.1.3 Key Question #3

What are private sector fishing industry interests and activities in the region, and how do they interface with regional fishery organizations?

The primary private sector interests regarding regional fisheries management are focused around business growth (i.e., maximizing profit and/or securing new markets) and economic (i.e., increased competitiveness and leverage, and/or market viability). Nearly all stakeholders interviewed have an inherent, long-term (i.e., multigenerational) financial interest in maintaining and growing the commercial fishing industry, often supported through long-term family business interests (including non-fishery enterprises) and a vision of business growth. The private sector consistently voices their concerns with the current reduction in catch rates, their increasing costs of operation, the increasing prices that they must factor into their balance sheet, and the consequential disappearing profit margins that they are experiencing at present. As a result, they clearly acknowledge private sector willingness to “bend the rules” in order to decrease costs, increase supply of raw material, and increase profits from the fishery. Processors are reporting that due to insufficient and/or inconsistent raw materials (i.e., landings), they increasingly need to source raw materials from distant fisheries and non-traditional suppliers, some of who are insufficiently regulated or unregulated. Many of the private sector companies are global players in the fishing industry, and are regularly exposed to various debates about sustainable seafood and complex proposals to ensure product traceability. However, as they explain at the end of each day the simple calculus that they must face in order to stay in operation is having sufficient raw materials sourced at a low enough cost in order to meet present demand (orders placed) at a fair price; thus providing a margin through which they can continue to exist, and ideally (but not typically) grow.

The private sector has periodic interface and limited engagement with RFMOs. They will engage when invited, but do not seek out engagement as they report that they often feel that they are targeted as the “cause of the problem” or the “bad guy” by conservation and environmental advocacy groups, rather than as a strategic partner who must be included as part of the solution. They report not feeling any strong sense of investment or ownership in the RFMOs, and that their engagement is intended more to “make the effort” and “show face” with the international management community, rather than to deeply and legitimately engage this community. They do not feel it necessary to engage with RFMOs unless there is a financial incentive for them to do so. The private sector tends to be well organized in each country through existing local (sub-national) and national fisheries associations and federations of associations. It is usually government representatives who are invited to trainings or meeting rather than private sector representatives. This lack of legitimate, equitable private sector engagement and accepted voice further alienates private sector interests from RFMO activities and procedures. As some commercial operators indicated during interviews, they see RFMOs as a western-driven process through which importing country special interest groups and advocacy organizations can advance their agenda internationally, within Southeast Asia. Some private sector representatives went further to note that such western interests and agendas are advanced through existing RFMOs without transparency and sanctioned with impunity through bi- and multi-lateral government relationships that do not interface adequately or appropriately with the private sector in the region.

The private sector faces a number of issues; primary among them is the need to address overcapacity in the fisheries. There is increasing competition and conflict between small-scale and commercial scale operators for remaining fishery resources, and commercial stakeholders consistently cited that this conflict is both expected and accelerating. Commercial fisheries state the priority need to find alternative livelihoods for small fishers in order to move them out of fishing and reduce competition

with commercial interests. It was consistently stated by commercial interviewees that small-scale fishers largely focus on short-term interests and needs (e.g., meeting dietary needs and/or immediate household income requirements), while the commercial fishers inherently think long term, both in terms of sustaining fish populations that can be extracted from, as well as sustaining and growing their business over multiple generations. Commercial fishers express their concerns with increased illegal fishing operators and piracy directed against compliant commercial operators. As a result, commercial operators report having no choice but to adapt, often working together in groups (coordinated through associations) to quietly prepare for inevitable tactical engagement and self defense measures at sea. Coupled with concerns regarding the at-sea illegal trafficking of humans, narcotics, and small arms, commercial operators report that maritime security is an increasing issue, and one that elected officials and the general public are poorly aware of and/or equipped to address. As a result, fisheries associations are becoming de facto forward operating bases for groups of commercial fishing operations, through which the latest at-sea intelligence, security and self-defense measures, and tactical strategy and navigational and operational adaptation techniques are shared among association members.

6.2 Potential Strategies

Based on the findings generated out of this study, there are several strategies to consider in terms of how to address the priority issues and threats that face marine capture fisheries in the Southeast Asian region.

6.2.1 Strengthening Fisheries Governance

Fish populations are one portion of complex marine ecosystems that are affected by many natural and human-induced factors. In turn, fisheries should be considered as systems in which social systems and ecological systems are, in fact, linked. This perspective calls for a new way of managing fisheries—specifically, ecosystem-based approaches. An ecosystem-based approach to fisheries management (EAFM) is geographically specified fisheries management, an approach that takes account of knowledge and uncertainties about and among living marine resources, their habitat, and human components of ecosystems, and strives to balance diverse societal objectives. EAFM supports increased stakeholder participation in management, improved information, and improved institutional capacity. The importance of political will and political capacity in determining the quality of fisheries management is central to strengthening fisheries governance. While participating national governments and non-government partners under the Coral Triangle Initiative have begun to move toward adopting and implementing EAFM principles and approaches, capture fisheries remains largely unengaged and insufficiently represented within EAFM efforts in the region. Increased, meaningful engagement by the private sector is necessary for EAFM to succeed regionally.

6.2.2 Addressing Overfishing and Overcapacity

Overfishing is widespread in the region, it is a threat to both the private sector businesses and fisheries-dependent communities, but there is also variability from one area to another and from one species group to another. It is accepted that overcapacity is one of the leading causes of this overfishing. Although the problem of overcapacity is well recognized and relatively easy to analyze, it remains one of the most intractable problems in fisheries management. Issues of overcapacity and unsustainable resource use cannot be isolated from poverty, unemployment, and declining quality of life in fishing communities, because overfishing most directly affects highly resource dependent populations such as

fishing households. Although many of the fishing capacity issues of the region are demonstrably national issues and lie within the jurisdiction and responsibility of individual states, there is a clear need for a regionally coordinated approach. There is a dearth of effective international and regional institutions for cooperation in sustainable fishery management, especially in capacity reduction programs.

6.2.3 Addressing Maritime Security Issues

Increasingly, non-traditional threats to security are linked to the issue of resource scarcity. Effective maritime governance and a smoothly functioning infrastructure ensure the viability of the ocean commons, whereas gaps in maritime security can enable the proliferation of security threats. In the absence of effective maritime governance, state and non-state actors can engage in piracy, illicit commerce (smuggling and human trafficking), illegal fishing, environmental pollution, support for insurgency, or acts of terrorism, while exploiting a country's territorial waters and exclusive economic zone. Recent investigations conducted by the Guardian (2013) and the Environmental Justice Foundation (2011) highlight the role that commercial fisheries play in human trafficking and indentured servitude (slavery) within the region. Williams (2013) states that cross-border illegal fishing is one of Southeast Asia's most prominent maritime security problems. Thus, illegal fishing, now commonly combined with unreported and unregulated fishing, generates diplomatic, territorial, military, food, fisheries, and environmental security threats across Southeast Asia, while perpetuating human rights abuses. In order to address such transnational threats, law enforcement authorities and civil society partners must work together to more deeply investigate and analyze regional maritime security issues in order for targeted interventions to be tested, refined, and deployed sub-regionally.

6.2.4 Diversifying Livelihoods

Moving toward improved fisheries management, such as moving toward an ecosystem approach to fisheries management (EAFM), may require a reduction or redirection of fishing effort, making it necessary for fishers and their households to find alternative, supplemental or enhanced livelihood activities. Having alternatives to fishing that locally generate income and food can reduce the pressure to exploit local resources. When fishers and communities have few if any economic alternatives, it will be difficult to institute effective fishery management involving constraints on fishing, since the impacts of such decisions may be unacceptably severe. Efforts to develop livelihood opportunities must not be seen as a panacea to solving fishery problems. Nevertheless, the broadened perspective inherent in improved fisheries management, such as EAFM, requires a holistic approach to addressing the needs of individuals, households and communities and should support their development of sustainable portfolios of livelihood sources.

6.2.5 Addressing Globalization of Trade and Market Access

The globalization of trade creates both opportunities and risks for the fishers of Southeast Asia. In some cases, it puts the decision-making beyond the fisher and those involved in other fishing activities. The market both provides and restricts livelihood opportunities for fishers and traders. The constraints to market access for fishers in the region include weak bargaining power, poor marketing strategies, monopolies among wholesalers, poor product-holding infrastructure, difficulties meeting quality standards, and a lack of market information. Market based approaches to improving the environmental sustainability of fisheries have included the certification of fisheries harvested by sustainable means, traceability of products, and the eco-labeling of fish and seafood products from certified fisheries.

6.3 Potential Strategic Direction

Based on the findings outlined through this study, a potential strategic direction could be to strengthen transboundary fisheries management within specific, sub-regions of Southeast Asia (e.g., SSME and the Gulf of Thailand) through direct engagement with the commercial capture fisheries sector via established commercial associations, with the goal of reducing illegal and overfishing in these sub-regions while simultaneously increasing maritime security and strengthening coastal community livelihoods. Through a sub-regional private-public partnership program of action, existing national and sub-national capture fisheries associations could be engaged and strengthened to address the considerations stated within section 6.2. Through such direct engagement with the private sector, regional dialogues on fisheries management and improved governance could directly engage the voice of the private sector, as well as providing technical support to regional commercial alliances and networks in the areas of policy and regulatory development and capacity building for sustainable fisheries management. Commitment to such strategic direction would not only represent a new focus on direct engagement and partnership with private sector interests within capture fisheries in the region, but would also require new outreach and partnership with civil society partners (including non-governmental organizations) investigating and working to address non-traditional, transnational threats facing coastal and marine resource management, particularly IUU fishing, maritime security issues, and fisheries-associated human rights abuses. Scoping and design for such a strategic direction would require a rapid, in-depth assessment to build upon and more deeply investigate, document, and propose solutions to address the regional issues and trends stated within Section 5.0. Solutions identified would need to focus along all points along the fishery product value addition chain, from the supply end of the chain through to demand side.

While there is growing interest and focus by actors and donors from northern, developed, seafood importing nations to apply consumer demand approaches to encouraging traceability and sustainability of seafood products to market (e.g., seafood product labeling and certification), such importing nation demand-side approaches must be balanced with supply-side interventions designed to address overfishing, illegal fishing, and maritime security issues at their source. Failure to do so will not effectively address current issues and trends, which at present continue to result in significant social and economic consequences for millions of people living in fishing communities, including increased maritime conflict and instability.

6.4 Potential for Further Analysis

This study only allocated the necessary resources to undertake a cursory analysis of private sector actors within five of the ten ASEAN countries. As such, this study essentially serves as a preliminary assessment on considering and weighing potential strategic options related to future strategic programmatic investment and support. During the interviews, private sector stakeholders reported an interest in providing additional information and further engaging with regional actors and donors in addressing regional capture fisheries management issues. Should future programmatic investment and support be made toward regional fisheries management, conducting an in-depth investigation into the region's commercial fishing sector would be warranted, building upon and focusing around the key issues, trends, and findings generated out of this cursory research. It is important to conduct an in-depth analysis for the entire of the ASEAN region due to the integrated nature of the sector from

fishing to exporting; for example, many of the fish caught within a specific country are shipped to Singapore for processing and export. It is also important to undertake such a study due to the forthcoming ASEAN economic integration. This analysis would include the other countries (Brunei, peninsular Malaysia, Myanmar, Singapore, and Thailand) that were not studied in the current study and a wider range of actors.

7. CONCLUSION

Each day, fisheries issues and trends in Southeast Asia impact upon the food and livelihood security of millions of primarily poor people, both positively and negatively. Increasing fishing effort and increased competition between artisanal and commercial fishers over remaining fish stocks exacerbates destructive and overfishing that severely impact marine and coastal biodiversity and ecosystem resilience, while fueling social problems and illegal activities that destabilize maritime security and increases civil conflict. These problems will only worsen if national governments and international donors continue to give low priority to engaging and partnering with the private sector to address capture fisheries issues, particularly on the supply-side.

Many fisheries issues in the Southeast Asian region are transboundary in nature due to fish stock distributions, habitat linkages, and global trade. Regional strategies to address overfishing and overcapacity are necessary given that many of the national fishing fleets in ASEAN and adjacent Asian countries stray into neighboring countries' exclusive economic zones (EEZs) to find fish—as their own waters are already overfished—creating maritime enforcement problems throughout the region. Illegal fishing activities commonly cross national borders, leading to maritime security threats. This has created additional regional issues exacerbating many of the existing tensions between nations due to numerous unresolved maritime boundary disputes and contested ownership claims over *in situ* living and nonliving natural resources.

Looking forward, USAID can play an important role in promoting regional dialogues on fisheries management and improved governance. It can also provide technical support to regional alliances and networks and national fishery associations in the areas of policy and regulation development and capacity building. As highlighted through this study, many capture fishery operators and fishing associations within Southeast Asia are open and willing to engage with and support regional fisheries management efforts that safeguard their long-term business interests through the promotion of marine resource sustainability, decreased fishing capacity, and increased maritime security. Doing so effectively will not only advance the strategic economic and environmental interests of Southeast Asian nations over the coming decades, but also further advance mutually-beneficial economic and political partnerships between the ASEAN economies and the United States.

