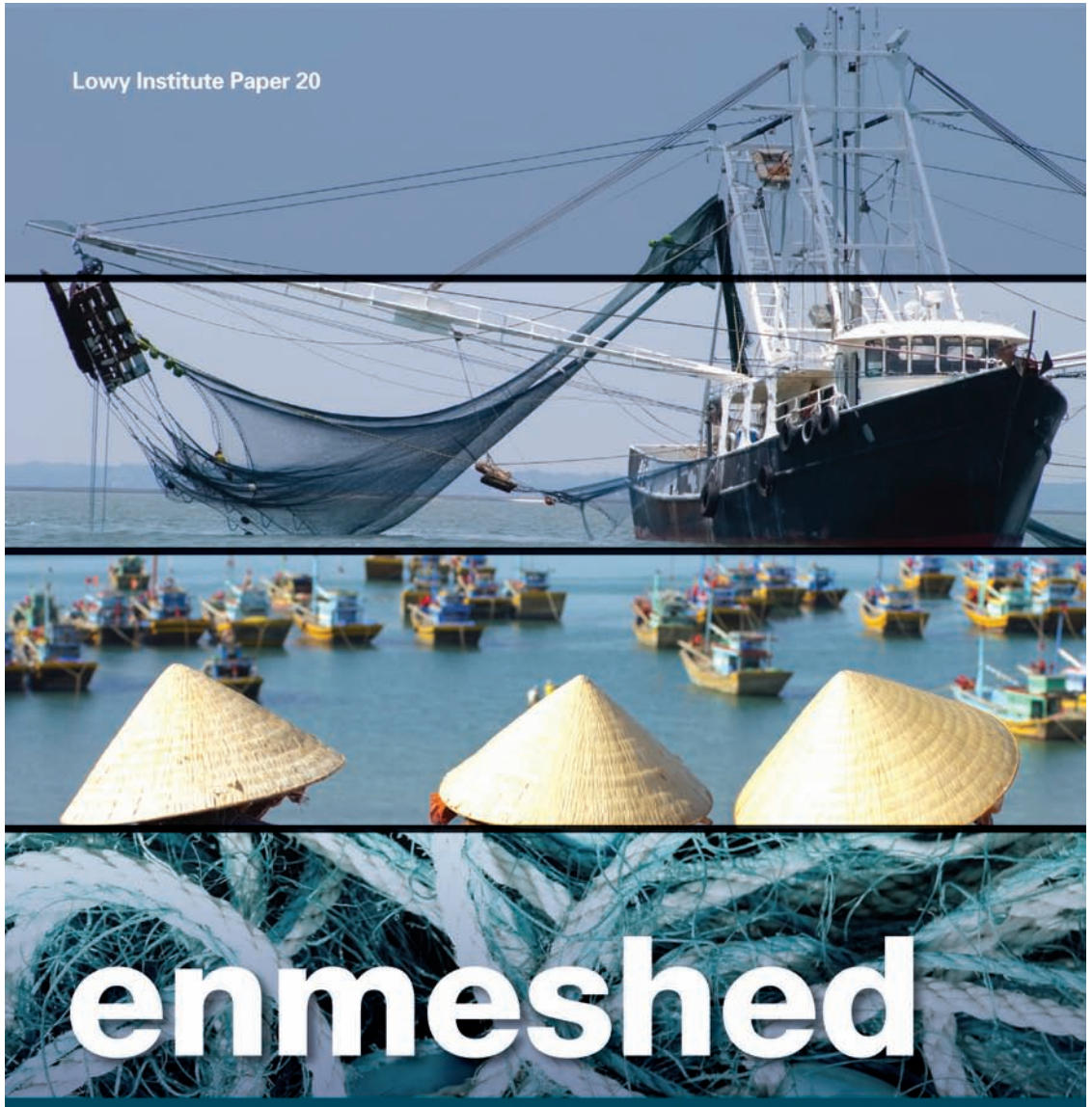

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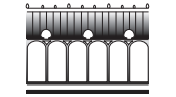


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**Meryl J. Williams** is engaged in non-executive leadership positions, including chair of the Commission of the Australian Centre for International Agricultural Research and member of the Australian Aid Advisory Council. From 2004-2005 she was the inaugural Executive Officer of the Alliance Office, supporting the collective action of the 15 centres of the Consultative Group on International Agricultural Research (CGIAR)

From 1994 to 2004, Dr Williams was Director General of the WorldFish Center, one of the CGIAR Centers. She concentrated the focus of the WorldFish on eradicating poverty, improving people's nutrition, and reducing pressure on the environment. During that period, she resided in the Philippines and Malaysia and worked widely in Southeast Asia and other regions.

Dr Williams began her career in the Queensland government in 1977, responsible for biometrics in fisheries research and the analysis of catch and industry statistics. In the mid-1980s, she was the fisheries statistician focusing on tuna and billfish at the South Pacific Commission. In 1986, she joined the Australian Department of Primary Industries and Energy (DPIE). Dr Williams established the Fisheries Resources Branch in DPIE to advise the Commonwealth

and State governments on how better to manage their shared fisheries stocks at a time when many difficult decisions about resources needed to be made. In 1990, she became executive director of the Bureau of Rural Resources that advised the Australian Government on the science of key agriculture, forestry, fisheries and quarantine issues. In 1993, Dr Williams left Canberra to lead the Australian Institute of Marine Science (AIMS) in Townsville.

Among her national and global leadership roles, Dr Williams has just completed a 4 year term as chair of the FAO Advisory Committee on Fisheries Research, and is a member of the Scientific Steering Committee of the Census of Marine Life. In 2005, she was a member of the Core Group to assist the development of Australia's White Paper on aid. She was elected a Fellow of the Academy of Science, Technology and Engineering in 1993 and awarded an Australian Centenary Medal in 2003. In 2004, the Asian Fisheries Society nominated her as an honorary Life Member.

She has published widely on fisheries and aquaculture.



# Executive summary

The training of diplomats, trade negotiators and supermarket executives in Australia and overseas usually does not cover the basics of fish and fishing, but maybe it should. In their careers, many will find themselves dealing with the challenges of illegal fishing, and other fish and fishing issues, such as fish trade, fish stock sustainability and marine environmental conservation. Nowhere is a fisheries education more pertinent than in Australia and Southeast Asia today.

Australia and Southeast Asian countries are enmeshed through many international connections over fish, four of which are capable of generating tensions in, as well as opportunities for, strengthening regional relations: illegal cross-border fishing; the challenges of managing shared fish stocks; managing highly migratory tuna stocks, and in fish trading. With respect to fish and fishing, Indonesia is Australia's nearest, biggest and most important neighbour; Thailand and Vietnam are key fish suppliers to Australia; and the Philippines and Papua New Guinea figure in regional tuna fishing and trade.

Australia's own fisheries resources are modest in size compared to those of Southeast Asia, although high in value. They are closely managed under agreed shared responsibilities by Commonwealth, State and Territory governments. Resource and environment sustainability and economic benefits are central management goals. To meet Australia's market needs in fish, more than half of that consumed is imported and, in future, the percentage will grow significantly as

domestic catches are tightly controlled to ensure sustainability, and as demand for fish expands with population growth and rising preference for fish. Currently, Southeast Asia countries supply nearly 50% of Australian fish imports.

At the same time as Australia sees its fish and fish import needs grow, a series of interconnected problems are likely to beset Southeast Asian marine fisheries as well as the shared stocks with Australia. These problems are turning our natural fisheries connections with the region into actual and potential tension points. The most serious underlying problems are fishing overcapacity, i.e., too many fishing vessels and fishers relative to the sustainable catch available, overlapping but incomplete regulatory bodies, a lack of scientific data on crucial issues such as the status of stocks, and even which stocks are shared across borders, and a tendency to see marine fisheries purely as a source of unlimited commercial return. These problems have the capacity to aggravate international relations and potentially turn Australian and Southeast Asian connections over fish into serious sources of bilateral and regional tension unless urgent action is taken.

## Overcapacity

Southeast Asian fisheries have expanded dramatically in recent decades, and Indonesia, Thailand, Vietnam and the Philippines are now in the top 12 fish producing countries in the world. Nearly 100 million people are directly dependent on the fishing industries and their related service sectors in Southeast Asia, and nearly all Southeast Asians are fish consumers. The regional fisheries expansion occurred in two phases. In the first phase, from the 1950s to the end of the 1970s, industrialisation led to an open race for fish, unconstrained by national borders. In the second, from the 1980s to the present, the open frontiers were closed by territorial claims under the Law of the Sea and through overfishing that closed off more and more fishing options and signalled the end of the rise in production from capture fisheries, i.e., fish caught from natural sources. However, paradoxically, the number of fishers is still increasing in most Southeast Asian countries that are taking advantage





of what is, in practice, open access to fishing, a growth paradigm that does not match the status of the resources and environments.

For Australia, the important Indonesian bilateral relationship over fishing has received attention because of illegal fishing, tuna management issues, shared fish stocks and, to a lesser extent, fish trade. As the fourth largest country in world fish production, Indonesia is a fisheries giant. Yet, on the best available information, Indonesian marine fisheries resources are close to fully exploited, and a significant number in all areas are over-exploited. Since the number of fishers, vessels and the intensity of fishing is still increasing, all resources are expected to be fully exploited and over-exploited in a decade.

The story in the other major regional fishing powers is little different. In the Gulf of Thailand, Thailand's most important fisheries location, the density of fish has declined by 86% from 1961 to 1991. Between 1966 and 1994, the catch per hour in the Gulf by trawlers declined more than sevenfold. In Vietnam, a new fishing power and source of imports for Australia, the total catch only doubled despite a tripling in the capacity of the fishing fleet. In the Gulf of Tonkin, where resources are shared with China, the fish resource status is even worse, as the fish catch per hour in 1997 was only a quarter of that in 1985. In the Philippines, most marine fisheries were overexploited by the 1980s, with catch rates now as low as 10% of rates when these areas were lightly fished.

## Regional regulation: too many but weak management organisations

Southeast Asian fisheries are served by a plethora of regional bodies and agreements, to many of which Australia is party, but few act effectively on illegal fishing and shared stock management, which is usually handled bilaterally. Australia is particularly concerned that Indonesia, the Philippines and Thailand take a more active role in the formal regional management organisations for tuna and highly migratory fish stocks, including southern bluefin and Pacific Ocean tuna. Other non-Southeast Asian economies are also interested in the fisheries of Southeast Asia, especially Japan, China and Taiwan.

## Lack of data

A basic lack of data on shared stocks in Southeast Asian waters, the size and impact of illegal fishing and the scope of environmental degradation of mangroves and seagrasses due to fishing and aquaculture, is delaying and complicating effective regional action. The extent to which fish stocks are shared across national boundaries is not well understood. In Southeast Asia, few scientific studies have been conducted to determine the relatedness of fish stocks across national boundaries. The studies are expensive and time consuming, but are also essential for proper regional coordination and action.

## The new approach

Australia already has a major fish and fishing engagement, bilateral and multilateral, with Southeast Asia. What are Australia's future options with respect to this engagement? One is 'business as usual' and another is a more comprehensive and strategic engagement that integrates Australia's interests in Southeast Asia in a coherent way. The justification for the comprehensive approach is that the present approach may be too reactive for future needs and already has mounting and unpredictable costs and coordination needs.

Indeed, 'business as usual' may soon be more expensive and counter-productive to Australia's interests as it tends to ignore the underlying causes that are driving connections over fish that will undoubtedly become sources of international tension. These include the lack of success by Southeast Asian countries in reducing fishing effort despite depleted stocks and in managing illegal fishing. A series of steps could achieve the preferred comprehensive approach. Nevertheless, some specific actions would be helpful regardless of the option chosen.

A comprehensive fisheries engagement can be achieved through a two-stage approach. This should start with first, a national analysis of the issues and options followed by, second, engaging Australia's neighbours when the national analysis has been completed.





The first stage would be under the joint leadership of the Departments of Agriculture, Fisheries and Forestry, Environment and Heritage and Foreign Affairs and Trade, and would be a national analysis examining the need for and future form of a comprehensive fisheries engagement between Australia and the countries of Southeast Asia and Papua New Guinea. The initial analysis and forward planning should also include other Commonwealth agencies involved in border security, development assistance and research.

The Lowy Institute is encouraged to help take the analysis beyond the government agencies by including the issue of Australia and Southeast Asian fisheries in its work agenda. It could, for example, host a dialogue with Australian and Southeast Asian experts on the types of reforms recommended by the present paper.

On the basis of the above analyses and the development of a national approach Australia should stimulate interest in dialogue and engagement among Southeast Asia and Papua New Guinea governments. Possible themes, stressing more effective policy implementation, are (1) how to effectively reduce fishing capacity and make fisheries regulation effective and (2) creating alternative options for today's fishers.

## General principles of Australia's fisheries engagement

Whether 'business as usual' or the comprehensive approach prevails, Australia should embed a number of general principles in all its bilateral and multi-lateral discussions and support regarding fish and fishing. All collaboration and assistance should be guided by underlying principles with a proven track record of achieving better outcomes, such as inclusive management processes, establishing rights over fisheries resources and looking beyond the catching sector to adopting a fish supply chain approach.