REFERENCES

- Abdullah, M. (2014). Foreign threat to fishing industry. [online]. Retrieved from <http://www.theborneopost.com/2014/03/31/foreign-threat-to-fishing-industry/#ixzz2xm7bQVb0>
- APEC (2014). Ocean and Fisheries. Retrieved from <http://www.apec.org/Groups/SOM-Steering-Committee-on-Economic-and-Technical-Cooperation/Working-Groups/Ocean-and-Fisheries.aspx>, May 1, 2014.
- Asia-Pacific Fishery Commission (n.d.). Asia-Pacific Fishery Commission.org. Retrieved from <http://www.apfic.org/>, May 1, 2014.
- ABD. (2011). Comprehensive Action Plans of the Sulu–Sulawesi Marine Ecoregion: A Priority Seascape of the Coral Triangle Initiative. Mandaluyong City, Philippines: Asian Development Bank (ADB). 141 pages. Available from <http://sites3.iwlearn3.webfactional.com/cti/programs-and-projects/coastal-and-marine-resources-management-in-the-coral-triangle2014southeast-asia-cti-sea/about-the-project>
- AVA 2010. Agri-food and Veterinary Authority of Singapore. Government website, accessed 23 April 2014. <http://www.ava.gov.sg>
- Central Institute of Economic Management, 2010. The fisheries sector in Vietnam: A strategic economic analysis. Hanoi
- Central Intelligence Agency (CIA). (no date). World Factbook: Coastline. Accessed 13 April 2014 <http://www.cia.gov/library/publications/the-world-factbook/fields/2060.html>
- Centre for Marine Life Conservation and Development (MCD). 2014. Feasibility Study: Marine Fisheries in Vietnam. Hanoi
- FAO 2012. International Guidelines for Securing Sustainable Small-scale Fisheries. Zero Draft. FAO, Rome. 31 pages.
- FAO (2005a, Last updated 1 November 2005). Fishery and Aquaculture Country Profiles. Philippines. In *Country Profile Fact Sheets*. [online] FAO Fisheries and Aquaculture Department. Retrieved from ftp://ftp.fao.org/FI/DOCUMENT/fcp/en/FI_CP_PH.pdf
- FAO (2005b, Last updated 1 May 2005). Fishery and Aquaculture Country Profiles. Viet Nam. In *Country Profile Fact Sheets*. [online] FAO Fisheries and Aquaculture Department. Retrieved from ftp://ftp.fao.org/FI/DOCUMENT/fcp/en/FI_CP_VN.pdf
- FAO 2006a. Fishery and Aquaculture Country Profiles. Indonesia *Country Profile Fact Sheets*. Rome: FAO Fisheries and Aquaculture Department.
- FAO (2006, Last updated 1 May 2006). Fishery and Aquaculture Country Profiles. Myanmar. In *Country Profile Fact Sheets*. [online] FAO Fisheries and Aquaculture Department. Retrieved from ftp://ftp.fao.org/FI/DOCUMENT/fcp/en/FI_CP_MM.pdf
- FAO (2009a, Last updated 1 February 2009). Fishery and Aquaculture Country Profiles. Malaysia. In *Country Profile Fact Sheets*. [online] FAO Fisheries and Aquaculture Department. Retrieved from <http://www.fao.org/fishery/facp/MYS/en>
- FAO (2009b, Last updated 1 August 2009). Fishery and Aquaculture Country Profiles. Thailand. In *Country Profile Fact Sheets*. [online] FAO Fisheries and Aquaculture Department. Retrieved from <http://www.fao.org/fishery/facp/THA/en>
- FAO (2011, Last updated 1 March 2011). Fishery and Aquaculture Country Profiles. Cambodia. In *Country Profile Fact Sheets*. [online] FAO Fisheries and Aquaculture Department. Retrieved from <http://www.fao.org/fishery/facp/KHM/en#pageSection1>
- FAO 2013. "Indonesia, FAO to strengthen fisheries and aquaculture cooperation." FAO News Article dated 27 May 2013. Rome. Accessed 23 April 2014 online: <http://www.fao.org/news/story/en/item/176776/icode/>
- FIS 2010. "Countries worldwide ask Singapore & Malaysia to shun toothfish poachers". FIS News, November 11, 2010. Fish Info & Services Co. Ltd. Accessed online:

- <http://fis.com/fis/worldnews/worldnews.asp?monthyear=11-2010&day=11&id=39158&l=e&country=&special=&ndb=1&df=1>
- Funge-Smith, S., Briggs, M. and Miao, W. (2012). Regional overview of fisheries and aquaculture in Asia and the Pacific 2012 *Asia-Pacific Fishery Commission, RAP Publication 2012/26*. (pp. 139) FAO Regional Office for Asia and the Pacific. Available from <http://www.fao.org/docrep/017/i3185e/i3185e00.pdf>
- Juna, M., Cinco, E. A., Wahab, R. and Salleh, H. (2007). Fishing Gears and Methods in Southeast Asia: V. Brunei Darussalam N. Ruangsivakul, S. Promjinda, I. Chanrachkit, S. Chindakhan and S. Siriraksophon (Eds.). Department of Fisheries / Brunei Darussalam SEAFDEC / Training Department. Available from <http://www.seafdec.org/download/fishing-gear-and-methods-in-southeast-asia-brunei-darussalam/>
- GFA 2009. "The Importance of Capture Fisheries in Food Security in Indonesia." Fact Sheet. Global Fish Alliance. 2 pages.
- Government of Australia. Compliance: illegal, unreported and unregulated fishing. Retrieved from <http://www.daff.gov.au/fisheries/iuu/compliance>, May 1, 2014.
- Government of Brunei Darussalam. Fish Processing in Brunei Darussalam Postharvest Development and Quality Control Division, Department of Fisheries, Fish Landing Complex, Serasa, Muara, Brunei Darussalam. Retrieved from http://www.fisheries.gov.bn/publications/fish_processing.htm, May 1, 2014.
- Greenpeace 2013. Out of Line: The failure of the global tuna longline fisheries. Greenpeace International. Amsterdam, the Netherlands. 44 pps.
- IE 2014. "IE Singapore assisted 26,000 companies in trade and overseas investments in 2013" Media Release No. 004/14, 20 February 2014. International Enterprise, Republic of Singapore. 7 pages.
- Juna, M., Cinco, E. A., Wahab, R., & Salleh, H. (2007). Fishing Gears and Methods in Southeast Asia: V. Brunei Darussalam. In N. Ruangsivakul, S. Promjinda, I. Chanrachkit, S. Chindakhan & S. Siriraksophon (Eds.): Department of Fisheries / Brunei Darussalam SEAFDEC / Training Department.
- Lewis, A. 2014. Evaluation of options for a consultative forum on the live reef food fish trade in the Coral Triangle region and adjacent areas. March. WWF.
- MoMAF 2009. Indonesian Fishing Ports 2009. Directorate of Capture Fisheries, Ministry of Marine Affairs and Fisheries (MoMAF). Jakarta, Indonesia. 210 pps.
- New Straits Times (2014, Last updated 2 April 2014). Total solution needed for illegal immigrants in Sabah Malaysia, Berhad. Retrieved from <http://www.nst.com.my/latest/total-solution-needed-for-illegal-immigrants-in-sabah-1.545411#ixzz2xm6yYBx5>
- NSPL 2008. "Commonwealth Network: Singapore". Nexus Strategic Partnerships Limited. Accessed online 14 April 2014 at <http://www.commonwealthofnations.org/sectors-singapore/business/fisheries/>
- Park, Kyunghye 2013. "Singapore's Changi Seeks Growth With Gold, Tuna: Southeast Asia" Bloomberg News, 20 May 2013. Accessed 10 April 2014 online: <http://www.businessweek.com/news/2013-05-19/singapore-s-changi-seeks-growth-with-gold-tuna-southeast-asia>
- Pilcher, N. J. (2009). Developing awareness and participation amongst fishers in Sabah, Malaysia of the value of TEDs in conserving sea turtles *Final Report for CI Grant Agreement MRF-02032009* (pp. 15). Quezon City, Philippines: Conservation International Philippines.
- PEMSEA (2014). Sustainable Development of the Seas of East Asia through Meaningful Partnerships. Retrieved from <http://www.pemsea.org/>
- Pomeroy, R. (2013a). Governance of tenure in capture fisheries in Southeast Asia. *Land Tenure Journal*, 1, 39-65. Retrieved from <http://www.fao.org/nr/tenure/land-tenure-journal/index.php/LTJ>

- Pomeroy, R. (2013b). Marine Fisheries in Crisis: Improving Fisheries Management in Southeast Asia. In R. Hathaway & M. Mills (Eds.), *New Security Challenges in Asia*. Washington, DC.: Woodrow Wilson Center Press.
- Ramsden, Neil 2013. "Tuna giant Tri-Marine to drive change with economic incentives" Undercurrent News, 28 January 2013. Accessed 14 April 2014 online: <http://www.undercurrentnews.com/2013/01/28/tuna-giant-tri-marine-to-drive-change-with-economic-incentives/>
- Sabah Government (1998). Sabah Coastal Zone Profile Retrieved from <http://www.townplanning.sabah.gov.my/iczm/Reports/Coastal%20Profile%20Sabah/ch1/11-FISHERIES.html>, May 1, 2014.
- SEAFDEC 2014. Marine Fisheries Research Department Annual Highlights 2013. Published by the Marine Fisheries Research Department, Southeast Asian Fisheries Development Center, Singapore. 19 pp. ISSN: 0219-2667
- SSME-FishProject.org (n.d.). Sulu-Celebes Sea Regional Fisheries Management. In *UNDP/GEF Project*. Retrieved from <http://www.ssme-fishproject.org/>
- Undercurrent 2013. "Singapore looks for growth in tuna trade" Undercurrent News, 21 May 2013. Accessed 10 April 2014 online: <http://www.undercurrentnews.com/2013/05/21/singapore-looks-for-growth-in-tuna-trade/>
- UN 2013. Environment Statistics Country Snapshot: Singapore. United Nations Statistics Division, New York. 2 pps.
- UNDP. (n.d.). Implementation of the Sulu-Celebes Sea Sustainable Fisheries Management Project. Malaysia, Philippines: United Nations Development Programme, Governments of Indonesia.
- WRI 2012. "Coastal and Marine Ecosystems - Marine Jurisdictions: Coastline length." World Resources Institute (WRI).
- Williams, M. J. (2013). Will new multilateral arrangements help Southeast Asian states solve illegal fishing? *Contemporary Southeast Asia*, 35(2), 258-283. doi: doi:10.1355/cs35-2f
- Yeap S. E., et. al. (2001). *Fish processing industry in Singapore*. Singapore: Agrotechnology Division, Agriculture and Veterinary Authority.

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APPENDIX

AI. Stakeholder Interview Summaries: Cambodia

1. Interviewee designation(s)	Camb-1; Camb-2 (multiple interviews)
2. Stakeholder type	Private sector
3. What is their role in fisheries? Primary fisheries-related activities and interests?	Commercial operator. Primary activities are post-harvest: fish processing and exporting. Primary interests: expanding export markets; maintaining fish stocks to support their business.
4. What is the geographic scope of their fisheries-related activities?	Fishing in nearshore and offshore areas
5. What is their capacity? No. of years in operation? How large/no. of employees? Level of expertise?	Moderately small operations. Moderate level of processing capacity and expertise.
6. Relationship to fisheries/seafood associations? Membership?	No national seafood/fisheries association in Cambodia.
7. Involvement with regional fishery management efforts or organizations?	None.
8. What is their relationship with other stakeholders? Other commercial operators? Government?	Low level of linkage with other commercial operators.
9. What is their level of influence over fisheries in the region? Ability to affect change?	Low
10. How concerned with overfishing and/or IUU fishing? How affected by overfishing and illegal fishing?	High level of concern (both). Illegal fishing by boats from Thailand and Vietnam fishing in Cambodia EEZ is a serious issue and is causing overexploitation of fish stocks. This makes it more difficult to obtain fish. Overfishing has impacts upon fishery sector jobs/employment. Destructive fishing gears are used widely.
11. What are the perceived barriers/obstacles to overcoming overfishing and IUU fishing?	Poor law enforcement, lack of enforcement capacity. Government corruption.
12. What are the roles of different genders and how does this affect stakeholder participation?	Not applicable.
13. Other issues that negatively affect their operations/efforts?	Poverty and food insecurity. Lack of alternative livelihood and employment opportunities.
14. Any opportunities or suggestions to improve how fisheries are managed within the region?	Interested and willing to work on a regional project to address IUU fishing and overfishing.
15. What is current relationship, if any, with USAID (entry point)?	No relationship to USAID.

1. Interviewee designation(s)	Camb-3; Camb-4; Camb-5 (focus group)
2. Stakeholder type	Government: national
3. What is their role in fisheries? Primary fisheries-related activities and interests?	Designated fisheries management authority. Regulation of extent, number, and licensing of commercial fisheries operators.
4. What is the geographic scope of their fisheries-related activities?	All marine waters, from high water mark to EEZ extent boundary.
5. What is their capacity? No. of years in operation? How large/no. of employees? Level of expertise?	Moderate management capacity. Insufficient number of staff.
6. Relationship to fisheries/seafood associations? Membership?	No national seafood/fisheries association in Cambodia.
7. Involvement with regional fishery management efforts or organizations?	Upon invitation.
8. What is their relationship with other stakeholders? Other commercial operators? Government?	Daily interaction and influence over all licensed commercial operators. Enforcement of rules and regulations over all stakeholders.
9. What is their level of influence over fisheries in the region? Ability to affect change?	Moderate to low, limited to Gulf of Thailand.
10. How concerned with overfishing and/or IUU fishing? How affected by overfishing and illegal fishing?	High level of concern (both). Illegal fishing by Thailand and Vietnam within Cambodia EEZ resulting in overexploitation. Pervasive use of illegal destructive fishing techniques leads to overfishing.
11. What are the perceived barriers/obstacles to overcoming overfishing and IUU fishing?	Insufficient enforcement capacity.
12. What are the roles of different genders and how does this affect stakeholder participation?	Women hold senior management positions within the national government departments.
13. Other issues that negatively affect their operations/efforts?	Poverty and food insecurity. Lack of alternative livelihood and employment opportunities.
14. Any opportunities or suggestions to improve how fisheries are managed within the region?	Willing to support regional efforts to address IUU fishing and overfishing, pursuant with the provision of the necessary human and financial resources.
15. What is current relationship, if any, with USAID (entry point)?	Bilateral relationship between Cambodia and USAID.

A2. Stakeholder Interview Summaries: Indonesia

As the world's third largest seafood producer, Indonesia is home to a vast number of commercial fisheries production and processing operations. Pursuant with the designated Scope of Work and geographic focus on the SSME, stakeholder interviews in Indonesia focused on fishery production in Northern Sulawesi, which bounds the southern and southwestern geographic extent of the SSME.

1. Interviewee designation(s)	Indo-1, Indo-2, Indo-3, Indo-4, Indo-5 (multiple interviews)
2. Stakeholder type	Private Sector
3. What is their role in fisheries? Primary fisheries-related activities and interests?	Fisheries Associations: national capture fishery operators; national fishing vessel owners; capture fisheries operators based out of Bitung, Northern Sulawesi; capture fisheries operators based out of Manado; small-scale fisheries based in Bitung. Provide assistance on: (a) representing fishers with government bodies and fisheries policy decision making; (b) licensing of members with relevant government authorities; (c) building market of commercial fishers; (d) building capacity in commercial fisheries sector, including value addition of seafood products. Primary interest is viability and maintenance of commercial fisheries in Indonesia/Northern Sulawesi. Fishers are typically expected/required to become members.
4. What is the geographic scope of their fisheries-related activities?	All marine waters, from high water mark to EEZ extent boundary. Focus on Celebes, Molucca,
5. What is their capacity? No. of years in operation? How large/no. of employees? Level of expertise?	Recognized as the leading voices and experts within commercial fisheries. Moderate management capacity. Typically low level to insufficient number of staff. High expertise: most knowledgeable, experienced, and successful commercial operators typically elected to serve in leadership positions. Focus on marketing/expansion.
6. Relationship to fisheries/seafood associations? Membership?	Bitung: 58 members within association; all capture fishery operators. Aims to improve the relationship between Bitung fishers and the government. Membership upon payment of small fee. Manado: several hundred members. Work closely with Provincial government. Annual dues from members. National: several thousand members; work closely with national government. Politically powerful.
7. Involvement with regional fishery management efforts or organizations?	None to date. De facto influence over fisheries within the region, particularly in the Celebes and Molucca Seas.
8. What is their relationship with other stakeholders? Other commercial operators? Government?	Associations speak on behalf of and represent commercial fishing businesses in Bitung and Manado. Influential and well respected by other, non-commercial stakeholders (including government) within fisheries sector of Northern Sulawesi. Aspects of a social club; recognized as being a safe place where all members are welcomed and get along. Police/marine patrol, national government, and large business owners have largest influence over members (fishers). No guarantee that Northern Sulawesi fishery associations work with Ambon fishery associations; exacerbates fisher conflict within contested fishing grounds; increased tension and competition.

<p>9. What is their level of influence over fisheries in the region? Ability to affect change?</p>	<p>High level of influence over provincial government; moderately high level of influence over national government. Have influence over fisheries policy within Province. Association effectively negotiates with national government to maintain (not raise) fees on commercial fishers in Bitung. National and provincial governments request input from Association regularly on proposed policies/regulations.</p>
<p>10. How concerned with overfishing and/or IUU fishing? How affected by overfishing and illegal fishing?</p>	<p>Illegal fishing is the top concern of association members. Members obey laws/rules and make effort to abide by regulations. Other fishers do not. Piracy from Filipino fishers and “black-skinned” (Melanesian) men within North Molucca Sea and Celebes waters between Mindanao and Sabah. Increased piracy in recent years on Bitung fishers has left captains beheaded and crew abandoned at sea; boats, gear, and catch confiscated by pirates. Bitung Association has obtained a copy of the Witherby (2011) “Best Management Practices for Protection against Somalia Based Piracy” guide, and translated and adapted some of the ship protection and boarding barrier measures for use by members’ boats. Illegal foreign fishers come to Indonesian waters to steal fish, but do not land them in Indonesia; i.e., lost revenues for Indonesia. Some export at-sea to Hong Kong and Japan (directly; not landed first).</p>
<p>11. What are the perceived barriers/obstacles to overcoming overfishing and IUU fishing?</p>	<p>(1) Increased competition between commercial fishers drives IUU fishing. (2) Non-existence or ineffective maritime enforcement; enables piracy and IUU fishing. (3) Lack of maritime security; need at-sea safety training and trained, armed security escorts (to fend off pirates). Don’t need boats or equipment; need human resources and training within the following skill areas: safety, at-sea security/defensive tactics, and safety technology. (4) High level of technological sophistication of Filipino fishers (competitors/pirates) in comparison to Indonesians (low capacity). Filipino fishers have fast, metal skiffs whereas Indonesians have slow, clunky wooden vessels; easy to intercept and board. (5) Increasing number of illegal foreign purse seines in Indonesian waters.</p>
<p>12. What are different gender roles, and how affect fishery?</p>	<p>Not applicable. Women do not play a significant role in associations or in the management of Bitung commercial fisheries operations.</p>
<p>13. Other issues that negatively affect their operations/efforts?</p>	<p>Key issue is overcapacity. Too many fishers, drive the price down. Too few markets, factories undercut raw material sales prices. (1) Conflicting and cumbersome licensing process for commercial fishers; multiple agencies/authorities. (2) Corruption: bribes required by marine patrol if boat’s papers not in order. (3) Too many confusing government rules, some of which overlap and conflict. Need clarification and simplification of rules and regulations. (4) Few export connections beyond local markets. Fish shipped to Surabaya for export; need to export directly from Bitung. Need Philippines export quota as limit.</p>
<p>14. Any opportunities or suggestions to improve how fisheries are managed within the region?</p>	<p>Bitung Association sponsors repopulation/restocking program annually of shallow water fish populations; 1000 fingerlings ‘sponsored’ by each fisher (member; ~ 30 participating). Including skipjack and yellowfin. Captured as bait fish, and then released at sea once grown out.</p>
<p>15. What is current relationship, if any, with USAID (entry point)?</p>	<p>None.</p>

1. Interviewee designation(s)	Indo-6, Indo-7, Indo-8, Indo-9, Indo-10 and Indo-11 (multiple interviews; one focus group)
2. Stakeholder type	Government: provincial/state
3. What is their role in fisheries? Primary fisheries-related activities and interests?	Designated fisheries management authority for province, under decentralized natural resource management framework. Regulation of extent, number, and licensing of commercial fisheries operators. Oversee and regulate commercial aquaculture and capture fishery operations. Conduct community outreach within fishing community. Build and donate fishing boats to local community.
4. What is the geographic scope of their fisheries-related activities?	Inshore, provincial (North Sulawesi) waters.
5. What is their capacity? No. of years in operation? How large/no. of employees? Level of expertise?	Operating since 1970. 130 staff. Approximately 70% work directly with local fishers in Manado and Northern Sulawesi.
6. Relationship to fisheries/seafood associations? Membership?	Provide government support to fisheries associations working in Northern Sulawesi.
7. Involvement with regional fishery management efforts or organizations?	Rarely. Upon invitation by national fisheries. Some involvement with the CTI-CFF Indonesia National Coordinating Committee work.
8. What is their relationship with other stakeholders? Other commercial operators? Government?	Promote and facilitate growth of artisanal, small-scale fisheries. Good relationship with local fishing communities; document their local needs, monitor local catch, and provide training/teaching. Report to national government and Governor.
9. What is their level of influence over fisheries in the region? Ability to affect change?	High level of influence, particularly over small-scale fishers in province. Influences decisions made by national fisheries (Jakarta).
10. How concerned with overfishing and/or IUU fishing? How affected by overfishing and illegal fishing?	High level of concern with illegal/IUU fishing; 3 categories: (1) fishing without a license; (2) unreported catch and/or fishing activities; and (3) unregulated harvest of certain species. Primary foreign illegal fishers are from Philippines, Taiwan, and China.
11. What are the perceived barriers/obstacles to overcoming overfishing and IUU fishing?	(1) Provincial government has limited direct control over commercial fisheries (licensed nationally). Therefore provincial government cannot enforce/control number of commercial landings, catch size, etc. (2) Complicated licensing process and conflicting licensing authorities creates overly burdensome licensing process for most fishers. Therefore drives up rates of illegal/unlicensed fishing. (3) Lack of electrical infrastructure within offshore island communities equates to lack of cold storage.
12. What are different gender roles, and how affect fishery?	Women hold senior management positions within the provincial government departments.
13. Other issues that negatively affect their operations/efforts?	Conflict between National Government licensing efforts and Provincial Government monitoring and enforcement of licenses. Trust issues between national and provincial agencies under decentralization. National government resistance to decentralization to provincial level. Bitung is a Class A seaport, so under National authority control (not Provincial).
14. Any opportunities or suggestions	(1) Need cold storage and power/energy plant. (2) Need increased

to improve how fisheries are managed within the region?	budget for electricity to run cold storage facilities. (3) Need increased market access; current focus on local catch insufficient. (4) Welcome fisheries project partnership with USAID to build capacity and address barriers or obstacles.
15. What is current relationship, if any, with USAID (entry point)?	None.

1. Interviewee designation(s)	Indo-12 through Indo-23 (multiple interviews; including 3 focus groups)
2. Stakeholder type	Private Sector
3. What is their role in fisheries? Primary fisheries-related activities and interests?	<p><u>Small-scale commercial</u>: provide fresh, high-quality reef fish and small pelagics for local restaurants, local consumers (via fish markets); promote traditional fishing methods that are ecologically sustainable.</p> <p><u>Medium- and large-scale commercial</u>: primary tuna (particularly skipjack, yellowfin, and bigeye) fishery production and processing center within SSME. Bitung (known as “Fish City”) is a major cannery and export center of Indonesian-caught tuna. Coral reef fish (including live reef fisheries), small pelagics (flying fish, sardine, mackerel), and processed invertebrates/cephalopods as secondary production focus. Exports primarily to China, Japan, Korea, Australia, and within ASEAN region.</p> <p><u>Artisanal</u>: fishing primarily done to meet household/family dietary (protein) needs; also for supplemental income needs (e.g., school fees), bartering, and sharing with extended family/neighbors. Livelihood focus.</p>
4. What is the geographic scope of their fisheries-related activities?	<p><u>Small-scale commercial and artisanal</u>: inshore, provincial (North Sulawesi) waters; including Manado Bay and Old Manado Island.</p> <p><u>Medium-scale commercial</u>: inshore and offshore waters; Molucca Sea, Banda Sea, and Celebes Sea as primary fishing groups for Bitung tuna fishers; occasionally fish out toward Southwest Pacific, adjacent to New Guinea and Solomon Islands (Coral Sea).</p>
5. What is their capacity? No. of years in operation? How large/no. of employees? Level of expertise?	<p><u>Small-scale</u>: small boats/skiffs with outboard engine (<10 gross tons); crews between 5 and 10. Primarily pole-and-line, handline gear. Make occasional overnight trips to fish the Molucca Sea for reef fish and tunas. Small operators typically with 3-5 boats, crews of 15-50.</p> <p><u>Medium-scale</u>: purse seiners, trawlers, long liners, and pole-and-line vessels (<60 gross tons); 20-30 crew size. Some larger vessels (25-30 meters length).</p> <p><u>Bitung</u>: 37 commercial fishing operations, of which 25 focus primarily on tuna. 54 processors, including 6 canneries (tuna, small pelagics), and 5 smoking factories. Remainder are frozen fish factories.</p>
6. Relationship to fisheries/seafood associations? Membership?	Nearly all small- and medium-scale operators belong to both local and national fisheries associations. Some operators avoid national associations due to national-level politics (corruption) and high level of influence by national government (graft) within national associations. Positive relationship between Manado and Bitung fishers, particularly at the small-scale commercial level; see one another as being in “the same family”; i.e., unified view of Northern Sulawesi fishers. No formal joint Bitung/Manado association.
7. Involvement with regional fishery management efforts or organizations?	Rarely. Upon invitation by national fisheries. Some involvement with the CTI-CFF Indonesia National Coordinating Committee work within Manado. Low level of interest in increased oversight/management by existing or new RFMOs; feel “over-regulated as is”. Low level of confidence in existing RFMOs and regional management efforts; see as ineffective or as making problems worse (e.g., maritime security). Perceived favoritism by RFMOs toward Philippines, and believed to work against “the poor fishermen of our archipelago”.

<p>8. What is their relationship with other stakeholders? Other commercial operators? Government?</p>	<p>Local politicians, police officers, Navy, national government, and developers (businessmen) have influence over large- and medium-scale commercial fishers. Medium-scale commercial fishers have influence over small-scale commercial fishers. Artisanal fishers often at odds with medium-scale commercial interests (and therefore national government); compete over same fish stocks within inshore waters. Artisanal fishers typically have a friendly/positive relationship with local/city government (including mayors), but avoid provincial fisheries departments due to wanting to avoid local politics; often have adversarial relationship with national fisheries (“as is typical throughout our country”). Small-scale commercial concerns about local politicians using their names and local reputations in order to advance own political interests. Medium-scale commercial operations compete with one another, but untie to pursue shared interests via fisheries associations (large influence). Small-scale fishers report feeling bullied by local politicians and national government.</p>
<p>9. What is their level of influence over fisheries in the region? Ability to affect change?</p>	<p><u>Small-scale commercial and artisanal</u>: low level of general influence. Low political influence; unable to voice concerns with decision-makers or affect change. <u>Medium-scale commercial</u>: Moderate to high level of influence within North Sulawesi. Business leaders influence politicians, and policies. Work together through fisheries associations to influence policy and change rules/regulations, particularly at the provincial level. Work to entertain and keep informed national government leaders to secure self-interests.</p>
<p>10. How concerned with overfishing and/or IUU fishing? How affected by overfishing and illegal fishing?</p>	<p><u>Overall</u>: high level of concern with both issues by all stakeholder levels. “Makes us poor and hungry.” <u>Overfishing</u>: observed declines in catch during past decade. High level of medium-scale commercial concern with overfishing done by artisanal fishers. High level of artisanal fisher concern with overfishing done by high-efficiency commercial fishing gear and destructive fishing by small-scale fishers. Observed levels of competition increasing over remaining stocks. Concern with increasing at-sea conflict over remaining stocks, particularly between local/artisanal fishers and foreign fishers. Drives down price, while operational costs continue to rise. Drives IUU fishing. <u>IUU fishing</u> primarily seen as being done by foreign (Filipino, Chinese/Taiwanese, and Melanesian) fishers, some of who are pirates. High level of concern with illegal/IUU fishing by small- and medium-scales. Low reported level of destructive fishing (poison, dynamite) in Manado Bay. Moderate level of destructive fishing in offshore islands beyond Manado, due to lack of enforcement.</p>
<p>11. What are the perceived barriers/obstacles to overcoming overfishing and IUU fishing?</p>	<p><u>Overfishing</u>: (1) Too many commercial operators to enforce/regulate effectively. (2) Loss of wetlands due to coastal development and urbanization, pollution. Fish habitat, particularly nursery grounds, reduced. Impacts population size (lowered), recruitment, and life cycle/migration patterns of target stocks. Reduced reproductive stock unable to replenish population. (3) Too many fish aggregating devices (“rumpons”), promoting overfishing and concentrating fishing pressure.</p>