- Australia should give priority to helping Southeast Asian countries build their capacity for fisheries management, policy development, research and information management in line with the needs of improving country and regional fisheries

management. Part of this capacity development would be to help fisheries department personnel become more active beyond the fisheries domain in integrated management where many of the fisheries problems such as habitat destruction and coastal pollution, and trade, may be solved.

- Australia should embed the principle of stakeholder inclusion in its fisheries interventions by stressing the importance of including views from fishers' representatives, environmental organisations, community and women's interests, consumers and the private sector representing the retail, food service and fish processing sectors.

- With appropriate sensitivity to the priorities of other countries, Australian fisheries cooperation programs should help the countries to develop rights-based management systems that are suited to the political, cultural and economic circumstances of their fisheries.

- Given the rudimentary state of knowledge concerning many of the key fisheries resources, their fisheries and supply chains, Australia should substantially increase the number of cooperative fisheries and amount of marine conservation research to support the needs of long term comprehensive fisheries engagement.

- Australia should join with regional bodies such as APFIC, ASEAN and SEAFDEC to create a regional process to assess fisheries resources and to provide advice to fisheries managers in a form suitable for their use. The resource assessment system should use the current country and regional fisheries arrangements and aim to provide regular assessments within the next three to five years.

- In cooperative actions with neighbouring countries Australia should be careful to clarify national responsibilities and temper its enthusiasm for fast action by respecting national sensitivities





## Specific policy recommendations

### *Improving regional fisheries management organisations*

Australia should continue active work through its membership on regional fisheries and economic bodies to persuade Indonesia, Thailand, the Philippines and other Southeast Asian countries to sign and ratify international fisheries agreements and conventions. The three regional tuna fishing agreements and their supporting bodies are of the highest priority, namely those for southern bluefin tuna, Pacific and Indian Ocean tuna. Within these arrangements, Australia should help the parties achieve catch limits and allocations to ensure sustainable fishing.

### *Fixing up the 'MOU Box' arrangements*

With the cooperation of the Government of Indonesia, Australia should work to help understand and define the historical, current and likely future patterns of fishing vessel use of this conservation area. Australia should then make appropriate changes to long term access arrangements for traditional Indonesian fishers to parts of Australian waters under the Ashmore and Cartier reef area (termed the 'MOU Box', see Box 1) of northwest Australia.

### *Informing consumers*

Australia should promote market-based instruments such as country of origin labelling and identification of the complete chain of custody for more fisheries products to combat illegal fishing and increase public awareness of and pressure for sustainable fish products.

### *Making decentralisation work*

Australia's experience with the Offshore Constitutional Settlement between the relevant states and the Commonwealth could offer insights, albeit to a different and more complex coastline and governance system, of how management authorities and accountabilities may be approached. Indonesia, the Philippines, Vietnam and Thailand have all initiated decentralisation programs that affect fisheries' regulation.

***Supporting the marine environment***

Australia's regional marine planning approach, as embraced in Australia's Oceans Policy, could offer models for ecosystem based approaches across levels of government. Australia should also continue to support its marine environmental assessment work with global and regional networks for coral reefs, mangroves and seagrasses. It should see how marine conservation efforts in the region could ensure that more attention is paid to seagrass assessment and protection, given the importance of seagrass habitats in fisheries.



# Contents

## Boxes, tables, figures and maps

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Finally, this study has had the benefit of 'standing on the shoulders of giants' in the form of several recently published and comprehensive works on Southeast Asian fisheries, all involving the work of scientists from Southeast Asian countries and from international agencies. I would like to particularly acknowledge the value of work published in Butcher (2004), Lewis et al (2003), Lubis, et al (2005), and the major and thorough regional efforts reported in Silvestre et al (2003) and WorldFish Center (2005).

**Disclaimer**

The views and conclusions expressed in this study are those of the author and do not represent the position or views of any organisation with which the author is currently, or has been, associated. All the mistakes are my full responsibility.

## Abbreviations and Acronyms

| | |
|---|---|
| ABARE | Australian Bureau of Agricultural and Resource Economics |
| ACIAR | Australian Centre for International Agricultural Research |
| AFMA | Australian Fisheries Management Authority |
| AFTA | ASEAN Free Trade Area |
| AIMS | Australian Institute of Marine Science |
| ANU | Australian National University |
| APEC | Asia Pacific Economic Cooperation |
| APFIC | Asia Pacific Fisheries Council (of FAO) |
| ASEAN | Association of Southeast Asian Nations |
| ATSEF | Arafura and Timor Seas Expert Forum |
| AusAID | Australia's agency for international development assistance |
| CCSBT | Convention for the Conservation of Southern Bluefin Tuna; also Commission for the Conservation of Southern Bluefin Tuna |
| COREMAP | Coral Reef Rehabilitation and Management Program (Indonesia) |
| CSIRO | CSIRO or Commonwealth Scientific and Industrial Research Organisation |
| DAFF | (Australian) Department of Agriculture, Fisheries and Forestry |
| DEH | (Australian) Department of Environment and Heritage |
| DFAT | (Australian) Department of Foreign Affairs and Trade |
| EEZ | Exclusive Economic Zone |
| EPBC Act | (Australian) Environmental Protection and Biodiversity Conservation Act (1999) |
| EU | European Union |
| FAO | Food and Agriculture Organisation of the United Nations |
| Fish | Used in this report to include finfish, prawns, crabs, and other aquatic organisms. |
| FRDC | Fisheries Research and Development Corporation (Australia) |
| HACCP | Hazard analysis and critical control point |
| IOTC | Indian Ocean Tuna Commission |
| IUU fishing | Illegal, unreported and unregulated fishing |
| 'MOU Box' | Area in the Australian EEZ around Ashmore, Cartier and other reefs designated for use by specified Indonesian fishers due to historical use. |
| NACA | Network of Aquaculture Centers in Asia |
| NAP | (Malaysian) National Agricultural Policy |
| NGO | Non-government organisation |
| OCS | (Australian) Offshore Constitutional Settlement (1982) |
| OIE | Office International des Epizooties (or the World Organization for Animal Health) |
| PNG | Papua New Guinea |
| RFMO | Regional fisheries management organisation |
| SBT | Southern bluefin tuna |
| SEAFDEC | Southeast Asian Fisheries Development Center |
| SIUP | Indonesia licence for a fisheries business |
| SPS | Sanitary and phytosanitary |
| UN | United Nations |

| | |
|---|---|
| UNCLOS | United Nations Convention on the Law of the Sea (1982) |
| UNFSA | United Nations Fish Stocks Agreement (1995) Full title: United Nations Agreement for the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks |
| US, USA | United States of America |
| WCPFC | Western and Central Pacific Fisheries Commission |
| WSSD | World Summit on Sustainable Development (2002) |
| WTO | World Trade Organisation |
| WWF | WWF (previously World Wildlife Fund, an international conservation non-government organisation) |



# Chapter 1

## Fishing catches Australian and international attention

Overall world fish[1] stocks have declined and yet excessive overfishing continues often in degraded environments.[2] Fish production rose rapidly last century, initially from the harvesting of natural fish stocks and then from rapid increases in farmed fish, that is, aquaculture production. Today, world fish production is seven times its 1950 level and, despite more mouths to feed, each person, on average, is eating twice as much fish compared to consumption levels in 1961.[3] Demand for fish is still growing[4], driven by growing populations, growing affluence — the better off can afford more fish, and a preference for fish generated by its recognised health benefits.

As we eat more fish, we are also becoming increasingly interested in where this fish comes from and whether stocks are sustainable — 'nearly all Australians are worried about fish'.[5] Concern over stressed fish stocks and high fish demand even enters the realm of international relations, especially those between Australia and its Southeast Asian[6] neighbours.

A complex and rich history of national developments lies behind the changes in global and regional fish production. From the 1950s,

Australian fishing expanded rapidly. The fishing industry took advantage of new tastes and technologies, such as trawling for prawns and fish; offshore and nearshore tuna were exploited, especially the valuable southern bluefin tuna, in competition with fishers from Japan among others; the fishing industry also learned how to penetrate the high value Asian markets for rock lobster and abalone and fed a growing local market with fresh fish. In 1979, Australia made an early declaration of its 200 nautical mile fishing zone and in the early 1980s launched its final expansion of fishing. As the sustainable limits of fishing were reached for most stocks in the 1980s,[7] domestic demand was increasingly met by supplementing local produce with fish imports. Today, more than half of the fish consumed in Australia comes from overseas. However, Australia has established its place in the world as a very small fish producer, but a savvy one, endowed with valuable species, generally well managed fish stocks and with a good track record in research and management.

Southeast Asian countries have undergone their own fishing revolutions and now Indonesia, the Philippines, Thailand and Vietnam rank in the top 12 world fish producers and traders.[8] Last century, they started from a lower level of fishing industry mechanisation than Australia, originally using intricate and mainly stationary fish traps that blanketed the coasts. In the last 50 years, these have largely been dismantled in favour of more mobile and mechanised industrial fishing such as trawling for bottom dwelling, that is, demersal fish, netting with purse seines and gill nets and fishing with long lines of hooks to catch the fish that swim in the water column, that is, the pelagic fish. Regional countries, especially Thailand, the Philippines and Indonesia, have become among the most successful countries catching the large migratory tunas, spreading their effort widely in the Pacific and Indian oceans. All the while, small scale fishing has persisted alongside the larger scale operations and it, too, has become more mechanised. As well as feeding local people, fish bring in much needed foreign exchange to the Southeast Asian countries, a fact that further drives fishing, almost regardless of the state of the stocks. Compounded by a lack of effective controls on the amount of fishing, the drivers for food, profit, livelihood and foreign exchange mean that most regional fisheries are now overfished.





The race for fish in the region has spilled over national maritime boundaries, much of it in the form of cross-border trade in fish, but some in the form of illegal fishing. Frequently, a regional ambassador or high commissioner in a neighbouring country will have to deal with the diplomatic fallout of illegal fishing by citizens of the country they represent. Australia also experiences the same side effects of regional fishing developments.

This paper explores the fishing linkages between Australian and its Southeast Asian neighbours, linkages that are driven by our geographic closeness as well as by the global conditions of fish and fishing.

## Australia and Southeast Asia — connected by fish and fishing

Geographically, ecologically and historically, Australian and Southeast Asian marine environments are united. Maritime boundaries cut across the geographical ranges of fish stocks, creating shared management responsibilities. Migratory fish such as tuna and many shark species show no regard for national borders. Illegal and highly mobile fishers can raid fish stocks across the borders, thus making fishing disputes newsworthy and included in diplomatic agendas. Even where fish stocks are not shared, knowledge of species can usefully be shared because Australia and Southeast Asia fish and farm the same or similar species. And Australia and Southeast Asia trade fish with Southeast Asia providing half of Australia's fish imports.

Australian and Southeast Asian interests, therefore, are enmeshed through their fish and fishing connections. Among all such types of international connections, described below, four stand out as deserving particular attention. These connections have generated four major areas of international engagement: illegal cross-border fishing; the challenges of managing bilaterally shared fish stocks; the challenges of multi-lateral management of regional tuna fisheries; and the interdependencies of the fish trade.

For Australia and among the Southeast Asian countries, connections are increasing in importance and some have led to tensions. The background to these is described in the following sections titled under

countries. In general, the tensions arise because over-fishing is now a problem in each country and yet the demand for fish continues to grow. Although aquaculture is meeting some of the growing demand for fish, it too is making additional demands on the region's fisheries and ecosystems. Examples include increasing fishing of small and low value fish to use as feed for aquaculture,[9] and marine pollution from farm waste.

Australia already makes a major contribution to the regional and global resolution of fishing problems and shares its scientific and technical expertise widely. In the face of rapid fishing overdevelopment in Southeast Asia, as this report describes, Australia will have to do even more to address its international engagement in Southeast Asian fisheries. Business as usual may be counter-productive to Australia's interests. Australia urgently needs a more strategic and comprehensive fisheries engagement with the region, based on a sound understanding of the regional fisheries situation and the fundamental causes of the problems.

This report addresses the underlying structures of the four key international fishing connections and how Australia can strategically address them. It summarises the present situation of the most important fishing countries in the region and uses this to advance a new Australian approach to regional marine resource management. Whereas most of the recommended action is the prerogative of governments acting bilaterally or regionally, the challenges facing the sustainable harvesting of regional fish stocks must be addressed also by consumers and traders through the markets, by the fishing industry through their practices and industry organisation action, by environment groups, and by multilateral intergovernmental cooperation.

At the same time as Australia's regional fishing engagement becomes more important, the Australian fishing industry is facing challenging times. Regional actions taken by Australia should take care to maintain the competitiveness of the Australian fishing industry.





## Scope of study: types of fisheries, geography and Australian interests

This paper focuses primarily on Australia's national interests in the marine capture fisheries of Southeast Asia, that is, those activities that harvest fish from natural stocks in marine waters (see glossary). However, since the products from and interests in all forms of fish production are interlinked through markets and via the government agencies, private companies and organisations that serve fish production, the study also makes reference, where relevant, to aquaculture and inland fisheries. Indeed, some of the fish products that Australia imports from Southeast Asia are produced from inland and marine aquaculture.

**Map 1: Map of northern Australia and Southeast Asia showing maritime boundaries**


*Source: VLIZ Maritime Boundaries Database, www.vliz.be*

***Australia's fish and fishing connections with Southeast Asia***

Australia and Southeast Asian fish and fishing connections can be organised into seven types. A brief description of each is provided below.

1. **Managing shared fish stocks:** Australia's interests are in the conservation of fish stocks shared across maritime borders and in securing an appropriate Australian benefit from the use of the stocks. Due to the northern boundaries of the Australian 200 nautical mile exclusive economic zone abutting those of Indonesia, East Timor and Papua New Guinea, certain fish stocks are shared at least on a bilateral basis. In general, the extent of sharing is poorly known.

2. **Managing tuna fisheries:** Tuna fishing is usually treated separately from the shared stocks referred to above as the several species taken are considered highly migratory and therefore their management is typically through multilateral international bodies. Their markets also tend to be distinct from the markets for other fish. Australia's interests are in the conservation of the valuable southern bluefin tuna stock, in ensuring that the Pacific Island countries obtain appropriate benefit from tuna fishing in the waters of the central and western Pacific, and in strengthening regional and bilateral cooperation through multilateral fishing agreements. Examples include Australia's work with Indonesia, Thailand and the Philippines in relation to tuna fishing in the central and western Pacific and Indian Oceans, and Australia's efforts to encourage Indonesia to become part of the formal management of the southern bluefin tuna fishery.

3. **Illegal fishing**: Australia seeks to prevent all illegal fishing in its exclusive economic zone and uphold the fight against illegal fishing in all cases, including by nationals of Southeast Asian countries. The most prolific and publicly known incursions have been by Indonesian vessels illegally fishing in Australian waters. Cambodia has also been associated with issuing 'flags of convenience' to vessels fishing illegally in Australia's southern territories





4. **Fish trade:** Australia's interests are in ensuring the national benefits of fish trade, biosecurity in the course of trade, and the safety of imported fish and in promoting a fairer international trading system. Thailand, Vietnam, Indonesia, Malaysia, Burma are major and more minor sources of Australia's fish imports. Imports of fish, aquaculture feed and bait from Southeast Asia bring risks of fish disease and pathogens. In the case of human health, fish products bring risks, through, for example, bacterial contamination during processing and transport, and through the use of drugs to promote the growth of aquaculture species. Australia and Thailand have a Free Trade Agreement that covers fish products, and, through regional bodies such as APEC, Australia works with Southeast Asian countries for better global trading systems.

5. **Overseas development assistance:** Through its aid program, Australia often targets fishing as a means of promoting economic growth, human development, regional security and regional cooperation, as for example in Indonesia, Vietnam and the Philippines. It assists Southeast Asian countries to improve their emergency preparedness and recovery after emergencies, such as through the assistance rendered to the fishing industry in Aceh, Indonesia after the 2004 Indian Ocean tsunami. Australia's aid program also promotes collaborative research in fishing and aquaculture in Indonesia, Philippines and Vietnam among others and helps build regional capacity through formal education and training programs including in the fishing sector, for example through scholarships in all Southeast Asian countries.

6. **Marine environment conservation:** Australia is involved in helping Southeast Asian countries conserve marine biodiversity and conserve the marine environment for the sake of healthier

fisheries and human lives. Australia is active in global efforts for the conservation of marine mammals, sharks and rays, turtles and other threatened marine species. Australia, Indonesia, the Philippines, Thailand, Malaysia and Singapore are leaders in the global monitoring networks for coral reefs, mangroves and seagrasses.

7. **Scientific cooperation:** Australia promotes joint scientific research for mutual benefit, on fishing and aquaculture topics on species and ecosystems of common interest, such as mud crabs, coral reefs, oceanographic and climate research in Indonesia, and regional studies such as those on sharks and rays.

Of all these types of connections, the first four have generated the most attention and even created some 'hot issues' between Australia and regional countries as follows:

**Illegal fishing**: All illegal fishing in Australia's exclusive economic zone (EEZ) is of concern to governments, fishers and the public. The key northern hot spots are the Arafura Sea, Queensland, Northern Territory and Western Australia offshore reefs, especially Ashmore and Cartier reefs, and at times the Great Barrier Reef, and the special Australia-Indonesia 'MOU Box' which is described later.

**Managing shared fisheries stocks**: The hot spots for Australia are the Indian Ocean part of the range for the depleted southern bluefin tuna stocks, western and central Pacific Ocean tuna stocks, sharks in the seas adjacent to Indonesia and certain Arafura Sea demersal (bottom dwelling) fish stocks. Sharks are the subject of worldwide conservation plans. Several species are listed under the Convention on International Trade in Endangered species. Sharks and rays tend to be easily depleted by fishing. They grow slowly, have few young, and most species roam over wide areas of ocean, hence creating shared stocks.[10]

**Managing tuna fishing**: In addition to shared tuna stock management, Australia is concerned with the impact that Philippine and Indonesian





fishing has on the western and central Pacific stocks that are a vital economic resource for the Pacific Island countries.

**Fish trade**: Australia imports a large and growing share of the fish it consumes and, therefore, sourcing imports is of interest, as is finding the best export markets for Australian products. Trade hotspots are Thailand which is the primary source of Australian imports and Vietnam which is the fastest growing source of certain products, such as catfish in the form of white fish fillets and prawns. Indonesia, Malaysia and Burma may increase in the future as sources for fish imports. Southeast Asian countries, with their growing number of affluent consumers, may be potential markets for high-value Australian products such as abalone and rock lobster. Australian consumers have a great love of prawns and other crustaceans for consumption and as bait in recreational fishing. Some of the annual imports of over 30,000 metric tonnes bring disease threats for Australia's fisheries and aquaculture, such as the pathogen white spot virus that could potentially be transferred to local prawns and crabs.

The body of this study is organised by country because each country has a different history, size and natural resource endowment and also because fishing regulation is still largely a national responsibility. International and regional cooperation arrangements are also analysed. The paper begins with the fisheries situation in Australia with an emphasis on northern fisheries. It then examines the regional outlook, focusing on Indonesia, Australia's nearest, biggest and most important neighbour in terms of proximity and fish production; Thailand and Vietnam as Australia's biggest Southeast Asian regional fish trading partners in terms of volume and value of fish traded; and the Philippines and Papua New Guinea because of their additional importance in tuna fishing and processing.

The tensions and hot spots that have or could be generated by these four key fish and fishing connections, namely, illegal fishing, management of shared stocks, management of tuna fishing and fish trade, should be treated as signals indicating the possibility of greater

fishing-related stresses in the region and as stimuli to Australian action to prevent an escalation in tensions. To act now in a positive way would minimise the future cost of dealing with larger crises and would help Australia and the region create greater value from their still-valuable fish stocks.

Looking beyond the issues themselves, the analysis in this study highlights common underlying factors that have or will lead to tensions. These common factors include the importance of fish and fishing to the Southeast Asian economies, people and governments. Although these countries are well endowed with marine fisheries resources, especially in relation to Australia, they are unable to either control the number of their fishers or to maintain fishing at sustainable levels due to political and economic constraints and the lack of clear fishing rights. In effect, Southeast Asian fisheries are still operating with an open access, fisheries growth paradigm that does not match the current status of their resources and environments.

Australia's future possible courses of action begin to emerge from this analysis. Building on what is already being done to address the key common connections, a comprehensive strategy for fish and fishing could encompass steps to help the region manage the underlying factors that are transforming naturally occurring and beneficial relations into diplomatic, commercial and environmental points of tension.



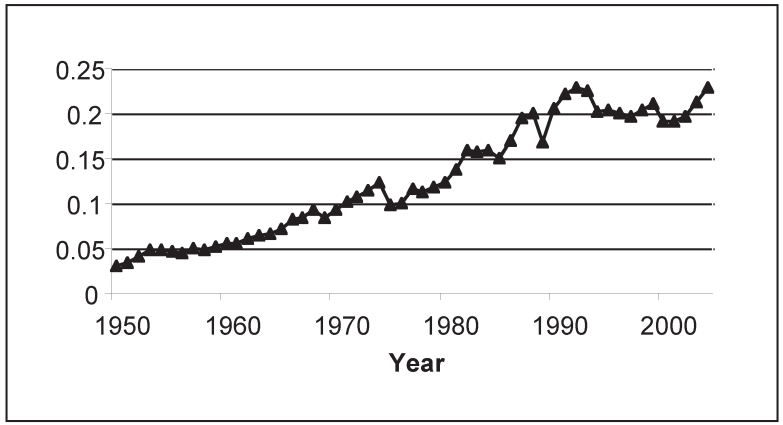
# Chapter 2

## Australia's fisheries and bilateral engagement with Southeast Asian countries

Australia's marine fisheries catch is small in comparison with those of the large Southeast Asian producers — 228,000 metric tonnes in 2004 as opposed to nearly five million metric tonnes for Indonesia.[11] It is also small in relation to the large size of the Australian EEZ, due to generally low marine productivity in Australian waters.[12] Even today, a minority of observers often ignore this factor and attribute the small Australian fish catch to over-management, rather than low productivity. One major difference between the Australian and Southeast Asian fish resources is that Australia lacks large stocks of small pelagic fish — scads, small mackerel, anchovies, etc — that form a significant share of Southeast Asian resources.

Australian marine capture fisheries production, which comprises the majority of Australian production, peaked in the early 1990s and, on the basis of scenario projections for 220 fished stocks, is expected to decline for at least another decade, with uncertain prospects of returning to earlier — and probably unsustainable — peak catches.[13] Projections of Australia's fish requirements and the likely production to 2020 and 2050 indicate that Australia will become much more reliant on imports (Table 2.1).

**Figure 2.1: Marine capture fisheries production in Australia, 1950-2004 (millions of metric tonnes)**




*Source: FAO statistics, accessed August 2006.*

In 2001, the Australian fishing and aquaculture production sectors employed only about 20,000 people.[14] By contrast, a survey of recreational fishing (a major national pastime) estimated that 3.36 million people participated in recreational fishing in 2000.[15]

In 2004-05, the gross value of all Australian fisheries production was A$2.05 billion; exports of 57,000 metric tonnes were valued at $1.54 billion; and imports of 186,000 metric tonnes cost $1.17 billion.[16] Australia imports considerably more fish than it exports, but due to the high value of exports such as southern bluefin tuna, fisheries have a positive balance of payments. However, this positive balance is eroding. The total value of Australia's fish production has decreased in recent years because of falling prices of some products and the strong Australian dollar. Japan and Hong Kong dominate Australia's export markets and the value of exports to the former has been in decline. Since 2000-01, the value of total exports has been declining, mainly due to the falling value of tuna on a weaker Japanese yen.





**Table 2.1: Projections of Australian fish needs, production, exports and imports in metric tonnes***

| | **2000** | **2020** | **2050** | **% change 2000-2050** |
|---|---|---|---|---|
| Domestic fish requirement | 442,000 | 776,000 | 1,150,00 | 260.2 |
| Australian fish production, wild caught | 198,000 | 170,000 | 165,000 | -20.6 |
| Australian aquaculture production | 34,000 | 66,000 | 130,000 | 382.3 |
| Fish exports | 70,000 | 70,000 | 70,000 | 0 |
| Fish imports | 280,000 | 610,000 | 925,000 | 330.4 |

**The projections are for the 'cautious scenario.' Source: Kearney et al 2003.*

On the other hand, Australian fish imports are increasing. In order by value, Thailand, New Zealand, Vietnam and China are the top four suppliers; imports from Thailand have been stable over the last three years; those from New Zealand are in decline; and those from Vietnam and China have increased rapidly. Australia's export markets are more concentrated, the top five countries taking 89 % of the product, compared to the more dispersed import markets, in which the top eight countries supply only 80 % of the total.[17] Southeast Asian countries supply nearly 50 % of Australian imports, by value and volume, but take only 9 % , by volume, of the exports.

Whereas Thailand and Vietnam figure highly in Australia's import and export fish trade, fish trade with Indonesia, Malaysia, Singapore, the Philippines and Papua New Guinea is small (Table 2.2).

**Table 2.2: Australian Fish Trade with Southeast Asia and Papua New Guinea, 2004-05**

| Country | Australian imports | | Australian exports to | |
|---|---|---|---|---|
| | **Metric tonnes** | **A$ '000** | **Metric tonnes** | **A$ '000** |
| Thailand | 60,159 | 236,641 | 2,606 | 8,700 |
| Non-edible products | na | 1,317 | na | 618 |
| **Total** | | **237,958** | | **9318** |
| Vietnam | 18,171 | 121,974 | 784 | 10,0054 |
| Indonesia | 4,289 | 26,165 | 512 | 2,529 |
| Non-edible products | na | 11,433 | | |
| **Total** | | **37,598** | | |
| Malaysia | 5,025 | 26,757 | 245 | 5,748 |
| Non-edible products | na | 679 | | |
| **Total** | | **27,436** | | |
| Singapore | 1,111 | 6,039 | 1,285 | 39,963 |
| Philippines | 666 | 2,529 | | |
| Non-edible products | na | 2,733 | | |
| **Total** | | **5,262** | | |
| Papua New Guinea | - | - | - | - |
| Non-edible products | - | 1,609 | na | 5,460 |

*Source: ABARE 2006; 'na' — not available; '-' — small quantities or negligible, not published; Non-edible products include pearls and bait.*





## Australian fisheries management arrangements

By agreement between governments, management of each fishery — defined by its area of operation, fishing method, species caught and number of fishers — is the responsibility of either the Commonwealth, or a State/Territory or is a joint responsibility between the Commonwealth government and one or several State/Territory governments. Such arrangements have been negotiated under the 1982 Offshore Constitutional Settlement (OCS). All Australian fisheries management arrangements enjoy a degree of stakeholder involvement through management advisory and other consultative committees and all are advised by a scientific or technical advisory committee.