	<p>(4) Conflict with Ambonese fishers over Molucca fishing grounds.</p> <p><u>Illegal fishing</u>: (1) Foreign fishers do not recognize/respect national boundaries. See regional fish stocks as “being in the eyes of God” and beyond national jurisdiction/authority. (2) When illegal foreign fishers caught by Navy/marine patrol, they typically have no papers or identification. Sometimes let go because unclear what to do with stateless persons. (3) Some illegal fishers want to be caught since will be housed and fed by Indonesian government. (4) Concern that illegal Chinese fishers/fishing vessels caught are paid-off (bribe to police) by local Chinese business owners and released; stay in Indonesia illegally and strengthen foreign fishery connections.</p> <p><u>Both</u>: Political corruption; officials paid off to allow for over fishing (new fishing licenses) and illegal fishing (by foreigners).</p>
<p>12. What are the roles of different genders and how does this affect stakeholder participation?</p>	<p>Women involvement within local fisheries, particularly fish processing, intertidal gathering, and inshore gleaning. Male-dominated capture fisheries within province. Low level of focus on the role of women within fisheries by existing businesses, associations, and governmental bodies. Poor to no awareness of gender issues associated with fisheries. Sex trade growth to support local and foreign fishers.</p>
<p>13. Other issues that negatively affect their operations/efforts?</p>	<p>(1) Concerns with increasing piracy by illegal foreign fishers with fast attack craft and sophisticated equipment; murder Indonesian fishers at sea, and take catch and/or boat, gear; set crew adrift or take as slaves/for ransom. Especially in Celebes, Molucca, and West Papua Seas. (2) Lack of focus on sustainability by national government; promotion of fisheries growth of commercial sector, while low attention on small-scale fishers. (3) Urbanization, waterfront development, and land reclamation projects destroy nursery habitat for fisheries (e.g., mangroves). (4) Concerns regarding bilateral funding provided to National Government agencies being “misappropriated” (corruption/graft) and not reaching local/provincial levels where fisheries issues are managed. (5) Growing awareness of reported trafficking of small arms (via Bitung into Sulawesi; reported origins from Mindanao and Sulu Islands/Philippines) and humans (for import into local sex trade for foreign fishers or transport to Australia) by commercial fishers visiting/transiting North Sulawesi. (6) National government resistance of management decentralization to provincial/local level. (7) Local beliefs that changing weather patterns and seismic/volcanic activity may have negative influence on fisheries, therefore allowing increased overfishing. (8) Perception of declining habitat and shrinking fishing grounds; particularly for skipjack, grouper, and small pelagics. (9) Flag of convenience abuse. (10) General fishery overcapacity at all levels. (11) Insufficient local cold storage capacity/facilities. (12) Insufficient landing sites and associated on-site processing facilities; including small-scale fisheries/markets. Need fish port expansion. (13) Insufficient electrical supply. (14) Lack of cold storage transport by land (refrigerated truck). (15) Lack of international marketing of locally landed fish; i.e., to Philippines, Thailand, EU, USA. Marketing outside of Manado difficult due</p>

	to lack of direct exporting capability.
14. Any opportunities or suggestions to improve how fisheries are managed within the region?	(1) Build local small-scale fisher awareness to support sustainability and food security (education and outreach); focus on promotion of traditional fishing gear and techniques (sustainable), in lieu of over-efficient fishing technologies/gear and destructive fishing practices. (2) Provide training to small-scale commercial fishers on safety, navigation, value-added handling and processing techniques, and organizing to interface within political decision-making process. (3) Provide/construct cold storage facilities and supporting energy sources/plants.
15. What is current relationship, if any, with USAID (entry point)?	None currently with RDMA. USAID Indonesia provides indirect local support to Bitung fishers.

1. Interviewee designation(s)	Indo-24 through Indo-36 (focus group)
2. Stakeholder type	Government: city/local
3. What is their role in fisheries? Primary fisheries-related activities and interests?	Promotion of fisheries sector and business investment. Within context of larger commercial/business development and growth. Due to Bitung's reputation as the "Fish City", major focus area.
4. What is the geographic scope of their fisheries-related activities?	Bitung City and surrounding waters.
5. What is their capacity? No. of years in operation? How large/no. of employees? Level of expertise?	Moderate business and marketing expertise. Approximately 40 staff focused (as one part of their responsibilities/position) on promotion and marketing of Bitung City fisheries.
6. Relationship to fisheries/seafood associations? Membership?	Support local and provincial associations. Provide occasional training and travel to association leaders/members.
7. Involvement with RFMOs?	None.
8. What is their relationship with other stakeholders? Other commercial operators? Government?	Promote growth of fisheries sector in Bitung, so well liked by fishery stakeholders. Seen as champions of local fishing livelihoods and guardians of Bitung City's fishing port reputation. Works closely with National Government due to Bitung under national jurisdiction/control.
9. Level of influence over fisheries in region? Ability to affect change?	High level of influence over commercial fishers from Bitung (only). Limited effects on region as a whole.
10. How concerned with overfishing and/or IUU fishing? How affected by overfishing and illegal fishing?	Moderate level of concern with overfishing. Avoid illegal fishing discussion due to political nature of topic.
11. What are the perceived barriers/obstacles to overcoming overfishing and IUU fishing?	(1) Complicated licensing process and conflicting licensing authorities creates overly burdensome licensing process for most fishers. Therefore drives up rates of illegal/unlicensed fishing. (2) Lack of electrical infrastructure and cold storage facilities and transport. (3) Insufficient fishery landing site capacity/facilities.
12. What are different gender roles, and how affect fishery?	Women hold low and mid-level management positions within the city/local government.
13. Other issues that negatively affect their operations/efforts?	(1) Bitung is a Class A seaport, so under National authority control (not Provincial). (2) Need fish port expansion, including enhanced landing site capabilities, new on-site processing and cold storage.
14. Any opportunities or suggestions to improve how fisheries are managed within the region?	(1) Development of other fisheries beyond tuna. Expand export countries and increase international marketing. (2) Improve landing site, cold storage facilities, and power/energy plant. (3) Human resource training provided for commercial fisheries sector on marketing, business planning, and financial management. (4) Create a national marine park within Bitung waters to promote tourism and sustainable fisheries. (5) Simplify rules and licensing procedures of national government licensing process. (6) Subsidize training costs of how to maintain catch log books/records by commercial fishers.
15. What is current relationship, if any, with USAID (entry point)?	None. Welcome public-private partnership to finance management of fisheries within province while promoting sustainability.

1. Interviewee designation(s)	Indo-37, Indo-38, and Indo-39 (focus group)
2. Stakeholder type	Government: national
3. What is their role in fisheries? Primary fisheries-related activities and interests?	Promotion, creation, regulation, and enforcement of national policies that alleviate poverty, provide food security, and grow a sustainable commercial fishery sector. Oversight and management planning of 11 fishery management areas across the nation.
4. What is the geographic scope of their fisheries-related activities?	National waters of Indonesia. Regional waters of Southeast Asia, particularly waters of neighboring countries whose EEZs abut Indonesian boundaries.
5. What is their capacity? No. of years in operation? How large/no. of employees? Level of expertise?	70 staff within division of capture fisheries. Other divisions in fisheries statistics, archipelagic and territorial waters, high seas, evaluation and effectiveness, inland waters, and decision support staff.
6. Relationship to fisheries/seafood associations? Membership?	Support local and provincial associations. Provide occasional training and travel to association leaders/members.
7. Involvement with RFMOs?	Active participation on behalf of Indonesia. Regional leader and influential voice within RFMO processes.
8. What is their relationship with other stakeholders? Other commercial operators? Government?	Promote growth of fisheries sector in Bitung, so well liked by fishery stakeholders. Seen as champions of local fishing livelihoods and guardians of Bitung City's fishing port reputation. Works closely with National Government due to Bitung under national jurisdiction/control.
9. Level of influence over fisheries in region? Ability to affect change?	High level of influence over commercial fishers from Bitung (only). Limited effects on region as a whole. Seeking to increase regional influence and voice, particularly with North Asia interests (China, Korea, Japan).
10. How concerned with overfishing and/or IUU fishing? How affected by overfishing and illegal fishing?	Low (official) level of concern with overfishing. Being addressed. Moderate level of concern with IUU fishing. Reportedly decreasing due to recent increases in enforcement effort. Primary illegal foreign fishers from China, Thailand, Vietnam, Philippines, and Taiwan. Due to Indonesia's large size and vast waters, need new remote surveillance technologies. Illegal fishing negatively impacts Indonesian economic development, poverty alleviation efforts, and maritime security and sovereignty. IUU fishing is a regional issue, not just a national one.
11. What are the perceived barriers/obstacles to overcoming overfishing and IUU fishing?	(1) 97% of Indonesian fishers are small-scale; difficult to manage. Capture quota far exceeded. Issues with significant by-catch by artisanal fishers. Destructive fishing techniques used by artisanal fishers; desperate, poor. (2) Decentralization of management to local/provincial level uneasy, particularly around licensing and enforcement. (3) Insufficient enforcement capacity, including within inshore and offshore waters. (4) EAFM implementation only now getting partially underway; should alleviate some of overfishing. Socialization of EAFM incomplete at provincial and community levels. (5) Low capabilities in remote sensing and surveillance; therefore limits enforcement efforts.
12. What are different gender roles, and how affect fishery?	Women hold low and mid-level management positions within the city/local government.

13. Other issues that negatively affect their operations/efforts?	(1) Human trafficking and human rights are not the legal mandate of the National Fisheries Ministry. However, known human rights abuses to Indonesian fishers by Taiwan, Philippines, Thailand, and Chinese fishing vessels/captains known to occur. Sensitive issue politically. (2) Too many senior staff/managers within Ministry. Too few mid-professionals, therefore concerns with future leadership and low management capacity. Public speaking and negotiation training needed.
14. Any opportunities or suggestions to improve how fisheries are managed within the region?	(1) Development of small-scale fishery quotas; transfer of quotas, limited in number. (2) Support to implementation of FMA plans and EAFM. Need international lessons learned exchange on how to manage FMAs and implement EAFM, so that do not make same mistakes, share management knowledge and technical expertise. (3) Expand professional education/technical short course opportunities to Ministry staff. (4) Training of national fishery observers; increase capacity, professionalism (discipline), and effectiveness. (5) Increase remote sensing and surveillance capabilities.
15. What is current relationship, if any, with USAID (entry point)?	Strong, long-standing, and increasing bilateral relationship.

1. Interviewee designation(s)	Indo-40, Indo-41, Indo-42, Indo-43, Indo-44, and Indo-45 (focus group)
2. Stakeholder type	Non-governmental organizations: conservation/environmental
3. What is their role in fisheries? Primary fisheries-related activities and interests?	(1) Promotion of a science-based approach to fisheries management; (2) Fisheries management capacity building, particularly at the artisanal level using traditional practices/techniques and indigenous knowledge; (3) Addressing fisheries issues within design and management of MPAs and MPA networks; (4) Promotion of sustainable fishing techniques that address human well being and food security needs; (5) Low level of focus on commercial fisheries, except on tuna; (6) Policy enactment support and regulatory reform/strengthening; (7) Reform of destructive/unsustainable commercial fishery practices (e.g., by-catch).
4. What is the geographic scope of their fisheries-related activities?	Indonesia-wide; focus largely on inshore/nearshore waters, and especially on coral reef and reef-associated ecosystems.
5. What is their capacity? No. of years in operation? How large/no. of employees? Level of expertise?	Between 20-80 staff per organization focused on marine conservation and policy. Approximately 10 staff per organization focused exclusively on fisheries. Strong US and EU organizational support and foreign donor support of operations. Recognize that marine management and coral reef conservation are currently growth areas of non-profit revenues (donor funding) and program operations. Increasingly working together as coalitions of NGOs with similar missions/agendas.
6. Relationship to fisheries/seafood associations? Membership?	Not applicable.
7. Involvement with RFMOs?	Significant, non-member country/signatory involvement. High influence on directions and policies of RFMOs via lobbying. Support Indonesian delegations attending RFMO meetings/conferences. Provide technical expertise and advice on RFMO interests, assessments, and directions.
8. What is their relationship with other stakeholders? Other commercial operators? Government?	Work primarily with fishing communities and government agencies. Partner with local NGOs. Try to work positively with all fishers, including commercial operators. Occasionally end up working against commercial fishing interests/operations and specific fishery groups. Perceived by public as 'watch dogs' and protecting public interest; even if at odds with commercial fishery interests.
9. Level of influence over fisheries in region? Ability to affect change?	High level of influence over fisheries within region due to international network of NGO offices within regional countries. Well financed and technically sophisticated international lobbying efforts, regionally and globally.
10. How concerned with overfishing and/or IUU fishing? How affected by overfishing and illegal fishing?	High level of concern with both overfishing and illegal fishing. Strong, consistent, advocates for reform of fisheries and halting/addressing both issues. Lead national and local public outreach campaigns to bring attention to and address both issues.
11. What are the perceived barriers/obstacles to overcoming overfishing and IUU fishing?	(1) Lack of Indonesian waters under protection; lack of marine reserves (no-take zones) as refugia/replenishment areas. (2) Lack of demand-side standards and controls over commercial fisheries; need to increased transparency and traceability of seafood products throughout value chain. (3) Insufficient management and enforcement capacity. (4) Data poor management; e.g., outdated/inaccurate stock assessment methods used to set fishery quotas/targets, leading to unsustainable harvest

	levels. (5) Open access fisheries regime promotes overfishing.
12. What are different gender roles, and how affect fishery?	Advocates for addressing gender issues and promoting gender equity within fisheries; active programmatic efforts underway. Socioeconomic research includes gender dimension investigation and documentation. Clear, central, and undervalued/poorly understood role of women within Indonesian fisheries. Fisheries management authority and control issues relating to gender, particularly within local communities and indigenous groups. Efforts to empower and strengthen women's roles within fisheries decision making and management. Poorly documented, and insufficiently highlighted as management need/concern by relevant authorities/actors. Link gender to social dimensions of fisheries. Human trafficking linked to sex trade of immigrant women.
13. Other issues that negatively affect their operations/efforts?	(1) Lack of awareness. (2) Lack of management capacity. (3) Poor science. (4) Ineffective management of current MPAs. (5) Corruption. (6) Weak governance. (6) Over population. (7) Human trafficking. (8) Climate change impacts. (9) Piracy, particularly in Molucca Sea, Malacca Straight, Celebes Sea (Northern Sulawesi and Northeast Kalimantan). Piracy both by locals and foreigners.
14. Any opportunities or suggestions to improve how fisheries are managed within the region?	(1) Promote market-based incentives, including traceability of fishery products from Indonesia to US and EU. (2) Increase waters under protection/MPAs. (3) Shift policy from open access to rights-based management to address IUU. (4) Increase enforcement presence and surveillance capabilities; enhance prosecution. (5) Empower and build capacity for local fisheries management. (6) Implement nation-wide EAFM. (7) Nation-wide, ministerial decree for catch sizes and limits, as well as bans on shark fin.
15. What is current relationship, if any, with USAID (entry point)?	Close relationship with USAID (bilateral and regional) missions. Financing provided to NGOs by missions for fisheries management and marine conservation efforts. Strong partnership via (now completed) CTI-CFF via CTSP (RDMA-funded). Terrestrial conservation programs within NGOs receive significant USAID funding/support; overall organizational benefit as a result.