Along the northern borders of Australia, fisheries are managed by the States/Territories of Western Australia and the Northern Territory, and jointly by the Commonwealth and Queensland (Torres Strait) or by the Commonwealth and the three northern states/territories (Northern Prawn Fishery). In Western Australia and the Northern Territory, Australian commercial fishing out to the maritime border is limited to a handful of licenses for trawls, traps, longlines and gillnets (see glossary) to ensure the sustainability of the fish stocks. In northeast Australia, due to the closer proximity of the boundaries to Australia's northern neighbours, greater intensity of Australian fishing occurs near the borders.

Australian fisheries management has been frequently reviewed. Recently, a National Competition Policy report reaffirmed that fisheries and the marine environment are community-owned national resources and therefore governments hold present and long-term responsibility for their management and to ensure the benefits flow to the community.[18] The 2003 report, *Looking to the future: a review of Commonwealth fisheries policy,* re-validated the core policies and structures for managing Commonwealth fisheries and, among others, highlighted the need for Australia to ensure that future fisheries management arrangements 'provide for total-stock management, as well as better coordination of their fisheries management responsibilities'.[19]

### *The environment*

Environmental sustainability and economic benefits are central to Australia's fisheries management actions.

Since the release of the 1998 National Oceans Policy[20] and the 1999 Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act), Australian governments have integrated fisheries management and marine environment concerns, to a greater extent than previously, in recognition of ecosystem-based fisheries management. Layers of assessments have also been added to the management processes to ensure that fishing adheres to environmental requirements. Greater cooperation among government agencies for fisheries management and the environment has evolved to meet the new needs.

At the Commonwealth level, fisheries management responsibilities are assigned as follows: the Department of Agriculture, Fisheries and Forestry (DAFF) is responsible for policy advice on all Commonwealth fisheries matters to support the development of the industry while ensuring environmental sustainability and representing Australia in most international fora; the Australian Fisheries Management Authority (AFMA) is responsible for the sustainable management of Commonwealth-managed fisheries under government policies and legislation; the Fisheries Research and Development Corporation (FRDC) is funded by the Commonwealth government and the fishing industry and supports research and development for sustainable fisheries; and the Department of the Environment and Heritage (DEH) is responsible for independent assessments of the ecological sustainability of all fisheries exporting from Australia and all Commonwealth-managed fisheries.

Since 2001, to help Commonwealth fisheries acquire a more strategic understanding of the sustainability assessments for the EPBC Act, AFMA, with the Commonwealth Scientific and Industrial Research Organisation (CSIRO) and the National Heritage Trust (in DEH), have been conducting environmental risk assessments for each Commonwealth fishery. These risk assessments and their risk-management frameworks place the DEH-required assessments in a larger framework, assess what level of risk the fishery could pose to





the marine environment and recommend management responses to the risks identified.[21]

At the state level, in recognition of the export approvals needed through the EPBC, the Western Australian Department of Fisheries now reports on the status of all its fisheries in an eco-regional context.[22]

In the case of the future management of fish resources shared with other countries, the implications of the more comprehensive environmental requirements on fisheries management are not clear.

A sensitive Australian marine area, the 'MOU Box' around the Ashmore and Cartier reefs off north-western Australia, has become primarily an environmental conservation area under the responsibility of the DEH due to its conservation listing. The former fishing areas are now in two marine reserves — the Ashmore Reef National Nature Reserve, established in 1983, and the Cartier Island Marine Reserve, established in 2000. DEH is responsible for managing these two reefs and for conducting the regular resource and environment assessments. It also liaises with AFMA and the Western Australian Department of Fisheries on Australian commercial fishing near the reserves.[23]

**Box 1 – The MOU**

In the 1970s, as international negotiations on the United Nations Convention on the Law of the Sea (UNCLOS) progressed, Australia and Indonesia settled most of their mutual seabed boundaries. In 1974, Australia and Indonesia agreed a Memorandum of Understanding (MOU) concerning access by 'traditional' Indonesian fishing vessels to five small parts of what would, in 1979, become included in the Australian fishing zone and later the Australian exclusive economic zone.[24] At this time, 'traditional' was defined as 'fishermen who have traditionally taken fish and sedentary organisms in Australian waters by methods which have been the tradition over decades of time'. Over the following decades, the formal access arrangements and definitions of permitted

fishers to this area, which became known as the 'MOU Box', were altered in a way which permitted access for many more vessels from eastern Indonesian ports and restricted some vessels that had long fished in the area.[25] In addition, Fox and Sen point out that the chronic state of depletion of the fisheries resources of the 'MOU Box' areas — Ashmore Reef, Cartier Islet, Scott Reef, Seringapatam Reef and Browse Islet — means that they cannot now support the livelihoods of even the traditional Indonesian users. Originally, sea cucumbers (trepang), green snail, abalone, trochus and sponges were the targets but these resources are now severely depleted. Shark fishing has become a key new activity for vessels using the 'MOU Box', including for safe anchorage and water.

Fox and Sen[26] analysed the databases from Environment Australia (in DEH) and from AFMA showing visits of vessels to the 'MOU Box'; the former database covering visits to Ashmore Reef from 1986 to 1999 and the later fisheries vessel apprehensions in the 'MOU Box' from 1988 to 2001. The majority of vessels (87.5 % of the Environment Australia lists) originate from Nusa Tenggara Timor (West Timor) and the remainder from east Java and Sulawesi. Of the 540 different vessels that visited Ashmore, 9 % were apprehended for fishing illegally outside the 'MOU Box'; half were targeting shark, a quarter trochus and the remainder trepang and reef fish.

The apprehension of illegal fishers in the 'MOU Box' peaked in the mid-1990s and has declined since. Fox and Sen suggest that the decline is due to fewer patrols, reduced target species and fewer vessels. They also undertook surveys of the vessel ownership in the Indonesian fishing ports from which the vessels originated and identified a pattern of increasing concentration in the hands of large owners and outfitters whose fishing vessels make voyages to Australian waters and have links with the local marine products traders, many of whom are ethnic Chinese. The concentration of vessel ownership is apparently assisted by vessels being apprehended





and destroyed in Australia as the big owners can readily replace these by buying or calling in debts from other single-vessel owners. Such big owners are key agents in the fisheries supply chains of Indonesia, having significant interests in the fishing services sector, fishing vessels and the marine products market chains with an inter-island and international reach.

### *Controlling numbers to keep fishing profitable*

Australian fisheries management initiatives have been directed not only at conserving fish stocks and the environment but also at supporting an economically viable fishing industry. Maintaining profitability in the competitive fishing sector is a constant struggle. In 2004, an ABARE study of Commonwealth-managed fisheries showed that, once all costs were included, several fisheries made no net economic returns to the country and that some were even a net economic drain.[27] In December 2005, the Commonwealth government announced a A$220 million one-off structural adjustment package, of which $150 million was allocated to buying out vessels from, mainly, southern Australian Commonwealth fisheries and adjustment support for crews and onshore related businesses.[28] The action originated when the Minister for Fisheries, Forestry and Conservation took 'the unprecedented step of formally issuing a direction to AFMA'.[29]

> The Australian Government considers that decisive action is needed immediately to halt overfishing and to create the conditions that will give overfished stocks a chance to recover to an acceptable level in the near future.

The direction foreshadowed the fact that, by 2008, all Commonwealth fisheries would be under a new Harvest Strategy Framework with transparent reference points and decision-making rules for managing catch. In the first half of 2007, public consultation was held on the draft of the Harvest Strategy Policy and its implementing guidelines, with a view to finalising the policy and ensuring that the policy was

applied in all Commonwealth fisheries by 1 January 2008.[30] This new policy represents a major step forward in codifying the aims and implementation methods for fish stock management targets. In effect, the policy makes much more explicit and transparent the practices that Australia has sought to achieve in its fisheries management.

In May 2006, Australian ministers announced a major budget package of over A$500 million over three years for enhanced efforts by a number of Australian agencies against the increase in illegal foreign fishing in the Australian EEZ.[31] This show of political commitment to protecting Australia's waters came in response to the increased incidence of foreign incursions, mainly from Indonesian vessels, into Australian waters.

## Shared history

Despite the great differences between Australian and Southeast Asian fisheries, they have all experienced some of the same trends as the country descriptions below amplify. Mechanised trawling was widely adopted in all countries between the 1950s and the 1970s.[32] In northern Australia, trawling remained largely concerned with landing prawns and discarding the remainder of the catch — the majority by volume — so as to land the highest-priced product to markets, often long distances from remote areas. In southern Australian waters, fish are the main target for trawling. From the 1970s until 1990 as many fishing nations sought more fishing access worldwide, Australia permitted Taiwanese and Thai trawlers, Thai-Australian joint venture operations and Chinese trawlers to fish the Northwest Shelf and the Arafura-Timor Sea. In 1983, the catch from the Arafura Sea reached a high of 10,000 metric tonnes.[33] All these foreign fishing operations have since ceased.

In its own EEZ, Australia has been active in fishing for tuna, having a special place in the fisheries for southern bluefin tuna. Southern bluefin tuna are high value fish used in top grade sashimi. They form a single stock around the Southern Ocean and school in southern Australian waters in their juvenile stages, where they are caught by Australian fishers. When catch quotas were reduced for all countries participating





in the management of the stock in the late 1980s and 1990s, Australian quota holders developed methods for catching the fish at sea, returning them live to inshore cages and growing them further for later sale at times of peak market prices. More details of the international management of southern bluefin tuna are described in the following section on regional arrangements.

## Stocks shared with Southeast Asia

In the north, the Australian EEZ borders those of Indonesia, East Timor and Papua New Guinea, with some fish stocks shared across the borders. Stocks of fish species are considered to be shared between countries if they form self-sustaining, interbreeding populations over one or a few generations and/or if they migrate to and from the two countries. Thus, whether stocks of a particular species are shared or not depends on how close they are, the ocean currents and depths separating them, how far the adults disperse and eggs and juveniles float or swim on the currents. Large, strong swimmers such as tuna, billfishes and some sharks are highly migratory and are shared over whole ocean basins. These are the exception rather than the rule and the stocks of most fish and other marine species are shared over much smaller areas, even if their species' ranges are much more widespread. That is, many species consist of several partially or completely separate stocks. For example, the main species of mud crab occurs widely throughout the Indian and west Pacfic Oceans but it is comprised of many separate stocks, each relying on self-replenishment of the populations. Rigorous scientific studies are required to establish which stocks are separate and which shared, and the extent of sharing.

### *Indonesian shared stocks and bilateral fisheries relationship*

Indonesia has the longest maritime border with Australia, but little is known on the extent of shared fish stocks. This has to be rigorously determined as not all species that occur in both countries will have shared stocks.[34] Australia and Indonesia share at least some stocks of species of demersal (bottom-dwelling) fish, such as red snappers, and

migratory fish, such as tuna and sharks. In the following country sections, stocks shared with each country will be described in more detail.

Bilateral fisheries relationships do not depend solely on managing shared resources. In 1992, Australia and Indonesia signed the *Agreement between the Government of Australia and the Government of the Republic of Indonesia Relating to Cooperation in Fisheries.* Under this agreement and more recent high-level diplomatic relations in 2001, the two countries formed the Australia-Indonesia Working Group on Marine Affairs and Fisheries, a government-to-government arrangement under the Australia-Indonesia Ministerial Forum. The Working Group holds regular discussions and has a broad remit to discuss cooperation on illegal fisheries, research and technical cooperation on fisheries, the marine environment and aquaculture. The 1992 Fisheries Cooperation Agreement includes provision for 'complementary management of shared stocks'.[35]

However, the two countries are still some way from joint management, partly because the need for joint stock management will not be clear until research determines the stocks that are shared and therefore need such management. For sharks, joint management has not yet been approached and, at a minimum, will await the outcomes of current studies assessing the nature of the shark fisheries. In the case of snapper fisheries, the Northern Territory Government is responsible for managing the domestic demersal fisheries on these species. Gold-banded snapper stocks appear to be separate in Australian and Indonesian waters, so the Australian stocks of this species can be managed independently in Australia. The red snappers, however, may require shared stock management and are already overexploited by several different types of fishing methods in Indonesia. Additional studies are required to give more precise information on the extent of stock sharing.[36] That said, the precautionary approach to fisheries management would suggest taking early action, even in advance of further knowledge, on both sides of the border to limit fishing for these sought-after species.