1. Interviewee designation(s)	Indo-46, Indo-47, Indo-48, and Indo-49 (focus group)
2. Stakeholder type	Academia: university
3. What is their role in fisheries? Primary fisheries-related activities and interests?	Integrated, sustainable fisheries and aquaculture. Training and capacity building of next generation of managers and business owners as primary focus. Handling, processing, marketing, gear use training. Also scientific exploration and research of marine environment.
4. What is the geographic scope of their fisheries-related activities?	Sulawesi-wide; especially Northern. Also Moluccas and West Papua.
5. What is their capacity? No. of years in operation? How large/no. of employees? Level of expertise?	150+ faculty (divisions in Marine Sciences Department) and staff. 70 PhDs and 17 professors. Marine laboratories on campus. Three research vessels and marine lab. 25 trainers in fishing technology. 50 staff in marine science.
6. Relationship to fisheries/seafood associations? Membership?	Not applicable.
7. Involvement with RFMOs?	None.
8. What is their relationship with other stakeholders? Other commercial operators? Government?	Limited direct engagement with fishery stakeholders; largely through extension service (small) and faculty relationships. Viewed as positive to neutral player by government. Not widely recognized by commercial sector. Local fisher engagement via community service by students.
9. Level of influence over fisheries in region? Ability to affect change?	Limited to low. Primarily through training/capacity building of individuals who may be involved in regional fisheries management. Some professors serve as technical consultants in region, providing policy advice and promoting fisheries expansion.
10. How concerned with overfishing and/or IUU fishing? How affected by overfishing and illegal fishing?	Moderately high level of concern with overfishing. Concerns with discards/by-catch and decreasing food security. High level of concern with IUU fishing by Philippines, Taiwan, Thailand, and Chinese. Concerns how destructive fishing techniques are passed by Filipino fishers to Indonesians.
11. What are the perceived barriers/obstacles to overcoming overfishing and IUU fishing?	(1) Lack of fishing season restrictions or size/catch limits. (2) Lack of science and scientific data. (3) Lack of enforcement. (4) Increased conflict at sea, piracy. (5) Many FADs no rules; promotes overfishing.
12. What are different gender roles, and how affect fishery?	Unclear.
13. Other issues that negatively affect their operations/efforts?	(1) Lack of scientific research funding. (2) Old/poorly funded laboratory and research vessels. (3) Low capacity of fishery associations.
14. Any opportunities or suggestions to improve how fisheries are managed within the region?	Pharmacological development of marine extracts for biotech/medical fields. Research into hydrodynamics of coastal habitats for climate change adaptation and response (restoration). Social media campaign.
15. What is current relationship, if any, with USAID (entry point)?	None. Prior experience with technical exchanges via NOAA.

A3. Stakeholder Interview Summaries: Malaysia (Sabah)

Pursuant with the designated Scope of Work and geographic focus on the SSME, stakeholder interviews within Malaysia were focused on fishery production centers in Sabah State. Eastern Sabah bounds the western geographic extent of the SSME.

1. Interviewee designation(s)	Malay-1; Malay-2; Malay-3; Malay-4 (multiple interviews)
2. Stakeholder type	Private sector
3. What is their role in fisheries? Primary fisheries-related activities and interests?	Commercial operators. Primary activities are capture fisheries and post-harvest value addition (fish processing, packaging/freezing, wholesale, and exporting). Primary interests: (1) Securing consistent supply of raw material to meet growing demand. (2) Long-term viability of business. (3) Expansion of exported products into new markets. (4) Maintaining fish stocks (sustainability) in order to support their business and allow multi-generational transfer/continuation.
4. What is the geographic scope of their fisheries-related activities?	Fishing within inshore and offshore waters of Malaysia. Stay within Malaysian fishing waters due to laws and international competition. No high seas waters around Sabah; all waters under national control (EEZs) or contested (South China Sea).
5. What is their capacity? No. of years in operation? How large/no. of employees? Level of expertise?	Moderate to moderately high levels of production (raw materials) and technological sophistication (including processing, packing, and exporting). Fairly well developed and financed fisheries sector, in comparison to neighboring Indonesia. Purse seines, shrimp trawlers, longline, and pole-and-line vessels. Crews of 12-20; moderate size. Metal vessels with inboard engines and modern navigational technology (in stark contrast to neighboring Indonesia). Processing centers (compounds) have several facilities each with dozens to hundreds of employees, and modern/state-of-the-art processing technology/equipment and methods. Typically have the capacity to abide by current quality control standards and international certification requirements; makes them competitive internationally with China, Japan, Korean, US, EU, and Australian export markets.
6. Relationship to fisheries/seafood associations? Membership?	Compulsory membership in multiple associations. Fishing associations closely monitored and supported by National Government. State Government serves as partner to associations.
7. Involvement with regional fishery management efforts or organizations?	Limited; only upon request of NGOs (WWF Malaysia) or National Government (rarely). Annual to every 2-years: participate in regional capacity building workshops/trainings and exchanges, sponsored by WWF Malaysia and Sabah Fisheries.
8. What is their relationship with other stakeholders? Other commercial operators? Government?	Commercial operators operate fairly independently, competing with one another, usually politely but directly. Chinese-owned fishery businesses tend to look after one another. Fierce competition and suspicion of artisanal/small-scale fishers by commercial operators; occasionally adversarial/conflict. Commercial interests supported by State and National governments. Artisanal fisheries have small influence and voice compared to commercial operators, who have significant voice and influence.

9. What is their level of influence over fisheries in the region? Ability to affect change?	Low regional influence. Sabah commercial operators not a dominant regional voice, and Peninsular Malaysian commercial operators' voices and influence are dominant over Sabah (and Sarawak).
10. How concerned with overfishing and/or IUU fishing? How affected by overfishing and illegal fishing?	High level of concern (both). Over fishing very serious concern. Illegal fishing by boats from Philippines, Taiwan, and China within eastern Sabah. Illegal fishing by boats from Thailand, Vietnam, and China within western Sabah. Increasingly difficult to obtain sufficient and consistent levels of raw materials due to over fishing. Commercial operators generally blame artisanal/small-scale fishers for major culprit of overfishing, but recognize that Malaysia commercial operators contribute to overfishing and illegal fishing as well. Overfishing has negative impacts upon fishery sector jobs/employment. Destructive fishing gears used less widely now than during the 1980s-1990s. Piracy levels down during past 10 years, but at-sea violence and armed conflict increasing. Feel increasingly vulnerable to IUU fishers and piracy. Commercial fishers have frequently experienced themselves or know others who have been victims of piracy and at-sea conflict.
11. What are the perceived barriers/obstacles to overcoming overfishing and IUU fishing?	(1) Poor law enforcement, lack of enforcement capacity. (2) National government corruption. (3) Chinese-national business owners report they are targeted unfairly and victimized by Malay-national authorities (police, politicians, and government officials).
12. What are the roles of different genders and how does this affect stakeholder participation?	Low level of integration of women's interests within private sector operations (male-dominated). Growing awareness of the role of women within fisheries management and decision-making.
13. Other issues that negatively affect their operations/efforts?	(1) Political graft/corruption. (2) Increasing competition and sophistication by commercial fisheries sector within neighboring countries. (3) Increasingly high levels of international demand-side/certification standards to be met to access/maintain northern hemisphere markets. (4) Economic crisis led to shortage in capital available for business loans and investment for growth. Not fully recovered from economic downturn.
14. Any opportunities or suggestions to improve how fisheries are managed within the region?	Interested and willing to work on a regional project to address IUU fishing and overfishing.
15. What is current relationship, if any, with USAID (entry point)?	No relationship to USAID.

1. Interviewee designation(s)	Malay-5 through Malay-18 (multiple interviews; two focus groups)
2. Stakeholder type	Private sector
3. What is their role in fisheries? Primary fisheries-related activities and interests?	Small-scale commercial/artisanal fishers. Primary activities are capture fisheries and limited post-harvest value addition (fish processing and local sale). Primary interests: (1) Meeting daily dietary protein requirements of household/family (food security). (2) Supplementary income generation (local sale). (3) Livelihood security; continued lifestyle. (4) Allocation of exclusive rights/area for artisanal fishing, without competition from commercial operators.
4. What is the geographic scope of their fisheries-related activities?	Fishing within inshore waters of Malaysia. Occasionally travel offshore on overnight/multi-day fishing trips.
5. What is their capacity? No. of years in operation? How large/no. of employees? Level of expertise?	Low level of production (landings). Low technological sophistication (including processing and marketing for local sale). Typically sell surplus catch to established middleman for a fraction of the value of the catch. Small skiffs/boats (usually < 7-10 meters) with outboard engine; usually 3-7 crew onboard. Typical gears: handline, pole and line, trap, barrier/surround nets, gill nets, long lines. Low to moderate level of expertise.
6. Relationship to fisheries/seafood associations? Membership?	Low to moderate level of membership in fishing associations. Low level of attention paid by fishing associations to artisanal fishers.
7. Involvement with regional fishery management efforts or organizations?	None to very low.
8. What is their relationship with other stakeholders? Other commercial operators? Government?	Fierce competition and suspicion of commercial operators by artisanal fishers; occasionally adversarial/conflict. Low level of attention and support by National government. Moderate level of support by State government. Artisanal fisheries have small influence and weak voice on fisheries decision-making, compared to commercial operators.
9. What is their level of influence over fisheries in the region? Ability to affect change?	None to very low.
10. How concerned with overfishing and/or IUU fishing? How affected by overfishing and illegal fishing?	High level of concern with over fishing by commercial operators. Moderate to low level of concern with illegal fishing by foreign national boats (rarely come inshore where artisanal fishers operate). Artisanal/small-scale fishers blame commercial operators for being major culprit of overfishing, and jeopardizing food security. Destructive fishing gears still in use by artisanal/small-scale fishers, but used less widely now than during the 1980s-1990s. Competition with commercial operators leading to increased at-sea violence.
11. What are the perceived barriers/obstacles to overcoming overfishing and IUU fishing?	(1) Government corruption and favoritism of wealthy, powerful commercial operators over artisanal/poor fishers. (2) Lack of law enforcement; corruption within law enforcement. (3) Food security. (4) Poverty; lack of income, and few livelihood opportunities. (5) Rising affluence and power of Chinese-nationals and Malays over indigenous peoples of Sabah (including Bajau); marginalization and deliberate disenfranchisement of indigenous Sabah peoples. (6) Impoverished living conditions; lowest socio-economic level in Sabah society.

12. What are the roles of different genders and how does this affect stakeholder participation?	Male-dominated capture fisheries; female-dominated gleaning and processing/market sale of landings. Growing awareness of the role of women within fisheries management and decision-making.
13. Other issues that negatively affect their operations/efforts?	(1) Political graft/corruption. (2) Lack of landing sites for artisanal fishers; focus on commercial landing sites. (3) Too many middlemen. (4) Lack of capacity. (5) Unsafe/dangerous conditions at sea. No safety gear/navigational technology.
14. Any opportunities or suggestions to improve how fisheries are managed within the region?	(1) Need improved fishing gears, less efficient (e.g., small mesh net replacement). (2) Need larger, more sophisticated fishing equipment/boats. (3) Need training in sustainable fishing techniques, marketing, handling and processing. (4) Need safety and navigation training, equipment, and support.
15. What is current relationship, if any, with USAID (entry point)?	No relationship to USAID.

1. Interviewee designation(s)	Malay-19 through Malay-37 (multiple interviews; two focus groups)
2. Stakeholder type	Private sector
3. What is their role in fisheries? Primary fisheries-related activities and interests?	Fishing associations: local/city-based capture fishery operators (Sandakan, Semporna, Kudat, Kota Kinabalu); State fisheries businesses and boat owners; national fishing vessel owners. Provide assistance on: (a) representing fishers with government bodies and fisheries policy decision making; (b) licensing of members with relevant government authorities; (c) strengthening market for commercial members; (d) building capacity in commercial fisheries sector, including value addition of seafood products. Primary interest is viability and maintenance of commercial fisheries in Sabah, Malaysia. Commercial fishers are required to become members.
4. What is the geographic scope of their fisheries-related activities?	Fishing within inshore and offshore waters of Malaysia. Stay within Malaysian fishing waters due to laws and international competition. No high seas waters around Sabah; all waters under national control (EEZs) or contested (South China Sea).
5. What is their capacity? No. of years in operation? How large/no. of employees? Level of expertise?	Moderate to moderately high levels of sophistication; offices, staff, meeting space, social gatherings, sponsorship of civic events. Recognized as the leading voices and experts within Sabah's commercial fisheries. High expertise: most knowledgeable, experienced, and successful commercial operators typically elected to serve in leadership positions. Focus on marketing/expansion and processing techniques/technologies.
6. Relationship to fisheries/seafood associations? Membership?	Membership in 100s to 1000s of members. Nearly full representation of full seafood sector. Annual dues from members. Work closely with State government. Moderately strong political influence at State level. Fairly disconnected with national and Peninsular-Malaysian fisheries decision-making and interests.
7. Involvement with regional fishery management efforts or organizations?	Limited to none.
8. What is their relationship with other stakeholders? Other commercial operators? Government?	Associations speak on behalf of and represent commercial fishing businesses in eastern, western, and northern Sabah. Influential and well respected by commercial stakeholders and provincial government. Inconsistent and uneven representation of artisanal/small-scale fisher interests.
9. What is their level of influence over fisheries in the region? Ability to affect change?	Low regional influence. Sabah associations not a dominant regional voice. Peninsular Malaysian associations voices and influence are dominant over Sabah (and Sarawak).
10. How concerned with overfishing and/or IUU fishing? How affected by overfishing and illegal fishing?	High level of concern (both). Negative influence on commercial operators. Growing concern in eastern Sabah with at-sea piracy, on-shore kidnapping and murder of foreign tourists has led to association support for establishment of Eastern Sabah Security Command (ESSC) and Zone (ESSZ). Unable to obtain security for commercial members (small arms/personnel for defensive purposes) due to national laws. Feel increasingly vulnerable to IUU fishers and piracy.
11. What are the perceived	(1) Poor law enforcement, lack of enforcement capacity. (2) National

barriers/obstacles to overcoming overfishing and IUU fishing?	government corruption. (3) Chinese-national business owner associations report they are targeted unfairly and victimized by Malay-national authorities (police, politicians, and government officials).
12. What are the roles of different genders and how does this affect stakeholder participation?	Unclear.
13. Other issues that negatively affect their operations/efforts?	(1) Political graft/corruption. (2) Increasing competition and sophistication by commercial fisheries sector within neighboring countries. (3) Increasingly high levels of international demand-side/certification standards to be met to access/maintain northern hemisphere markets. (4) Economic crisis led to shortage in capital available for business loans and investment for growth. Not fully recovered from economic downturn.
14. Any opportunities or suggestions to improve how fisheries are managed within the region?	(1) Provide technical and financial support to associations for increased level of training provision to membership. (2) Interest to work in partnership with fishing associations in neighboring SSME countries.
15. What is current relationship, if any, with USAID (entry point)?	No relationship to USAID.