### *Papua New Guinea shared stocks and bilateral fisheries relationship*

Papua New Guinea (PNG) and Australia fisheries are closely linked across the shallow and narrow Torres Strait. Australia shares a single stock of the commercially lucrative tropical rock lobster with PNG. Four fisheries exploit this single stock, namely the newly developed northeast Queensland live lobster fishery, the Torres Strait traditional fishery, an agreed number of vessels from PNG fishing in the Australian zone and the fishery under PNG jurisdiction. The fishery is considered overfished but the data on which this assessment is based is not considered reliable.[37]

### *East Timor shared stocks and bilateral fisheries relationship*

The shared fisheries of East Timor and Australia are little studied but some stocks are certain to be shared across the common border.

# Chapter 3

## The regional fisheries picture

Despite Southeast Asia's long and rich history astride the cultural and trade routes of Asia, nothing has prepared the region for the economic and population explosion of the last century, least of all in the fisheries sectors. The rush to exploit and trade fish has culminated in countries reaching and overreaching the limits of sustainable catch from their large fish stocks. In the process, however, several Southeast Asian countries have become world-rated fish producers and traders.

This section describes regional fish supply, demand trends and the plethora of institutional arrangements, at the regional and international levels, that have been created to address regional fisheries.[38]

### Regional trends and outlook for fish supply and demand

Southeast Asia was the historical crossroads for maritime trade and cultural interchange between China and the economies and civilisations to the west, including those of South Asia, the Muslim Middle East and Europe.[39] However, the historic role of fishing in the economies of the region has been little studied.[40] From the start of human habitation in the region some 100,000 years ago, fish no doubt provided important food and livelihoods for many of the island and coastal people as well

as those living along the great rivers, deltas and lakes. Trade in fish also has a long history that, until recent decades, depended on salted and dried fish.[41]

In historical times, however, fish was not eaten in great quantities by the relatively small populations in the region. Historical observations described fish as a condiment, used in small quantities on rice and soy products, not a major source of protein.[42] In the last 50 years, regional fisheries development has exploded, driven by fast-growing populations (more mouths and more fishers), the adoption of modern fishing and aquaculture technologies and their geographic expansion, burgeoning domestic and international markets, greater local consumption, flexible and rapidly adapting fish-supply chains and investments in fish-processing.

The huge growth in contemporary fisheries and aquaculture and the extent of the changes driving this explosion are dramatic in scale.[43] The latest Southeast Asian fisheries expansions occurred in two phases. The first, from the 1950s to the 1970s, was termed the 'great fish race'; the second, from the 1970s to the present, is typified as the period of the 'closing of the frontiers', in which most remaining fish stocks have been and are being exploited by more fishers and new technologies. [44]

Similar changes are occurring or have occurred globally. The current worldwide transition in fish-related matters (fish stocks, fishing techniques, fish processing etc.) entails a shift in the mid-1980s from the dominance of developed to developing country production, a shift to aquaculture, greater trade and higher fish prices, and the imperative to find better ways to manage fisheries.[45] With respect to the exploitation of natural fish stocks, policy makers have to change their focus from simply how to find more fish to making the most of the available fish. Southeast Asia is in the thick of these changes.

Southeast Asia is complex in every dimension of fisheries — biophysically, culturally, economically and politically. It is composed of large countries, such as Indonesia and the Philippines that are archipelagos and others, such as Thailand, Vietnam, Malaysia and Burma, with long, productive coasts and river deltas. In addition, the region includes physically small countries with little coastal space or





ocean territory, namely Singapore, Brunei Darussalam, East Timor and Cambodia, although this last country has major inland fisheries associated with the Mekong River system. Papua New Guinea is also included in the present study given its location in the region and connections to Australia.

Southeast Asia's marine fish stocks directly support approximately 10 million people as fishers, roughly the same number again in support industries plus, indirectly, the families of these workers. Thus, nearly 100 million people may be directly dependent on the fish stocks of Southeast Asia.

In Southeast Asia, as in other parts of Asia and Africa, the automatic link is often made between poverty and the status of small fisheries — in terms of the health of the resource and the profitability of the enterprises exploiting it. However, as Bene[46] pointed out, it is people's access to fisheries resources, rather than the nature and status of the resources themselves that are the more important determinants of wealth and poverty in the fisheries sector. Small-scale fishers seem to do poorly whereas many larger operators will prosper, even when the resource is badly depleted, as will be revealed in several of the country cases below.

What are the future needs for fish in Southeast Asia and how are they likely to be met? What impact will the outlook have on poor consumers and fishers in the region? These questions were the subject of a major Asian regional project completed in 2005.[47]

Using 2005 as a baseline, national fish supply and consumption was projected to 2020 for each of nine countries in East Asia (China), Southeast Asia (Indonesia, Malaysia, the Philippines, Thailand, Vietnam) and South Asia (Bangladesh, India, Sri Lanka) on the basis of supply and demand trends disaggregated by rural and urban patterns (Table 3.1). In fish trade, by 2020, the projections indicate that Southeast Asia will decline in relative importance against East Asia (China) and South Asia (Bangladesh and India). In 2005 (estimated), Southeast Asia's fish exports were 52 % of the total of the nine Asian countries studied; by 2020, this is expected to drop to 37 % due to the growth in China and South Asia.[48]

**Table 3.1: Aggregate country production and consumption projections for nine Asian countries, 2005-2020**

| | Annual Growth in Total Fish Production (%) 2005-2020 | Aquaculture Share Baseline 2005 (%) | Aquaculture Share (%) 2020 | Annual Growth (%) in Total Consumption (2005-2020) | Annual Growth (%) Export Volume (2005-2020) | Annual Growth (%) Import Volume (2005-2020) |
|---|---|---|---|---|---|---|
| ***East Asia*** | | | | | | |
| China | 3.29 | 54.26 | 73.19 | 2.53 | 2.92 | 1.82 |
| ***Southeast Asia*** | | | | | | |
| Indonesia | 0.88 | 12.50 | 14.74 | 1.05 | 0.64 | 1.44 |
| Malaysia | 1.49 | 9.55 | 16.67 | 9.95 | (2.67) | 15.72 |
| Philippines | 0.10 | 17.23 | 24.85 | 0.50 | 0.24 | (3.85) |
| Thailand | 1.75 | 25.96 | 41.25 | 1.83 | 1.91 | 3.40 |
| Vietnam | 2.03 | 36.66 | 36.67 | 1.73 | 2.23 | N/A |
| ***South Asia*** | | | | | | |
| Bangladesh | 1.36 | 60.18 | 78.10 | 0.22 | 8.69 | N/A |
| India | 3.10 | 51.98 | 61.44 | 2.47 | 3.69 | 0.94 |
| Sri Lanka | 3.57 | 2.0 | 5.63 | 3.91 | 4.69 | 7.32 |

*Source:* WorldFish Center 2005, extracts from Tables 8.4, 8.5 and 8.6.





In Southeast Asia, Vietnam is predicted to achieve the greatest production growth, largely from aquaculture. However, none of the Southeast Asian countries matches China, India and Sri Lanka for predicted overall growth.

The future supply and demand for fish in Southeast Asia also was recently studied as part of global economic modelling for fish and other foods — *Fish to 2020*. The authors of the study concluded that:

> Most of the world's per capita consumption growth will occur in East and Southeast Asia.[49]

In *Fish to 2020,* six global scenarios were developed in order to model the supply and demand for fish to the year 2020. Past production and supply-and-demand parameters for different types of fish were applied from other regional studies, plus human population projections. Briefly, the scenarios were: baseline (most likely), with aquaculture expansion exceeding current rates of growth, China's fish projections lowered over current trends, technological and farm management improvements allowing greater fish efficiency in the use of fishmeal and fish oil in fish feeds, slower than baseline aquaculture growth and with a slow collapse of natural fish stocks (i.e., 1% per year decline, termed ecological collapse).

Under the baseline scenario, the price of fish continues to rise to 2020, whereas the prices of meat, eggs and milk continue to decline. The worst scenario — ecological collapse — assumed a 1% per year decline for capture fisheries, marine and inland and including fishmeal and fish oil. Under this scenario, the prices for all fish types and all animal products, except for milk, rise. Also, the expected positive performance of aquaculture cannot overcome the loss from capture fisheries and so Southeast Asia would end up with a total production just above its 1997 figure (Table 4).[50] What happens to the sustainability of natural fish stocks in the region is therefore critical to the whole fish outlook and aquaculture cannot be counted on to make up the whole difference.

**Table 3.2: Southeast Asian food fish production projections to 2020 (million metric tonnes)**

| | Actual 1997 | Most likely (baseline) | Faster aqua-culture expansion | Lower China production | Fishmeal and fish oil efficiency | Slower aqua-culture expansion | Ecological collapse |
|---|---|---|---|---|---|---|---|
| Southeast Asia | 12.6 | 17.5 | 19.5 | 17.5 | 17.6 | 16.2 | 13.5 |

*Source:* Extracted from Table 4.5, p 59 *Fish to 2020.*

## Regional fisheries institutions

In fisheries management and conservation, no country can 'go it alone'. Southeast Asian countries have taken note of and have established themselves in many international and regional fisheries arrangements. Australia is also a very active contributor to many of the regional bodies and has taken a lead in signing and ratifying many international agreements. By promoting regional stability and cooperation (one of the four key themes for the Australian aid program[51]), Australia can continue an active role.

### *The global level*

The two most relevant international agreements are the 1982 United Nations Convention on the Law of the Sea (UNCLOS) and the 1995 United Nations Agreement for the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (or, for short, the United Nations Fish Stocks Agreement — UNFSA). Australia has signed and ratified both agreements; all Southeast Asian countries have





signed and ratified UNCLOS except Thailand (which has not ratified), and Cambodia and East Timor (which have not signed, see Annexure). By contrast, only Australia and Papua New Guinea have signed and ratified UNFSA; Indonesia and the Philippines have signed but not yet ratified it. The other Southeast Asian countries have not signed UNFSA. UNFSA is important for the management of tunas (highly migratory fish stocks) and for management of stocks that straddle international waters and the waters of one or more countries.

Targets for fisheries conservation featured prominently in the Plan of Implementation from the 2002 World Summit for Sustainable Development (WSSD)[52] signed by all countries of the region. For example, the primary fisheries commitment, and one very difficult to achieve, is Article 30(a) that states:

> Maintain or restore stocks to levels that can produce the maximum sustainable yield with the aim of achieving these goals for depleted stocks on an urgent basis and where possible not later than 2015.

### *The regional level — including Australia*

Australia and all the Southeast Asian countries are members of the United Nations Food and Agricultural Organization (FAO) and its regional fisheries council — the Asia-Pacific Fisheries Council (APFIC) — that, in recent years, has been revitalised to provide a strong platform for technical assessment and review. APFIC's 2004 and 2006 Council meetings highlighted the parlous state of the region's fisheries. The 2006 Council meeting, composed of national fisheries managers, agreed to reduce fishing capacity and especially the capacity to catch the small fish that comprise 'trash' fish and bycatch by trawlers and inshore push-nets, and to channel more of the small fish caught directly to the human food chain instead of to fish and animal feeds.[53] This agreement, however, is non-binding. The 2006 Council meeting also stressed the importance of involving fisheries stakeholders in the management of fisheries, and cooperation in improving access to the fish markets.

Regional inter-governmental coalitions for economic cooperation also take an interest in fisheries and marine resources. Australia is a founding and active member of the countries for Asia-Pacific Economic Cooperation (APEC) that hosts a Fisheries Working Group and a Marine Resource Working Group. Supported by these two working groups, APEC has held two Ocean Related Ministerial meetings (2002 and 2005), the second of which released the Bali Plan of Action. Among the comprehensive, but generalised, undertakings of the Plan of Action, is that APEC will increase the number of its members that 'ratify or adhere to' the international and regional fisheries arrangements, such as UNFSA.

One important type of fisheries arrangement is the regional fisheries management organisation (RFMO). Globally, a rational but still incomplete set of RFMOs has been established to help manage shared fish stocks and highly migratory species.[54] However, Southeast Asia is not covered by many RFMOs, which perhaps reflects the possibility that these countries prefer to manage their fisheries on a national basis, subject to first settling maritime boundaries — a work still in progress on some borders.[55] In addition, the extent to which fish stocks are shared across national boundaries is not well understood. In Southeast Asia, few scientific studies have been conducted to determine the relatedness of fish stocks across national boundaries.

Three RFMOs that deal with highly migratory species, especially tuna (Box 2), are particularly relevant to Australia and Southeast Asian countries (see Annexure), namely the Indian Ocean Tuna Commission (IOTC), the Commission for the Conservation of Southern Bluefin Tuna (CCSBT) and the Western and Central Pacific Fisheries Commission (WCPFC). Despite being a key fishing and trans-shipment country for the Indian and Pacific Oceans, Indonesia is little involved in the relevant RFMOs, being a cooperating non-member for the IOTC, a signatory (yet to ratify) to the WCPFC and of uncertain status for CCSBT. As a fish trans-shipment country, Indonesia would also be a relevant signatory to the Convention on the Conservation of Antarctic Marine Living Resources, which deals with fisheries and other living marine resources in the Southern Ocean.





**Box 2 – Tuna**

Tuna, including its higher-value species such as the southern bluefin tuna (SBT), is a very important fishing resource in the region. Tuna fishing is the main commercial fishing industry in the South Pacific, and the South Pacific accounts for almost two-thirds of the global tuna catch. Yet, global tuna catches have remained relatively stable since 1998, with the SBT population showing the greatest signs of effects from overfishing. Tuna fishing in the Pacific is currently dominated by foreign fishing interests, and the Pacific island countries earn fees from providing access to the stocks. Pacific island countries are becoming more active in industrial scale tuna fishing, see for example, the Papua New Guinea section below, and policy makers are considering how to encourage greater local consumption of tuna to compensate for declining availability of reef fish, the mainstay of many rural island diets, and to replace imported foods, such as canned salted beef, in urban diets.

In the western and central Pacific Ocean, Philippine and Indonesian fleets exploit tuna in their own EEZs, in the EEZs of neighbouring countries and in international waters. The Philippines and Thailand are major processors of tuna from the Pacific. The tuna catch data and data-collection systems of Indonesia and the Philippines are presently inadequate. With Australian assistance,[56] the WCPFC is gathering data and helping the two countries to establish more rigorous tuna data-gathering systems and to bring them to a suitable standard for use in tuna resource assessment and management.[57] Indonesia is being assisted to develop port-based tuna data-collection systems at the main industrial landing ports on Java and Bali and artisanal ports in Sumatra, Java, Bali, Flores and West Timor.[58]

In the central and western Pacific, Australia has a dual interest in the sustainable management of tuna and other highly migratory species

such as marlin and sailfish. One interest concerns Australia's own industries, commercial and recreational, based on the stocks, and the other is for their use by Pacific island countries. The northeast coast of Australia shares certain resources, especially marlin and other billfish, with the Pacific, and, more importantly, the tuna fisheries are vital to the economies of the Pacific Island countries.[59] To help the countries realise the value of these oceanic fisheries, Australia through its aid to the Pacific, has provided a constant stream of financial and technical support for the regional fisheries programs and bodies such as the Secretariat for the Pacific Community and the Forum Fisheries Agency. In addition, Australian fisheries experts have been active in regional fisheries policy, management, and scientific and technical forums, including those dealing with compliance. After concerted regional actions dating back to the mid-1970s, the WCPFC has been established to implement the arrangements of the 2002 Convention for the Conservation of Highly Migratory Fish Stocks in the western and central Pacific Ocean. Australia has been a major driver in every stage of the technical and policy developments.

On fish trade and aquaculture, Australia is an active government member of the Network of Aquaculture Centers in Asia (NACA), a body that, among other activities, monitors the status of pathogens in fisheries products in aquaculture and has developed new guidelines for more environmentally friendly prawn culture. Australia and the larger Southeast Asian countries are active in global and regional work of the Office International des Epizooties (OIE or the World Organization for Animal Health) and in the global food standards body, Codex Alimentarius (see Annexure).

### *The regional level — excluding Australia*

The Association of Southeast Asian Nations (ASEAN) addresses fish and fishing issues such as trade, marine science and fisheries management. The fisheries products sector is targeted for economic integration through intra-regional free trade. ASEAN's 'Roadmap for Fisheries Integration' aims to:





- Strengthen regional integration through liberalisation and facilitation measures in the area of trade in goods, services and investments; and

- Promote private sector participation.[60]

The roadmap includes provisions on tariff elimination, improvement of rules of origin and measures to improve the transport of fish products across borders. This was agreed at the January 2007 ASEAN meeting and drew protests from Philippine non-government organisations because the free trade provisions are not matched with measures to protect over-exploited fish stocks.[61]

In recent years, ASEAN has linked with the South East Asian Fisheries Regional Development Center (SEAFDEC), a regional, intergovernmental technical agency originally established by Japan and Southeast Asian countries in 1967. Japan is a member of SEAFDEC. ASEAN and SEAFDEC established a Fisheries Consultative Group that developed a strategic partnership. In April 2006, after the eighth annual meeting of the Fisheries Consultative Group, SEAFDEC endorsed the strategic partnership. The ASEAN Sectoral Working Group on Fisheries has also now included SEAFDEC participation, commencing from its June 2007 meeting.

For countries such as Australia, ASEAN and SEAFDEC present entry points for economic, technical and development assistance cooperation. ASEAN plus SEAFDEC has also been suggested as a suitable platform for building a fisheries regulatory regime that would assume regional powers over fisheries even within national waters.[62] Given the strong drive of national sovereignty, the predominance of fishing in national waters, despite the quantum of transboundary fishing, this suggestion is unlikely to be taken up.

Australian organisations seeking to engage on technical fronts, including the Australian Center for International Agricultural Research (ACIAR), have supported projects at SEAFDEC. Australia's aid agency, AusAID (and its predecessor AIDAB) have supported technical projects through ASEAN and continue to do so.[63] From 1986

to 1994, a major science cooperation program, the ASEAN-Australia Living Coastal Resources program, led by the Australian Institute of Marine Science and cooperating with other Australian agencies and those in Indonesia, Malaysia, the Philippines, Singapore and Thailand, developed and promulgated, through manuals, training courses and assessments, important coral reef, mangrove and seagrass survey methods. As regional and global concern grew about the degradation of these tropical marine resources and habitats, the core Australian and Southeast Asian members of this project became the nuclei of global survey and status assessment programs for each habitat —coral reefs, mangroves and seagrasses.[64]

Other non-Southeast Asian countries are also interested in the fisheries of Southeast Asia and engage with the Southeast Asian countries in several ways. Three Asian fisheries powerhouses merit mention — Japan, China and Taiwan. Japan has historically fished in the region[65] and has long held strong economic and political interests in the region that play out through fisheries. It has had a direct role in fish and fishing, seeking access for its own fishing vessels, and, more recently, in securing access to the required high-quality fish for its large and discerning market. China and Taiwan both have strong regional fisheries connections, in many ways parallel to those of Japan although their markets differ. In some products, China is also a fish trade competitor for Southeast Asian countries.

Australia is one of the few countries in the world to have a comprehensive oceans policy. Since the early 1990s, East Asian regional efforts on integrated coastal management have grown. Although Australia has had no formal role, Australian experts have been very influential, drawing on Australia's own experience at home and in the region. In 2003, all the Southeast Asian countries joined other East Asian countries and agreed on a *Sustainable Development Strategy for the Seas of East Asia.*[66] Fisheries are included in this strategy but, unfortunately, fisheries ministries are not active in integrated coastal management. A further task for fisheries agencies in Southeast Asia will be to become more active in the policy and planning fora for ocean and coastal management.





The above outline of regional institutions concerned with fisheries matters, and Australia's roles in them indicates a high level of activity. What more needs to be done or what needs to be done differently? Certainly, there is already a surplus of regional and global oversight bodies with overlapping mandates and incomplete memberships, adding more regional bodies to this would not be advisable. The short answer is that Australia needs to develop a comprehensive strategy to guide its considerable regional fisheries contributions. A strategy and overarching plan of action involving all relevant government agencies at Commonwealth and State/Territory level would form the framework for fisheries relations. Such a strategy would need to be well-informed by the current position and outlook for fisheries in each country.

# Chapter 4

## Indonesia

The Australian-Indonesian bilateral relationship with respect to fish and fishing is the most important in Southeast Asia for Australia. Australia has consequently devoted the most attention to this relationship because it encompasses all four key international connections over fish: illegal fishing, managing shared fish stocks; tuna; and fish trade. Despite considerable friction over illegal fishing incursions, fishing matters do not appear to have deeply affected the overall Australian-Indonesian diplomatic relationship. Fishing does figure highly in the bilateral relationship, however, and is included in the 2006 *Agreement between the Republic of Indonesia and Australia on the Framework for Security Cooperation*.[67] Given the importance of the Indonesian relationship overall to Australia and its fishing component in particular, it is important that Australia is well informed on Indonesian fishing and its outlook.

Indonesia is the largest of the Southeast Asian countries — in geographic size, size of its exclusive economic zone, human population, gross domestic product, number of fishers and in fish production, including marine capture fisheries production.

Indonesia's total fisheries production is still expanding but, simultaneously, many parts of the resource are overexploited and in

decline, especially those fishing areas where fishing intensified first, such as the Java Sea and Malacca Straits. The Java Sea is the most important and heavily fished area of Indonesia. It yields about one-third of Indonesia's marine fisheries production[68] and is adjacent to the most dense population concentration in Indonesia. Java has historically been the centre for the Indonesian fish trade.[69] The number of fishers is still increasing, and with more modern equipment and techniques, it is now possible for them to fish in new areas, at new depths and stay longer at sea. Often, fishing encroaches illegally into the wrong zones of local fisheries and into neighbouring country waters. A significant legal and semi-legal ingress of fleets from foreign countries such as China, the Philippines and Thailand are also taking their toll. The overflow of more vessels and different types of fishing vessels from Indonesia into Australian waters is a symptom of these developments. Indonesian fishers are also major exploiters, although to an uncertain extent, of the valuable tuna fisheries of the Indian and Pacific Oceans, most notably of southern bluefin tuna. Southern bluefin tuna spawn in the Indian Ocean south of Java and off the northwest shelf of Australia.

## Size and scope of the fisheries sector

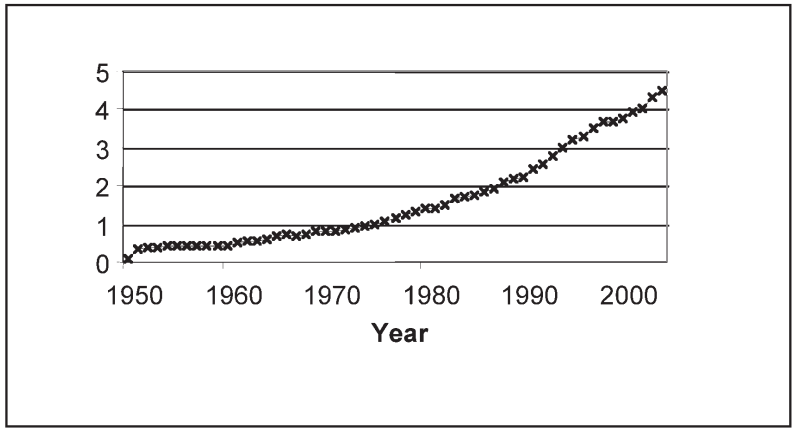
Indonesia is one of the world's foremost fishing nations. In 2004, Indonesian fisheries and aquaculture produced 5.9 million metric tonnes of fish and other aquatic products (excluding marine mammals, reptiles and aquatic plants), the fourth largest production of any country, after China, Peru and India (47.5, 9.4 and 6.1 million metric tonnes, respectively). In capture fisheries, Indonesia was the fifth largest producer and, in aquaculture, the sixth largest. Aquaculture supplied 18 % of fisheries and aquaculture production.

Production from marine capture fisheries, the dominant sub-sector in Indonesia, continues to increase, due to the growing intensification of fishing across the country, especially to the east (Figure 4.1).





**Figure 4.1: Marine capture fisheries production in Indonesia, 1950-2004 (millions of metric tonnes)**




*Source: FAO fisheries statistics accessed August 2006.*

In 2001, by value, Indonesia was the eleventh largest exporter of aquatic products in the world and had a positive balance of payments on fisheries trade, exporting US$1.6 billion and importing US$95 million. Prawns and tuna are the main exports; Japan takes more than half of all exports. Australia and Indonesia are minor fish trade partners. In 2004-05, Australia imported fish valued at nearly A$38 million from Indonesia and exported A$2.5 million to Indonesia (Table 3.1).

In 2002, 5.7 million Indonesians, out of the total population of about 220 million people, were directly engaged in fishing and aquaculture,[70] of whom 60 % were working in the capture fisheries sector and the remainder in aquaculture. The number of fishers continues to grow, having increased 9 % from 2000 to 2002. Accurate estimates of the numbers of fishers are difficult to make because many are part-time and occasional fishers and their proportions vary geographically.[71] Fishing from the islands of Java, Sumatra and Bali is dominated by full-time fishers but Kalimantan, Sulawesi and the islands and provinces in eastern Indonesia have proportionally more part-time and occasional

fishers.[72] Of those fishing part time as a major occupation, most also work in agriculture and traditional fish processing.[73] A survey of fishing households indicated that the average marine fishing household would be ranked among the poorer households. In Java, these households would, on average, be poorer than rice farming and freshwater fish farming households.[74]

In 1998, the Indonesian fishing fleet consisted of 412,700 vessels, of which over 90 % were small-scale units, and 50 % lacked motors.[75] The numbers of small vessels with outboard and inboard motors is increasing rapidly and the number of large vessels, that is those of more than 100 metric tonnes, rose from about 500 in the early 1990s to over 1000 in 2000.[76] About 10 % of fishing households did not possess a vessel. No estimates are available for employment in the fishing support sectors.[77]

According to cost-benefit studies on the major vessel and gear types used in northern Java fisheries, all vessels types are still profitable,[78] despite the fact that the Java fisheries suffer from the 'tragedy of the commons' wherein stocks are biologically overexploited and fished by more vessels than are needed to catch the fish in an economically efficient manner. In common with other Southeast Asian countries where fishing labour is abundant and relatively low cost and industrial-scale gear relatively expensive, Indonesian fishing enterprises are mainly small scale and labour intensive but have gradually incorporated more and more mechanisation. Larger vessels will usually be owned by onshore businessmen and companies and operated by a captain, engineer and crew. Many fishing trips are daily events, especially for the smaller vessels, but larger purse seines and prawn trawlers with freezer capacity may be at sea for up to a month.[79]

In terms of fishing intensity, the waters around the provinces and land masses of Indonesia have been classified as follows:[80]

1. Heavily populated and high fishing intensity of all categories, modern and traditional — East Java.
2. Heavily populated, modernised fisheries — West Java.
3. Provinces with mainly full-time fishers deploying a variety of motorised and passive or set fishing equipment — Riau and North Sumatera.
4. Provinces with medium fisheries intensity, predominantly part-time fishers, non-motorised vessels — East Kalimantan, Sulawesi, eastern part of Nusa Tenggara.
5. Vast provinces with mainly part-time and occasional traditional fishers —Maluku and Papua.
6. Provinces with relatively little fishing activity — Aceh, other provinces of Sumatera, other provinces of Kalimantan, Yogyakarta, Bali, western part of Nusa Tenggara.