A4. Stakeholder Interview Summaries: Philippines

Pursuant with the designated Scope of Work and geographic focus on the SSME, stakeholder interviews within the Philippines were focused on fishery production centers in the southern and western Philippines. The Philippines bounds the northern and eastern geographic extent of the SSME.

1. Interviewee designation(s)	Phil-I
2. Stakeholder type	Private sector
3. What is their role in fisheries? Primary fisheries-related activities and interests?	Fully integrated seafood company (net to plate/supermarket). International fishing efforts initially a small business decision, primarily based on the need to be able to fish or operate the whole year round.
4. What is the geographic scope of their fisheries-related activities?	Operating throughout the coral triangle. Expanded operations into: Indonesia, Vietnam, China, Papua New Guinea and South Africa. Export markets include: Japan, Thailand, Iran, France, United Kingdom, Italy, Middle East and the United States.
5. What is their capacity? No. of years in operation? How large/no. of employees? Level of expertise?	Established in the Philippines in the 1960's. High capacity. Among the largest (nationally/regionally), with >5000 employees, scores of facilities, and large fleet of various fishing boat types (purse seine, long line, trawl, net, pole-and-line, etc.). One of the most recognized companies in both the fishing and food processing industries in the world. It has consistently been among the top 500 corporations of the Philippines despite the ups and downs of the economy. Have established tuna processing and fishing entity in New Guinea and partner on processing plant in Indonesia. Planning to set up a fully integrated operation in the Solomon Islands in the near future.
6. Relationship to fisheries/seafood associations? Membership?	Member of relevant national and provincial associations. Leading voice within associations, with significant influence.
7. Involvement with regional fishery management efforts or organizations?	Moderate. Participated in the establishment of the Western and Central Pacific Fisheries Commission (WCPFC). They see how scientists and fish managers argue their case, but in the end, they consult the industry. An indication that no matter how scientists and regulators may reason out, it is actually the private sector or the fishermen who contribute the most in the success or failure of the Commission in the management of the fish stocks. While the WCPFC was being formed, they witnessed the increasing number of new vessels and fishing entities participating in the tuna fishery; it was as if this served as a cue to get into the tuna fishing before it became a closed fishery.
8. What is their relationship with other stakeholders? Other commercial operators? Government?	Due to large size, feared by many other commercial operators. Large commercial influence and impact over the target fisheries. Recognized as one of the remaining original fishing companies established in the Philippines in the 1960's; historic significance and importance.
9. What is their level of influence over fisheries in the region? Ability to affect change?	Low regional influence. Sabah associations not a dominant regional voice. Peninsular Malaysian associations voices and influence are dominant over Sabah (and Sarawak).
10. How concerned with overfishing	High level of concern. Supply levels have become erratic and unreliable,

and/or IUU fishing? How affected by overfishing and illegal fishing?	especially in relation to sardine and tuna fishing as more fishing groups are established. Worried that many players within the local industry have started to use illegally sized nets where even juvenile tuna and the round scad (their source of food) are being caught, without monitoring or controls. In the Philippines, they worry about continuity of their fishing business, particularly after the local tuna fishing industry in the Philippines collapsed/downsized between the 1990s and 2000s.
11. What are the perceived barriers/obstacles to overcoming overfishing and IUU fishing?	Now we are in a situation where more fishing vessels in or still trying to get in the convention area, and some of these vessels are coming from other less productive regions. There is a need to reduce fishing mortality of a specific fish stock in a mixed specie fishery. Eco labeling is not a new challenge. They have complied with Earth Islands Institute's Dolphin safe standards and have voluntarily requested accreditation by the Friends of the Sea.
12. What are the roles of different genders and how does this affect stakeholder participation?	Women employees within company.
13. Other issues that negatively affect their operations/efforts?	Distant water entities must work with the Coastal states to develop their fishery by sharing their fishing capacity and more important to process a big percentage of the catch on shore so that coastal states gain the added value in processing the fish and encourage participation of the coastal states in the fishery.
14. Any opportunities or suggestions to improve how fisheries are managed within the region?	Suggested interventions include: <ol style="list-style-type: none"> 1. Moratorium on increase of vessel number in the CTI, as scientists sort out the real situation of the fishery 2. Scrapping of Vessel Days Scheme 3. Vessel number limit to be imposed again as it is the best system and the most simple and effective measure for conservation 4. Vessel capacity limit should be imposed. Each vessel has to have a maximum size. 5. Strict regulation of mesh sizes used in the fishery 6. Strict regulation of fishing gears 7. Closure of spawning grounds and areas with high mortality of endangered stocks from any commercial fishing activity. 8. For WCPFC to come out with its Eco label as the only one that is certified by all. And hiring of a third party auditing firm to audit all data and results of WCPFC monitoring and surveillance.
15. What is current relationship, if any, with USAID (entry point)?	No relationship to USAID.

1. Interviewee designation(s)	Phil-2 through Phil-14 (multiple interviews; three focus groups)
2. Stakeholder type	Private sector
3. What is their role in fisheries? Primary fisheries-related activities and interests?	Capture, processing, packing, and export of tuna, small pelagics, invertebrates/cephalopods.
4. What is the geographic scope of their fisheries-related activities?	Fishing in Southern Philippines (south of the Sulu archipelago), in the Celebes and Molucca Seas. Some operations extend into the Western Pacific, when weather conditions permit. Fishing subsidiaries/partners in Papua New Guinea, Indonesia, and the Solomon Islands. All operators based out of General Santos Fishing Port Complex (Tambler, General Santos City, Mindanao).
5. What is their capacity? No. of years in operation? How large/no. of employees? Level of expertise?	Medium-scale: 100 to several hundred employees. Most operations 20-30 years old. Some of the largest and most well recognized tuna and small pelagic commercial fisheries operations within the Philippines. Operate fleets of purse seiners, trawlers, long liners, net boats, and pole-and-line vessels.
6. Relationship to fisheries/seafood associations? Membership?	Member of relevant national and provincial associations. Leading voices within associations, with significant influence.
7. Involvement with regional fishery management efforts or organizations?	Low to moderate-low. Participate within Western and Central Pacific Fisheries Commission (WCPFC) procedures and regional fishery meetings. Low interest in increased RFMO activity over fisheries.
8. What is their relationship with other stakeholders? Other commercial operators? Government?	Small community of commercial operators; collegial and friendly competition. Social and family networks within fisheries sector encourage cooperative and supportive relationships. Competition with northern Philippines businesses and Indonesians. Distant but polite relationship with national government (BFAR). Close relationship with Mindanao State University. Suspicious of environmental/conservation NGOs operating in northern Philippines. Low level of local/provincial NGO presence within General Santos City. Seen as “sophisticated bullies” by Indonesian fishers within shared fishing grounds. Less contentious relationship with small-scale/artisanal fishers than in Malaysia or Indonesia; likely due to higher overall standard of living and lower levels of poverty.
9. What is their level of influence over fisheries in the region? Ability to affect change?	Moderate regional influence due to significant capture operations.
10. How concerned with overfishing and/or IUU fishing? How affected by overfishing and illegal fishing?	High level of concern (both). Notable declines in catches/landings since the peak in late 1980s/early 1990s. Decreased reported levels of at-sea kidnappings and piracy. Several representatives of fishing operations had been victims of kidnapping/piracy in past, and monitor prevalence of events. Overfishing has reduced production levels and led to inconsistent supply of raw materials. Some commercial operators unable to survive the downsizing of the tuna industry that occurred in the late 1990s/early 2000s. Increased concern of commercial operations viability due to rising scarcity of target stocks; requires fishing farther away, in Pacific waters (dangerous, expensive). IUU fishing from Taiwan, Korea, China, and Japan within Philippines EEZ

	(especially eastern side/Western Pacific).
11. What are the perceived barriers/obstacles to overcoming overfishing and IUU fishing?	(1) Overcapacity; too many licensed commercial fishers. (2) Increasing competition from growing small-scale fisheries sector; use illegal and destructive methods of fishing; create conflict and violence on commercial operators at sea (particularly from Sulu archipelago). (3) Government does not have sufficient enforcement capacity to address IUU fishing.
12. What are the roles of different genders and how does this affect stakeholder participation?	Women employees within fishing companies, including at senior levels. High level of awareness of role of women in fisheries industry and local efforts to empower women's roles within sector.
13. Other issues that negatively affect their operations/efforts?	(1) Lack of strong regulatory framework; conflicting authorities and jurisdictions. (2) Ineffective enforcement. (3) Too many rules and regulations; conflicting and overlapping. (4) Lack of political will within government to sustainably manage fisheries. (5) Rising cost of fuel. (6) Lack of alternative livelihoods to capture fisheries. (7) Deteriorating peace and order situation within Sulu Archipelago/Mindanao; drives investment out of region due to security concerns, heavy presence of military and police.
14. Any opportunities or suggestions to improve how fisheries are managed within the region?	(1) Need to promote aquaculture as alternative to capture fisheries. (2) Need to provide alternative livelihoods. (3) Increase security and end civil unrest/disturbances.
15. What is current relationship, if any, with USAID (entry point)?	USAID has many projects historically and currently in Philippines (nationally) and Mindanao (provincial). No current partnership directly with capture fisheries or processing in General Santos City.

A5. Stakeholder Interview Summaries: Vietnam

1. Interviewee designation(s)	Viet-1 and Viet-2 (focus group)
2. Type of organization:	Nongovernmental organization
3. What is their relevance to overharvesting and IUU fishing?	
4. What is their primary fishing-related activity?	A non-profit, non-governmental organization which is devoted to marine conservation and sustainable development in Vietnam's coastal areas
5. How are they affected by overharvesting and IUU fishing?	Works with coastal communities and small scale fishers to help with fisheries management and livelihoods
6. What is their commercial interest?	Non-profit
7. What is their level of influence over fisheries in the region?	Well known among NGOs in region; member SEAFISH network
8. What is their relationship to /membership in other stakeholders and regional fisheries bodies?	N/A
9. What are their barriers to change to sustainable harvesting and reduction in IUU fishing?	Advocacy, coastal resource management, small scale fisheries management
10. Where do they work?	Coastal areas nationwide; MCD operates in the habitat of impoverished communities inside and around Nature reserves, National parks, Coastal conservations and Biosphere reserves with ocean component according to national prioritization. MCD also works in areas with typical ecosystem in wetlands and the Redriver Delta, Mekong Delta, the central coast and coastal islands.
11. What is their relationship to USAID/ perspective to shape the RDMA strategy (entry point):	Currently have USAID project in Vietnam on climate change
12. What are the roles of genders and how affect stakeholder participation?	High level of expertise on gender in fisheries

1. Interviewee designation(s)	Viet-3, Viet-4, and Viet-5 (focus group)
2. Type:	Government
3. What is their relevance to overharvesting and IUU fishing: fisheries?	Management of 3769 vessels working from Haiphong; The fleets, have capacity bigger than 20 CV, are 1387 ships (36.8%, in detail: which have capacity in range 20-49 CV: 623 ships = 16.53%; 50-89 CV: 268 ships = 7.11%; 90 – 149 CV: 269 ships = 7.14%; 150- 249 CV: 142 ships = 3.76%; 250-399 CV: 67 ships = 1.77%; bigger than 400 CV: 18 ships = 0.48%).
4. What is their role in fisheries?	<p>Fisheries management</p> <p>Priorities:</p> <p>For Government</p> <p>Need to expand beneficiaries of preferential policies for building and upgrading fishing vessels, purchasing fishing gears, equip communication devices, ensure vessels and fishermen.</p> <p>Invest to complete construction of fish harbors, vessels hiding from storm in local and region level.</p> <p>For City</p> <p>Making group support policies for fishing and travelling offshore in next-time, these policies include allowances for the leader, the captain of offshore fishing vessels.</p> <p>Based on proposal of functional groups, early making decision about interest rate for boat building and upgrading in 2014; period: 2014 to 2015.</p> <p>Department of Agriculture and Rural Development (DARD) consultates for City People's Committee annually in performing new rural construction program, vocational education for rural areas according to town's plan, City People's Committee was offered to lead for all function section in focusing on construction improvement ... for coastal and island communes, districts to ameliorate quality of life for fishermen.</p> <p>Consider and delegate responsibility for DARD to create project for establishment center, has function as controlling and saving for fishing vessels, in Bach Long Vy and Cat Ba; fishing vessel registration center of these areas. At the same time, departments and offices are offered to find solution for finance, equipment, vehicles supply for above centers.</p> <p>Early making plan to submit for DARD to create and conduct communication projects, fishing database projects.</p> <p>District People's Committees, which have fishing activities, are directed to take care for difficulties about paperwork for fishermen, create opportunities for them to receive land use right certificates according to legislation, it will be as a collateral for bank loan to new building and upgrading offshore vessels.</p> <p>For functional departments of the city and people's committees of districts</p> <p>Based on characteristic assignment and closely corporative with DARD to raise the efficiency of government management, extricate problems and create opportunities</p>

	<p>for sustainable fishery promotion.</p> <p>Coordinate closely with the DARD to advise and implement the proposed policies of government, guide for central branches about fisheries development of city; at the same time, research, advise and recommend on the addition and adjustment by increasing mechanism of supporting for local fisheries.</p>
5. What is the expertise?	Low capacity to manage fisheries.
6. What is their capacity?	Limited; The management of government for fishing: resources management, registration and licensing of fishing activities is still limited; resources investigation, fishing grounds forecasts, fishing seasons, base logistics fisheries, protecting restricted areas, prohibited objects as well as the control offshore exploitation ... is inadequate, difficulties; human resources, facilities and equipment to serve the outstanding professional work are limited, did not establish a network of collaborators involved in the exploitation and protection of fishery resources in the city, lack of fishing model effective, which have high spread.
7. What is their level of influence over fisheries in the region?	Limited
8. What is their relationship/ membership with other stakeholders and regional fisheries bodies?	Relationship in Vietnam high; outside Vietnam low
9. What is their ability to affect change?	High at a local level
10. Where they work?:	Haiphong, Vietnam
11. What is their relationship to USAID, perspective to shape the RDMA strategy?	Low
12. What are the roles of different genders and how does this affect stakeholder participation:	N/A