The evolution of modern fishing methods in Indonesia has one feature that distinguishes it from that of the other Southeast Asian countries, namely the prohibition, in large areas, on bottom-trawling technology. In the late 1960s, trawling developed rapidly after its introduction in response to international demand for prawns (shrimp).[81] During the 1970s, scientific surveys of bottom-dwelling ('demersal') fish resources of the Java Sea indicated that the resources were declining and that the fisheries conflicted with the small more traditional fishing fleets. Consequently, in 1980, using a Presidential Decree, the Indonesian Government banned trawling, except in the Arafura Sea. In the early 1980s, scientific surveys indicated that demersal resources were recovering but, as the other fleets modified their fishing practices to target the demersal resources, resource abundance began to decline again after the mid-1980s.[82]

Indonesians consume only a moderate amount of fish by Southeast Asian standards. Domestic fish consumption is encouraged by the government and increased from 19 kg per person per year in 1999 to 25 kg per person in 2003.[83] Model projections of fish supply and demand for Indonesia from 2005 to 2020 provided the following summary results:

- Growth in fish production will be led by growth in aquaculture, especially in marine aquaculture
- Demand is rising faster than supply in most categories of fish, but fish prices are below the inflation rate, so fish is projected

to become more affordable, largely due to imports. Imports will grow faster than exports
- In a scenario in which fuel use is reduced by 10%, production of some marine fish such as tuna is reduced but not the production of many other species which are now fully or overexploited
- Export growth will increase if export prices grow faster than at present; but
- Per person consumption is likely to decline in future.

## Fisheries resources shared by Indonesia and Australia

The EEZs of Australia and Indonesia share a long, common maritime boundary but their major land masses are separated by hundreds of kilometres of sea except across the Torres Strait and near West Timor. Since many marine species are associated with near shore habitats, and since the oceanographic and ocean floor (geological) conditions in the boundary area appear to provide conditions for separation of fish species, the extent to which Australia and Indonesia share fish stocks may be less than indicated by the long shared boundary. Many of the types of plants and animals of the Indonesian-Australian region are separated biologically by Wallace's line, between Bali and Lombok, and Lydekker's line between Australia and the island of Timor. These and similar lines separate many species and stocks of species on the land, and, as new studies have revealed, in the sea. In general, however, very few studies have addressed the extent to which Australia and Indonesia share fish stocks.[84]

An overview of the current knowledge of the likely extent to which stocks of fish species groups are shared between Australia and Indonesia is provided below.

### *Oceanic tuna and billfish species, including SBT, skipjack, yellowfin and bigeye, marlin species, swordfish, sailfish*

All stocks are considered highly migratory and straddling, that is the fish are capable of swimming across national maritime borders and also into international seas. Scientific advice is reviewed through





the scientific review processes of the three tuna commissions — the CCSBT, IOTC and the WCPFC.

The most valuable fish stock shared by Australia, Indonesia and other countries is the southern bluefin tuna (SBT), which forms a single stock about Australia and the Southern Ocean.[85] Indonesian fishing of the badly depleted SBT stock is unregulated and a cause of great concern to Australia and the other countries of the CCSBT (Commission for the Conservation of Southern Bluefish Tuna). Indonesia has between 1100 and 1500 industrial-scale longline vessels fishing in the Indian Ocean, catching large quantities of SBT, including from the only spawning ground for this species in the northeast Indian Ocean.[86] CCSBT estimates are that Indonesia has caught between 500 and 2,500 metric tonnes of SBT each year for the last 12 years, and members are eager to have Indonesia take a more active part in the Commission that agrees on overall catch quotas for the stock.[87] Indonesia is not yet a member of CCSBT, is only a cooperating non-member of IOTC and has signed but not ratified the convention necessary to become a member of the WCPFC (see Annexure).

Australia is assisting all three regional tuna commissions to improve the state of knowledge. Two current Australian partnership studies with Indonesia and the Philippines are addressing illegal fishing and Indonesia tuna fishing, respectively.[88]

### *Sharks and rays*

Sharks and rays are readily overexploited fish and fishing for them has accelerated in recent years in response to the greater demand for the high-priced sharks' fins and for meat. Even the number of species remains unknown and biological information is almost totally lacking. Australian and Indonesian scientists are compiling all available information on the hundreds of species of sharks and rays, and data on fishing catches and effort for the Java and Arafura seas. The main studies, which concluded at the end of 2006 and are now being written up, have already helped Indonesia develop a National Plan of Action on Shark and Ray fisheries, based on the FAO International Plan of Action on Shark and Ray Fisheries;

produced a bilingual field guide to species, and examined the genetic structure of stocks of the most important species to help identify the extent to which different stocks of the species may be shared between the countries.[89]

### *Snappers*

Snappers are high value food fish and hence sought after by fishers. A joint Australian-Indonesian study, funded by ACIAR and led by CSIRO, considered all available, although sparse, data on three key species of snapper — two red snappers, and the deeper-water, gold-banded snapper — about the border areas of the Arafura Sea and the Sahul Shelf of the Timor Sea, as well as sites inside Indonesia. Based on genetic information, each red snapper species in the Arafura Sea appears to form a single species stock; the gold-banded snapper forms at least six separate genetic stocks and research indicates little sharing between Australian and Indonesian stocks.[90]

## Status of fisheries resources

On the best available information, the resources of Indonesian marine fisheries are close to fully exploited, and a significant number in all waters are overexploited. Since the number of fishers, vessels and the intensity of fishing continue to increase, all resources are expected to be fully exploited and overexploited within a decade. The current exploitation state has been reached rapidly over the last decade, but is the culmination of the spread of more intense fishing by Indonesian fishers and those from Japan, Thailand and the Philippines over the last century.[91]

Indonesia has prepared periodic national assessments using available current and historic data;[92] over the last three decades and several one-off reviews have also been conducted.[93] As a way-point, the 1995 overall assessment of the extent of exploitation of the main fisheries in Indonesia estimated that, except for the prawn (shrimp) and coral reef fishes, other groups could sustain greater exploitation.[94] Since then, the total Indonesian marine capture fisheries production has increased by nearly one million metric tonnes and therefore many of these resources





will have reached or gone beyond their sustainable potential. More recent national assessments verify this conclusion.

More recently, a scenario-based assessment and review of fishery-by-fishery information found that 65 % of Indonesia's 'understood' fisheries, i.e., those for which an assessment is available, were over-exploited, 21 % were fully exploited and only 12 % were underexploited. Overall, the study concluded, Indonesia is approaching the limits of its fisheries growth at the national level and in each of the regions not yet fully exploited. More benefit could be obtained by better managing and restoring fully and overexploited fisheries than in expanding the remaining under-exploited fisheries.[95]

In all these assessments, the areas and resources that have been intensively fished for the longest period of time, such as the inshore, shallow water, demersal fisheries resources of the Java Sea and the Malacca Straits abutting Malaysian waters, are already depleted. In the Java Sea, Silvestre et al[96] noted a fall of 40.9 % in the biomass per square kilometre of demersal fish species between 1977 and 1998. Another assessment for the Java Sea revealed that the inshore coastal resources were already overexploited but that offshore resources may be able to withstand more exploitation.[97]

Fishing for small pelagic stocks of the Java Sea has a long history, starting with traditional fishing gears, then motorised purse seiners before independence and accelerating with the introduction of the larger purse seiners in the 1970s. The intensity of fishing on the small pelagic species increased in the 1970s and 1980s, and the areas being fished expanded eastwards into the Makassar Straits and also northwards into the South China Sea.[98] Fish catch per unit of fishing effort — considered as an indicator of fish resource abundance — fluctuates from year to year, as is typical for fisheries of small, fast-growing fish in a fluctuating environment. However, the average catch rates tended to be in decline by the mid-1990s,[99] despite increasing application of better technology and increased fishing experience. The fact that the total Indonesian catches of small pelagic fish are still increasing suggests that fishers are working further afield so as to maintain the total catch.

Few field surveys or assessments have been conducted on fisheries resources remote from the main population centres, especially those of eastern Indonesia which are closer to Australia. However, even from the limited data it is clear that many of these fisheries resources are overfished. For example, in the Indonesian part of the Arafura Sea, seven resources have been assessed as overexploited, three as fully exploited and one as under-exploited.[100]

## The Indonesian marine environment and policy successes

Direct overfishing of fish stocks is usually the primary cause of their decline. However, a healthy marine environment is also important as many fish species spend all or part of their lives, for example their juvenile stages, living in or near coral reefs, mangrove forests or seagrass meadows. Marine pollution can also damage the fragile early life stages of fish and, if sufficiently severe, kill adult fish.

Marine environments that support fish resources are most degraded if near large cities and centres of economic development, including mining projects. Natural disasters such as tsunamis, earthquakes and volcanoes also take their toll on the marine environment and fisheries. Fisheries habitats in less populous and developed areas, especially in the east, are less affected by land-based human activities.

In a positive step, marine resource management efforts in the more remote provinces are increasingly targeting the marine environment and its conservation rather than simply fisheries resources alone. Indonesia is home to the largest extent of coral reefs in Southeast Asia. Estimated at 51,020 sq km, this is more than twice the extent of the next country, the Philippines.[101] Against the Southeast Asian trend of declining health of coral reefs over the decade 1994 to 2004, Indonesia was the only country to show a positive trend in measures of coral reef health, such as the amount of living hard coral cover. On the negative side, and in common with most of Southeast Asia, in terms of coral reef management, marine-protected areas cover little of the reef area (9%) and, of the 29 declared marine-protected areas, only one is considered adequately managed.[102]





Coral reef monitoring commenced in 1986 through the AusAID[103]-funded ASEAN-Australia Living Coastal Resources Project. This has stimulated a rapid increase in the national capacity to monitor reefs. For example, between 1994 and 2004 the number of permanent monitoring sites increased from 340 to 538. Monitoring has been coordinated by a major national project, COREMAP (Coral Reef Rehabilitation and Management Program), conducted through government agencies, universities and non-government organisations, and funded by the Government of Indonesia, the World Bank, the Global Environmental Facility and other donors, such as AusAID, through complementary projects. COREMAP is designed to proceed through three phases. Phase I commenced in 1998, followed by phase II in 2004. The project aims to reverse destructive fishing practices, introduce community-based management and develop alternative livelihoods through an integrated and reinforcing system of legal, policy, economic and social initiatives.[104]

In Indonesia, COREMAP and other projects by international conservation groups such as WWF and Conservation International are giving priority to education and action programs to counter destructive fishing such as dynamite fishing for food fish, in other words exploding dynamite underwater to stun and capture fish for human food and cyanide fishing for food fish and for aquarium fish.[105] These conservation programs sometimes also target certification and eco-labelling for fisheries, including aquarium fish.

Indonesia contains the world's largest area of mangrove forests, distributed along the coasts of all the main islands.[106] Since 1950 estimates for the area of mangrove coverage have varied widely, but recent analysis of the many estimates has concluded that just over one-third of the mangrove area of 1980 had been lost by 2000.[107] Mangroves are removed for many reasons, and the current public perception is that prawn farming is the major culprit. However, a review of studies of coastal habitat conversion for aquaculture concluded that only about 5% of Indonesia's original mangrove area had been converted for prawn farming.[108]

Tropical seagrasses, often found near coral reefs and mangroves, provide highly productive habitat for marine fish, crustaceans,

molluscs and other marine organisms. Indonesia is estimated to have at least 30,000 square kilometres of seagrasses, among the largest area recorded for any country, although even this figure is almost certainly an underestimate.[109] As is the case for coral and mangrove species, Indonesia is among those countries with the greatest diversity of seagrass species.[110] Unlike coral reefs and mangroves, however, seagrass beds are neither protected areas nor the target of special conservation efforts despite the fact that this is highly desirable.

## Fish supply chains

Indonesian fish supply chains are as complex and dynamic as its fisheries and respond to both domestic demands and international trade. International trade has been assisted by lower tariffs in the main trading countries, especially Japan and the European Union. However, trade is now more subject to technical barriers, such as food safety standards and sanitary and phytosanitary (SPS) requirements.[111] In 1998, Indonesia released national regulations for implementing HACCP (hazard analysis and critical control point) standards and achieved 'List 1' country status for imports to the European Union (EU). That is, it was rated as a country with standards fully in compliance with those of the EU.[112] Although progress with trade deregulation has been slow, the Government of Indonesia has focused attention on meeting importing-country standards so as to ensure market access.[113]

Indonesia is sensitive to international market actions. In December 2005, the Ministry of Maritime Affairs and Fisheries banned the import of prawns from Thailand, China, India, Vietnam, Brazil and Ecuador, after the United States Government accused these countries of dumping on the market. Market volume information raised suspicions that Indonesia was re-exporting product from the banned countries.[114] Market-based trade instruments such as country of origin labelling and the ability to identify the complete chain of custody for fisheries products could overcome trade access problems such as this.