1. Interviewee designation(s):	Viet-6
2. Type:	Association, socio-professional organization established in 1992 on a voluntary basis of people from various economic components evolving in fisheries and operating in various organizations: individual organization, cooperatives and State-owned enterprises
3. What is their relevance to overharvesting and IUU fishing?	Influence on 400,000 members
4. What is their role in fisheries?	a linking organization between the Government and fishermen; it keeps with the Government's objectives and orientations to organize activities for promoting fisheries development and bring back practical benefit to all its members as well as fishermen communities. Priorities: Social organization, production (raw materials) protection of fishermen concerns and benefits.
5. Expertise:	Technical support for the fishermen in production, processing, other services
6. What is their capacity?	Low
7. What is their level of influence over fisheries in the region:	Low
8. Relationship/membership with other stakeholders and regional fisheries bodies:	Good with ASEAN No other membership
9. What is their ability to affect change:	High in Vietnam
10. Where they work:	Nationwide. 400.000 members, provinces network at 32 provinces
11. Relationship to USAID, perspective to shape the RDMA strategy	Potentially high as a partner to influence change, involved in USAID MARKET project
12. What are the roles of different genders and how does this affect stakeholder participation	N/A

1. Interviewee designation(s)	Viet-7
2. Type:	Private association
3. What is their relevance to overharvesting and IUU fishing?	They have over 300 members in the seafood business in Vietnam and can influence these companies.
4. What is their role in fisheries	Established by the membership/traders, exporters and processors. Nationwide. 15 years, 300 members, Head office in HCMC and representative office in Hanoi, 4 sub-committees (fish, seafood etc). Priorities: trading, market promotion, value/quality of product, exporting; priorities for capture fisheries are reduce number of fishers, livelihoods, safety at sea, resources protection
5. Expertise:	Market development, trade promotion, training and advocacy programs, VIETFISH forum, publications
6. What is their capacity	High in market development, trade promotion, training and advocacy programs
7. What is their level of influence over fisheries in the region	Low
8. Relationship/membership with other stakeholders and regional fisheries bodies	N/A
9. What is their ability to affect change?	High
10. Where they work?	Vietnam nationwide
11. Relationship to USAID, perspective to shape the RDMA strategy?	Could be high as they can access a large group of exporters and processors
12. What are the roles of different genders and how does this affect stakeholder participation?	High as many companies managed by women

1. Interviewee designation(s):	Viet-8
2. Type:	Research
3. What is their relevance to overharvesting and IUU fishing?	Provide information on fisheries; CPUE of marine capture fisheries in Vietnam is declining from 0.39 in 2010 to 0.34 in 2012; provides information to DFish for management purposes
4. What is their role in fisheries?	Scientific research on marine fisheries Priorities: tuna and small pelagic research
5. Expertise:	Biological research
6. What is their capacity?	High for research
7. What is their level of influence over fisheries in the region?	Low in region; high in Vietnam
8. Relationship with other stakeholders and regional fisheries bodies:	Member of SEAFDEC
9. What is their ability to affect change?	High in Vietnam; low in region
10. Where they work?	Nationwide
11. Relationship to USAID, perspective to shape the RDMA strategy:	Low but can provide critical data on Vietnam fisheries
12. What are the roles of different genders and how does this affect stakeholder participation?	N/A

1. Interviewee designation(s)	Viet-9, Viet-10, Viet-11, and Viet-12 (focus group)
2. Type:	Government
3. What is their relevance to overharvesting and IUU fishing:	Management of fisheries in Vietnam, national fisheries policy and strategy, enforcement
4. What is their role in fisheries?	<p>Fisheries management, policy, legal, enforcement; advise and assist the Minister of MARD in state management, to execute duties on state management regarding fisheries and to govern public service activities</p> <p>Priorities: restructuring of the fisheries sector 2014-2020, transform nearshore fisheries which are overfished to offshore fisheries, transform livelihoods to aquaculture, improve post-harvest; community allocation of fishing rights, credit for fisheries, insurance scheme, send fishers to work on foreign boats, Decision 2760/QĐ-BNN-TCTS dated 22/11/2013 by the Minister of MARD on improvement of the Sectoral Program on Re-structuring the fisheries sector towards increasing value-added and sustainable development. In the marine capture fisheries sub-sector, the Program aims to reduce capture catch in the nearshore areas and promote offshore catch; reduce post-harvest losses; reach the annual value growth rate of over 3% per year from marine capture and improve the earning and living standards of local coastal fishermen communities. It expects that the incomes from fisheries livelihoods of local fishermen by 2020 will increase by 2.5 times than 2010.</p>
5. Expertise:	Medium
6. What is their capacity?	Low capacity to manage fisheries
7. What is their level of influence over fisheries in the region?	Member of APFIC, SEAFDEC
8. Relationship/membership with other stakeholders and regional fisheries bodies:	
9. What is their ability to affect change?	High
10. Where they work?	nationwide
11. Relationship to USAID, perspective to shape the RDMA strategy:	Low relationship but a critical partner for shaping RDMA strategy
12. What are the roles of different genders and how does this affect stakeholder participation?	N/A

1. Interviewee designation(s)	Viet-13, Viet-14, and Viet-15 (focus group)
2. Type:	Provincial government
3. What is their relevance to overharvesting and IUU fishing	Manage fisheries in Binh Dinh province; Fleet quantity: 7.339 vessels/boats have total 980.838 capacities (there are 4,592 fleets have capacity <90CV account for 63%, which have the capacity bigger than 90 is 2,747 vessels, account for 37%); Key fishing gears: trawlers have 617 units (8.4%), gillnet have 492 units (6.7%), seines have 913 units (12.5%), fishing has 1,615 units (23% of them are hand-fishing); Fishing ports there are three trading areas Quy Nhon (2 of them belong to Phu Cat, Phu My Provinces), trading station in North of Hoai Nhon; Labor force in marine fisheries in Binh Dinh: 50.000 fishermen (50% near-shore, 50% off-shore). Up to now, the province has created one fisheries co-operative and 265 collaborative fishing groups with the participation of 1,049 vessels (accounted for 38%, which have more than 90 capacities).
4. What is their role in fisheries	Fisheries management and development. Priorities include: (1) Applying pilot model of tuna production following exploitation, purchase, processing exported tuna products in Binh Dinh. This method is practiced for 5 tuna fishing vessels, the work bases on the corporative groups and in Vietnamese fishery grounds. This trial model includes activities relate to exploitation, purchase and export ocean tuna in closed-chain, it received technical, technical supporting from government and the links between fishermen and purchasing, exporting companies in Binh Dinh province. This model are conducting from April to July of 2014, including buying fishing Japanese devices and instruction for fishermen, fees is paid by province finance, under the consultation of OSAKA, an agency of Japanese.(2) Exploitation without any harm for ocean habitat, reduce activities of trawlers, explosive substance, electric => proposal to shift to friendly-fishing for marine habitat, supporting for marine resources restoration. (3) Participation in improved fishery program (FIP: fisheries improvement program) with support of WWF and SEAFDEC (Southeast Asian Fisheries Development Center), make an effort to tuna eco-labeling. (4) Performing co-management near-shore resources – World Bank’s project (2013-2018): strengthen ability for fisheries department belong to fishery sector, build MCS station, inspector vessels and agencies. Resident have right to access hotline to call for inspector station, when detecting any illegal activities. There are 2 trial stations and pilot co-management models in 2 communes (Nhon Ly and Nhon Hai) in Quy Nhon city.
5. Expertise:	Fisheries management
6. What is their capacity	Medium for fisheries management
7. What is their level of influence over fisheries in the region	Limited
8. Relationship/membership with other stakeholders and regional fisheries bodies	Low
9. What is their ability to affect change	High in Binh Dinh province

10. Where they work:	Binh Dinh province
11. Relationship to USAID, perspective to shape the RDMA strategy	A good potential site for work
12. What are the roles of different genders and how does this affect stakeholder participation	Work with women in fishing communities in province

A6. Stakeholder Interview Summaries: Commercial Fisheries (Summary)

1. Interviewee designation(s)	All (combined); Cambodia, Indonesia, Malaysia, the Philippines, Vietnam
2. Stakeholder type	Private sector
3. What is their role in fisheries? Primary fisheries-related activities and interests?	<p><u>Primary role</u>: private operations within Southeast Asian commercial fisheries (tuna, small pelagics, inshore schooling silverfishes, coral reef associated fishes, and cephalopods and other invertebrates). <u>Primary activities</u>: capture, wholesale, post-harvest value addition (fish processing, freezing, packing, transport), marketing, retail, and export. <u>Primary interests</u>: (1) Business growth, both in terms of profit margin and market share. (2) Securing consistent supply of raw material to meet growing demand. (3) Long-term financial viability of business; including access to capital. (4) Expansion of exported products into new, foreign markets, particularly in the developed north. <u>Secondary interests</u>: (1) Maintenance of fish stocks (sustainability) in order to perpetuate and support business; including multi-generational continuation or transfer of business. (2) Meeting daily dietary protein requirements of local households within own community (food security); particularly with small-scale operators. (3) Livelihood security and continuation of occupational lifestyle. (4) Reduction of conflict between artisanal and commercial fishers. (5) Allocation of exclusive rights/area for fishing, without competition from others.</p>
4. What is the geographic scope of their fisheries-related activities?	<p><u>Primary scope</u>: within nearshore (<5 NM) and offshore (>5 NM; EEZ) waters under national jurisdiction. <u>Secondary scope</u>: as licensed, within offshore waters of foreign nations, including beyond Southeast Asia (e.g., Papua New Guinea, Solomon Islands, Fiji); in the Western Pacific high seas; non-jurisdictional) or disputed waters (e.g., South China Sea).</p>
5. What is their capacity? No. of years in operation? How large/no. of employees? Level of expertise?	<p><u>General regional capacity</u>: Low/moderate-low (Cambodia, Vietnam) to moderately-high/high (Indonesia, the Philippines, Malaysia) levels of production (raw materials). Moderately well developed and financed fisheries sector within Malaysia and Philippines. Dozens to hundreds of employees. Often in operation more than 20 years. <u>Capture</u>: Low/moderately-low (Cambodia, Indonesia, Vietnam) to moderately high (the Philippines and Malaysia) levels of technological sophistication. Common vessel/gear types include wooden/iron purse seine, trawl, longline, and pole-and-line vessels. Small to moderate vessels sizes and crews (12-20). . Some of the largest and most well recognized tuna and small pelagic commercial fisheries operations in the world. <u>Post-harvest</u>: Moderately-low (Cambodia, Indonesia, Vietnam) to moderately high (the Philippines and Malaysia) levels of technological sophistication (including processing, packing, and exporting). Processing centers (compounds) with multiple facilities; some with modernized processing technology/equipment and methods. Some operators in Malaysia and the Philippines have the capacity to abide by current quality control standards and certification requirements for international export markets.</p>

<p>6. Relationship to fisheries/seafood associations? Membership?</p>	<p>No associations in Cambodia. Compulsory membership in Indonesia, the Philippines, and Malaysia of private sector operators in fisheries associations; not enforced in Indonesia or the Philippines. Associations highly influential, particularly with national and provincial/state government authorities and local politicians. Commercial associations occasionally at odds with artisanal fishers and licensing and enforcement agencies, including maritime police and coast guard/navy. Fishing associations are typically monitored and often supported by National Government. Provincial/State Government frequent partner and supporter of commercial fisheries association members.</p>
<p>7. Involvement with regional fishery management efforts or organizations?</p>	<p>No to limited (upon request of NGO or government) involvement; low incentive for engagement. Some engagement around tuna fishery-focused RFMOs, particularly the WCPFC. Malaysia and the Philippines: participation in regional capacity building trainings, workshops, and exchanges annually to every two years, typically only when sponsored by NGOs or donors.</p>
<p>8. What is their relationship with other stakeholders? Other commercial operators? Government?</p>	<p>Commercial operators operate fairly independently, competing with one another. Competition and suspicion between artisanal/small-scale fishers and commercial operators typical; occasional conflict. Intra-national competition typically friendly/polite to non-confrontational. Social and family networks within fish ports/fishing centers encourage cooperative and supportive relationships between operators, at those sites. International (with foreign fishers) competition can be verbally confrontational, tense, and occasionally violent. Increasing levels of competition and frequency of physical conflict between Filipino, Indonesian, and Malaysian commercial fishers operating in the Sulu, Celebes and Northern Molucca Seas. Commercial interests often supported by State and National governments, sometimes at the expense of small-scale interests. Artisanal fisheries typically have much smaller political influence and public voice compared to commercial operators. NGOs often support and empower artisanal fishers and fishing communities; increasingly working with small-scale commercial operators to improve fishery sustainability and product traceability. Commercial operators often suspicious or confrontational with environmental or conservation NGOs operating in the region.</p>
<p>9. What is their level of influence over fisheries in the region? Ability to affect change?</p>	<p>Low to moderate-low. Commercial operators have influence (via associations, largely) over provincial/state and national government, and therefore, limited influence (via national government) within region. Commercial operators increasingly seen by civil society as important and under-realized agents of change to affect fisheries sustainability.</p>
<p>10. How concerned with overfishing and/or IUU fishing? How affected by overfishing and illegal fishing?</p>	<p>High level of concern (both). Over fishing very serious concern, being driven by increased market demand and commercial overcapacity. Increasing difficulty to obtain sufficient and consistent levels of raw materials due to over fishing. Commercial operators typically blame artisanal/small-scale fishers as the primary culprit of overfishing; occasionally recognize that high numbers of commercial operators contribute as well. Overfishing has negative impacts upon the fishery sector through reduction in employment/jobs due to collapse of</p>

	<p>certain stocks/fisheries. IUU fishing occurring by unlicensed foreign national fishers, including from Indonesia, the Philippines, Thailand, Vietnam, Taiwan, China, and Korea. IUU fishing also being done locally, particularly at the small-scale level. Destructive fishing gears used less widely now than during the 1980s-1990s, but still prevalent. Frequency of at-sea kidnappings and piracy down during past decade; however, levels of at-sea violence and armed conflict increasing; commercial operators feel vulnerable and inadequately prepared for at-sea self-defense/security. Deep and widespread concern within commercial operations of the viability of capture fisheries in the future, due to overfishing, rising target fishery scarcity, and increasing competition/conflict over remaining stocks.</p>
<p>11. What are the perceived barriers/obstacles to overcoming overfishing and IUU fishing?</p>	<p>(1) Overcapacity; too many fishers (commercial and artisanal) leads to unsustainable levels of fishing effort. (2) Ineffective law enforcement; lack of enforcement capacity. (3) Government corruption/graft; (4) Increasing competition between artisanal/small-scale and commercial fishers; conflict and violence increasing at sea. (5) Presence and growth of high economic value transnational treats (e.g., slavery and human trafficking; illegal trade in small arms; trafficking in narcotics) associated with IUU fishing.</p>
<p>12. What are the roles of different genders and how does this affect stakeholder participation?</p>	<p>Low level of integration of women's interests within capture fisheries operations (male-dominated). Increasing presence and influence of women within commercial fishery operations (including post-harvest), particularly at the financial management and business operations level. Growing awareness of the role of women within provincial/state and national fisheries management and decision-making.</p>
<p>13. Other issues that negatively affect their operations/efforts?</p>	<p>(1) Poverty. (2) Low level of food insecurity. (3) Lack of alternative livelihood and employment opportunities. (4) Political graft/corruption; lack of political will within government to sustainably manage fisheries. (5) Lack of strong regulatory frameworks; conflicting authorities and jurisdictions. (6) Increasing competition and sophistication by commercial fisheries sector within neighboring countries. (7) (8) Too many rules and regulations; conflicting and overlapping; (9) Economic crisis led to shortage in capital available for business loans and investment for growth; not fully recovered from economic downturn.</p>
<p>14. Any opportunities or suggestions to improve how fisheries are managed within the region?</p>	<p>(1) Interest to support a regional, public-private partnership that would address IUU fishing and overfishing. (2) Promotion of aquaculture as alternative to capture fisheries to encourage excess capacity to exit capture fisheries. (3) Need to provide alternative livelihoods to encourage excess capacity to exit capture fisheries. (4) Increase security and reduce at-sea conflict/violence. (5) Training in sustainable fishing techniques, safe navigation, and self-defense (at sea).</p>
<p>15. What is current relationship, if any, with USAID (entry point)?</p>	<p>No direct relationship or communications with USAID. Limited awareness of USAID-funded/supported projects, usually in-country.</p>

A7. Regional Stakeholder Interview/Profile Summary: PEMSEA

1. Regional Stakeholder Name	Partnership in the Environmental Management of Seas in East Asia (PEMSEA)
2. Type	International, nongovernmental organization focused on Seas of East Asia
3. What is their relevance to overharvesting and IUU fishing?	Limited relevance
4. What is their role in fisheries? (management training, science, policy, advocacy, academic)	Limited role, mainly focused on policy. Have had past trainings linking ICM and EAFM; Goal is to have 20% of coastline with ICM; Under new Phase 3 program, expansion to include EAFM. A new focus on fisheries and develop partnerships to include fisheries management. Link to the “Essential EAFM” training program.
5. What are their priorities? (nearshore, open ocean; commercial, tuna, live-reef trade)	Integrated coastal management, pollution prevention. Views country-level sustainable financing as a priority.
6. What is their expertise? (ICM, EAFM, conventional fisheries management)	High level of ICM experience. PEMSEA has experience working with the corporate sector and social responsibility for ICM; could use the knowledge gained working with the private sector for ICM for EAFM.
7. What is their capacity? (experience: years resources: funding, staff, and facilities;	Over 20 years’ experience with sustained resources and staff
8. What is their level of influence over fisheries in the region (H, M, L).	Low
9. Relationship/membership with other stakeholders (hierarchies and networks) and regional fisheries bodies (ASSP, CTI-CFF, RPOA-IUU)	11 country partners, 20 non-country partners. There is a desire to collaborate more with other regional organizations.
10. What is their ability to affect change?	High in terms of regional exchange, pollution prevention. Believes it would be useful and a high priority to have a workshop on commonalities and differences of methodologies for resource management; include ICM, EAFM, MSP, CCA, EBM, MPAs, governance, sustainable water, etc.
11. Where do they work (countries, fishing areas)	11 East Asian countries
12. What is their relationship to USAID/perspective to shape the RDMA strategy? (strategic entry point)	PEMSEA would like to have close links with the CTI-CFF regional secretariat (formerly USAID-supported).
13. What are the roles of different genders and how does this affect stakeholder participation?	Not specified.

A8. Regional Stakeholder Interview/Profile Summary: ADB

1. Regional Stakeholder Name	Asian Development Bank Southeast Asia Support to the Coral Triangle Initiative
2. Type	Multilateral organization
3. What is their relevance to overharvesting and IUU fishing?	Directly addressing IUU and fisheries management. For IUU in the region, it is a low priority for Coast Guard, Navy and police; limited court support. IUU in SSME believed to most often be from Chinese fishing boats.
4. What is their role in fisheries? (management training, science, policy, advocacy, academic)	Policy and training. Focus of activities include: CCA, IUU, EAFM, MPAs, livelihoods, marine connectivity, transboundary marine resource issues, small pelagics, and marine turtle network.
5. What are their priorities? (nearshore, open ocean; commercial, tuna, live-reef trade)	Support of the National Plan of Actions in the SSME. Nearshore coastal marine resources. Priority is sustainable financing in the SSME; push is for countries to use own funds to implement activities. Another priority is further implementation EAFM in the region.
6. What is their expertise? (ICM, EAFM, conventional fisheries management)	EAFM, IUU; Pilot projects on EAFM. Provide skills training on livelihoods, CCA and fisheries law enforcement.
7. What is their capacity? (experience: years resources: funding, staff, and facilities;	High capacity to support fisheries management related projects.
8. What is their level of influence over fisheries in the region (H, M, L).	High, can include loan provisions that support sustainable fisheries. Tri-national agreement of the SSME.
9. Relationship/membership with other stakeholders (hierarchies and networks) and regional fisheries bodies (ASSP, CTI-CFF, RPOA-IUU)	Attends meetings and provides resource persons for regional bodies such as CTI-CFF. Interested in setting up of a business development unit for the program.
10. What is their ability to affect change?	Builds capacity for EAFM
11. Where do they work (countries, fishing areas)	Sulu and Sulawesi/Celebes Seas. Focus area in the Philippines for EAFM is Zamboanga region; focus on small pelagic.
12. What is their relationship to USAID/perspective to shape the RDMA strategy? (strategic entry point)	Regional donor partner; jointly funds shared interest areas, including through funding agreements.
13. What are the roles of different genders and how does this affect stakeholder participation?	For the livelihoods work, the focus in the household (male and female roles); providing business management skills; using business people to assist households.

A9. Regional Stakeholder Interview/Profile Summary: UNDP/GEF

1. Regional Stakeholder Name	UNDP/GEF/UNOPS
2. Type	International organization
3. What is their relevance to overharvesting and IUU fishing?	Funds projects directly related to improving conditions of fisheries and habitats in the SSME
4. What is their role in fisheries? (management training, science, policy, advocacy, academic)	Management, training, policy, science. Science basis for EAFM.
5. What are their priorities? (nearshore, open ocean; commercial, tuna, live-reef trade)	Focus is on small pelagic fisheries management within the SSME. A priority is the development of sustainable/diversified livelihoods.
6. What is their expertise? (ICM, EAFM, conventional fisheries management)	EAFM, transboundary diagnostic analysis; EAFM is to be used for small pelagic fisheries management
7. What is their capacity? (experience: years resources: funding, staff, and facilities;	Sustained resources to the SSME
8. What is their level of influence over fisheries in the region (H, M, L).	High in the SSME
9. Relationship/membership with other stakeholders (hierarchies and networks) and regional fisheries bodies (ASSP, CTI-CFF, RPOA-IUU)	Participates in regional bodies
10. What is their ability to affect change?	High in the SSME. Critical to strengthen law enforcement through cooperation and exchange of information among law enforcers (transboundary)
11. Where do they work (countries, fishing areas)	SSME
12. What is their relationship to USAID/perspective to shape the RDMA strategy? (strategic entry point)	Multilateral partner to bilateral donors
13. What are the roles of different genders and how does this affect stakeholder participation?	Work to address gender issues in region

A10. Regional Stakeholder Interview/Profile Summary: RPOA-IUU

1. Regional Stakeholder Name	RPOA-IUU
2. Type	Regional platform/voluntary instrument
3. What is their relevance to overharvesting and IUU fishing?	Action plan on addressing IUU
4. What is their role in fisheries? (management, training, science, policy, advocacy, academic)	Policy
5. What are their priorities? (nearshore, open ocean; commercial, tuna, live-reef trade)	Fishing in nearshore and offshore areas
6. What is their expertise? (ICM, EAFM, conventional fisheries management)	EAFM
7. What is their capacity? (experience: years resources: funding, staff, and facilities;	7 years
8. What is their level of influence over fisheries in the region (H, M, L).	Potentially high, but difficult to evaluate degree of success
9. Relationship/membership with other stakeholders (hierarchies and networks) and regional fisheries bodies (ASSP, CTI-CFF, RPOA-IUU)	Linked with FAA and Australia
10. What is their ability to affect change?	Potentially high, but depends on commitment of the signatory countries
11. Where do they work (countries, fishing areas)	11 countries
12. What is their relationship to USAID/perspective to shape the RDMA strategy? (strategic entry point)	US government agency technical expertise involvement and representation within IUU RPOA process.
13. What are the roles of different genders and how does this affect stakeholder participation?	Unclear.

AI.1. Regional Stakeholder Interview/Profile Summary: CTI-CFF

1. Regional Stakeholder Name	CTI-CFF
2. Type	Inter-governmental body
3. What is their relevance to overharvesting and IUU fishing?	Goal 2 of the CTI-CFF RPOA devoted to EAFM and IUU
4. What is their role in fisheries? (management, training, science, policy, advocacy, academic)	Management, training, science, policy
5. What are their priorities? (nearshore, open ocean; commercial, tuna, live-reef trade)	Nearshore fisheries, migratory species, live-reef fish trade
6. What is their expertise? (ICM, EAFM, conventional fisheries management)	EAFM, ICM
7. What is their capacity? (experience: years resources: funding, staff, and facilities;	5 years, funding after USCTI support unknown
8. What is their level of influence over fisheries in the region (H, M, L).	Potentially high if the RPOA is implemented
9. Relationship/membership with other stakeholders (hierarchies and networks) and regional fisheries bodies (ASSP, CTI-CFF, RPOA-IUU)	Member countries are associated with other bodies including RPOA-IUU
10. What is their ability to affect change?	Potentially high but depends on commitment of CT countries
11. Where do they work (countries, fishing areas)	Indonesia, Malaysia, Papua New Guinea, Philippines, Solomon Islands, Timor-Leste
12. What is their relationship to USAID/perspective to shape the RDMA strategy? (strategic entry point)	US CTI Support Program provided predominant funding to help get CTI-CFF off the ground
13. What are the roles of different genders and how does this affect stakeholder participation?	Works to address gender issues within participating countries.

A12. Regional Stakeholder Interview/Profile Summary: SEAFDEC

1. Regional Stakeholder Name	SEAFDEC
2. Type	Inter-governmental body
3. What is their relevance to overharvesting and IUU fishing?	Mission is directly related to fisheries and IUU policy and planning
4. What is their role in fisheries? (management, training, science, policy, advocacy, academic)	Policy, management, training, science
5. What are their priorities? (nearshore, open ocean; commercial, tuna, live-reef trade)	Nearshore and offshore fisheries, post-harvest technology
6. What is their expertise? (ICM, EAFM, conventional fisheries management)	EAFM
7. What is their capacity? (experience: years resources: funding, staff, and facilities;	46 years, funding, staff, and facilities in Philippines, Thailand, Singapore, and Malaysia
8. What is their level of influence over fisheries in the region (H, M, L).	Potential high through capacity building efforts and research
9. Relationship/membership with other stakeholders (hierarchies and networks) and regional fisheries bodies (ASSP, CTI-CFF, RPOA-IUU)	Associated with ASEAN
10. What is their ability to affect change?	Moderate to moderately-high
11. Where do they work (countries, fishing areas)	Brunei, Cambodia, Indonesia, Japan, Lao, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Vietnam
12. What is their relationship to USAID/perspective to shape the RDMA strategy? (strategic entry point)	Current partner with USAID and other US government agencies.
13. What are the roles of different genders and how does this affect stakeholder participation?	Expertise in addressing gender issues within regional fisheries.

A13. Regional Stakeholder Interview/Profile Summary: APFIC

1. Regional Stakeholder Name	APFIC
2. Type	Regional organization
3. What is their relevance to overharvesting and IUU fishing?	Regional fishery body
4. What is their role in fisheries? (management, training, science, policy, advocacy, academic)	Policy, advocacy, management
5. What are their priorities? (nearshore, open ocean; commercial, tuna, live-reef trade)	Coastal fisheries and mariculture, fish processing and marketing
6. What is their expertise? (ICM, EAFM, conventional fisheries management)	EAFM
7. What is their capacity? (experience: years resources: funding, staff, and facilities;	50 years
8. What is their level of influence over fisheries in the region (H, M, L).	
9. Relationship/membership with other stakeholders (hierarchies and networks) and regional fisheries bodies (ASSP, CTI-CFF, RPOA-IUU)	APFIC Secretariat supported by FAO, members from Australia, Bangladesh, Cambodia, China, France, India, Indonesia, Japan, Malaysia, Myanmar, Nepal, New Zealand, Pakistan, Philipopines, Korea, Sri Lanka, Timor-Leste, Thailand, United Kingdom, USA, Vietnam
10. What is their ability to affect change?	
11. Where do they work (countries, fishing areas)	
12. What is their relationship to USAID/perspective to shape the RDMA strategy? (strategic entry point)	
13. What are the roles of different genders and how does this affect stakeholder participation?	

A14. Regional Stakeholder Interview/Profile Summary: APEC

1. Regional Stakeholder Name	APEC-OFWG
2. Type	Regional organization
3. What is their relevance to overharvesting and IUU fishing?	Working group focused on fisheries and aquaculture
4. What is their role in fisheries? (management, training, science, policy, advocacy, academic)	Policy, information exchange
5. What are their priorities? (nearshore, open ocean; commercial, tuna, live-reef trade)	Marine capture fisheries, small and large
6. What is their expertise? (ICM, EAFM, conventional fisheries management)	EAFM
7. What is their capacity? (experience: years resources: funding, staff, and facilities;	20 years
8. What is their level of influence over fisheries in the region (H, M, L).	
9. Relationship/membership with other stakeholders (hierarchies and networks) and regional fisheries bodies (ASSP, CTI-CFF, RPOA-IUU)	
10. What is their ability to affect change?	
11. Where do they work (countries, fishing areas)	
12. What is their relationship to USAID/perspective to shape the RDMA strategy? (strategic entry point)	
13. What are the roles of different genders and how does this affect stakeholder participation?	