Worldwide, fish and other food supply chains are being increasingly driven by the ingress of major food-processing companies, retail and food-service chains.[115] Indonesia has major market potential, and domestic, regional and international supermarket and fast food chains are a growing force in the cities and towns of Indonesia. The fish purchasing policies and practices of these corporations will eventually have an impact on the quality and sustainability of fish on domestic markets, just as international markets are leading quality control and processing practices now. Supermarket managers in Indonesia, therefore, are likely to become more knowledgeable about sustainable fisheries, as are their counterparts in the United States, United Kingdom and Europe.

Indonesia is using its new policies on foreign and joint venture fishing to further improve its domestic fish-handling capacity and better capture the value added from its fish harvest by foreigners. In 2006, Ministerial Decree No 17/2006, mandated that foreign fishing firms can operate in Indonesia's EEZ only if they set up fish-processing plants in Indonesia. The latest bilateral agreement between Indonesia and Thailand follows this decree and permits Thai vessels to fish in Indonesia only if they establish fish-processing plants in Indonesia. Future agreements with China and the Philippines will also follow this pattern. Indonesia assessed that its previous bilateral agreements allowing fish caught in Indonesian waters to be directly exported, were to its disadvantage.[116] Making the new decree fully effective will be a challenge as previous measures of a similar nature have been unsuccessful.

## National fisheries policy — policy changes, problems and their solutions

In the last decade, the Indonesian political system has undergone a major transition towards full democracy. All sectors of economic activity and governance have been affected. The fishing sector is being directly targeted through specific changes and is also experiencing the consequences of more general legal changes. This section focuses on four policy issues: the new national government structures and new laws; the impact of decentralisation; the problem of illegal fishing; and Indonesia's engagement in international fisheries arrangements.

### *New Ministry, new laws, problems and solutions to implementation*

Indonesia faces daunting challenges in sustaining its fisheries and fisheries-based economy. In 2000, to better address the challenges, the government created the Ministry of Marine Affairs and Fisheries and, in 2001, moved the fisheries and aquaculture research institute from the agriculture research institute into the Ministry. In 2004, a new Fisheries Law was passed, recognising the new challenges and the major changes in Indonesia over the decades since the last comprehensive fisheries law in 1985, including the far-reaching 1999 law on decentralisation.[117]

Developing the work of the new ministry and implementing the new laws is a major undertaking. How will Indonesia fare? Assessed against the great needs, regional peers judged that Indonesia has sufficient formal laws covering fisheries. Its plans and actions are moderately well formulated and resolution of fisheries resource and social conflicts are being addressed effectively. However law enforcement remains weak.[118] Fisheries support in terms of research and development, extension and training, human resource skills, credit facilities for fishers, access to fisheries inputs (fuel, ice, labour, aquaculture technologies, etc) and markets were assessed as fair on a scale of three — strong, fair or poor. However the administration of fisheries was assessed as poor.[119]

The new Fisheries Law provides legal support to address the administrative shortcomings. Among its provisions, it requires that every operator in the fisheries sector has a licence, called a SIUP, to operate a fisheries business, except for small-scale operators, defined as those whose means of living is catching or breeding fish to 'fulfil his/her daily necessities'.

Of relevance to Australia, the Law stipulates that Indonesian-flagged vessels can fish only in the zones of other countries with the permission of the Indonesian government and, likewise, vessels of other countries can fish in Indonesia waters only if there is a fishing agreement between the Government of Indonesia and the government of the flag country of the vessel.



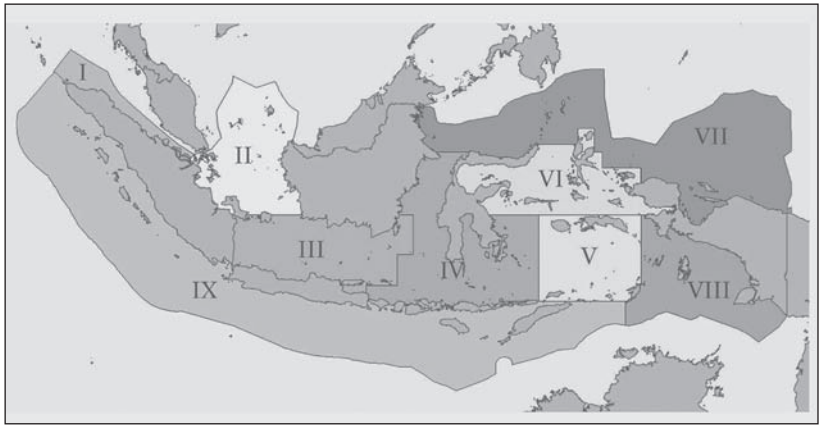


The new fisheries arrangements have been given further implementation opportunities and challenges as a result of the 1999 Regional Administration Law. Under the decentralisation arrangements of the Regional Administration Law, Indonesia's (now) 33 Provincial Governments were given authority for 'exploration, exploitation, conservation and management of the wealth of the sea' within territorial waters.[120] Thus, the national Ministry must also coordinate its work with that of the provincial and district governments.

The new fishing vessel licensing arrangements do not automatically constitute a rigorous and well-enforced fisheries licensing and management system. The 2004 Fisheries Law provided for the establishment of a special central court of fishery affairs, to be set up within two years of the passing of the Law in October 2004. This special fisheries court would, among many requirements, take into account the division of authority between the central and the regional governments. In May 2007, the Indonesian government announced that the court would begin opening regional offices in mid 2007, starting with Batam (Riau, Sumatra province), Pontianak (Kalimantan), Medan (Sumatra), Jakarta (Java) and Tual (Maluku province).[121]

An important aspect of fisheries management is a sound reporting system. Soon after the introduction of the 1999 Regional Administration Law, the new Ministry of Marine Affairs and Fisheries began a process designed to simplify reporting of fisheries data using nine Fisheries Management Zones (Map 2). The nine zones will also form the basis for fisheries ecosystem-based stock assessments, a feature that was not possible when all data were reported separately from each of the provinces. The zoned system also encompasses reporting of catches within the waters of the district government units, that is waters extending to four nautical miles from the coasts.

**Map 2: Indonesian fisheries management zones**




*Source:* Indonesia Ministry of Marine Affairs and Fisheries, Wilayah Pengelolaan Perikanan (Fisheries Management Areas) SK. Menteri Pertanian No. 995/Kpts/IK.210/9/99).

Controlling access to the fisheries in order to control exploitation rates is a further challenge that the licensing arrangements are starting to address. However, fisheries remain effectively open access since the number of licenses is not limited and counterfeit licenses and joint venture agreements may be on the rise. Therefore, no effective controls exist on the amount of fishing effort in any part of the Indonesian EEZ, despite enhanced surveillance and monitoring. Although this is an Indonesian problem, it is also a core issue underlying illegal fishing inside and outside Indonesian waters that contributes to a ready supply of poorly controlled vessels capable of fishing in Australian waters. Tackling the challenge of open access fisheries can, therefore, provide an entry point for overseas engagement.

Open access is a factor in most overfishing problems worldwide and has proven to be one of the most intractable to solve. This is particularly so for developing countries with large populations and many small-scale vessels. Lack of enforceable property rights is at the heart of this problem and rights-based fisheries management systems are critical to its solution.[122] Such systems can be created only if the nature of the





fisheries resource and its supporting ecosystem, the institutional and cultural dimensions of the fisheries and the forms of use rights to the resource are taken into account.

Indonesia has already taken some steps in the direction of creating rights-based management systems, including decentralisation and community-based coastal management approaches. Overseas development partners such as Australia could further assist this essential but lengthy transition by focusing assistance on the development of rights-based systems and more controlled fishing under the new resource management arrangements.

Overall, under the leadership of the new Ministry of Marine Affairs and Fisheries, Indonesia is acting with strong intent to implement the new Fisheries Law. With appropriate sensitivity to Indonesia's priorities, Australian development cooperation could work more closely to help build Indonesian capacity in this area without becoming merely a source of project-based funding. Scientific partnerships and new government-to-government fisheries officials' liaisons are already part of these efforts but more could be done.

### *Making decentralisation work for fisheries*

Most Indonesians and observers welcomed the decentralisation movement in the late 1990s as an important step towards giving greater control to authorities and people in the provinces and districts. However, concern soon surfaced over the impact of the 1999 Regional Administration Law on natural resource management, including fisheries. Conflicts and challenges arose when responsibilities were not clearly demarcated among national, provincial and district governments.[123] Licensing authorities and responsibilities for marine management could be mismatched. Nationally managed waters are those beyond 12 nautical miles from the coast, provincial waters four to 12 nautical miles and district waters within four nautical miles of the coast. A mismatch in responsibilities exists in that district and provincial authorities can licence smaller 'traditional' fishing boats which, along with non-motorised vessels, can fish in all waters, including those managed by the provinces and the national government. Only the

national government can licence vessels greater than 30 gross registered metric tonnes. Such an arrangement creates further licensing loopholes in the fight to control the number of fishing vessels.

Moreover, small and large scale vessels compete despite the zoning system.[124] The zones are not well enforced and their management arrangements have become, on the one hand, more complex with the devolution of management powers to the provinces and district governments but, on the other hand, are being streamlined with the introduction in 1999 of a new system of nine Fisheries Management Zones.

Decrees released after the new Fisheries Law also aim to legitimise community-based coastal resource management, albeit with some further contradictions between local community rights and the rights granted by fishing licences from three levels of government. Views on the new laws vary from optimistic to more cautious.[125]

Australia also has three levels of government and a wealth of experience in natural resource management across the levels. In particular, Australia's experience with the Offshore Constitutional Settlement could offer insights, albeit to a different and more complex coastline, of how management authorities and accountabilities may be approached. Further, Australia's regional marine planning approach, as embraced in Australia's oceans policy, could offer models for ecosystem based approaches across levels of government.[126]

### *Tackling illegal fishing on all fronts*

Despite new fisheries laws, several forms of illegal fishing by foreign and domestic vessels occur. These include fishing by unlicensed vessels with or without forged papers, fishing in contravention of the fishing license permissions — for example, with respect to permitted sizes of vessels, types of gear and fishing areas and under-reporting or misreporting of catch, especially by foreign vessels. Document falsification is reported to be a major problem. More than one vessel may also fish under the same name and licence number.[127]

Indonesian-flagged vessels have been caught fishing illegally in Australian waters and in the waters of other countries in increasing





numbers. Incidents include cross-border fishing in Australian waters, neighbouring Southeast Asian countries and Papua New Guinea and, more distantly, illegally fishing in the waters of South Africa, Mozambique and the Seychelles in the Indian Ocean.[128] In 2004 in PNG waters, Indonesian illegal fishing accounted for 83 % of apprehensions. As a percentage of total catch value, the total IUU (illegal, unreported and unregulated) catch value was estimated as 14 % of the legally reported value. Presumably, Indonesian vessels were responsible for most of this illegal loss.[129]

The Indonesian Ministry of Marine Affairs and Fisheries has mapped key spots for potential conflicts — including illegal fishing — in the Indonesian EEZ, noting the disputed borders at Sipadan and Litigan Islands (near Sabah, Malaysia) and around East Timor, the shared boundaries with Australia (especially the Arafura Sea), Malacca Straits (Malaysia), Nicobar Islands (India) and the maritime boundary around Palau. Internally, the insecure areas of Maluku, Poso (north Suluwesi) and Aceh are also marked.[130]

Illegal fishing by Indonesian vessels in Australian waters has an impact on Australian fish stocks and adds to the cost of Australia's surveillance and justice system. The 'MOU Box' (see Box 2) is one but not the only part of the Australia EEZ attractive to Indonesian fishers. Apprehensions in the Australian EEZ have been increasing and have also been made further east, in the Arafura Sea, Torres Strait and the northern section of the Great Barrier Reef. From January to July 2006, more than 200 vessels had been apprehended — more than twice the number from the same period in 2005. In one two-week special operation from 22 March to 3 April 2006 (Operation Breakwater), the Ministers for Defence and Minister for Fisheries and Forestry announced that 23 vessels had been apprehended, comprising two large Chinese fishing trawlers, 13 Indonesian shark fishing boats and eight 'ice boats' used to supply the fleets.[131] In total, a record 365 boats were apprehended by Australia in 2006, although this record was also due to the enhanced surveillance.[132]

The ingress of large Chinese trawlers is not only a problem for Australia but also for Indonesia where many of these vessels are illegal

or marginally legal, operating under forged licences or joint ventures of dubious legality.[133] In Indonesia, an aerial survey carried out in September and October 2003 by the Indonesian Air Force and the Ministry of Marine Affairs and Fisheries recorded about 1,300 Chinese vessels in the Arafura and Aru seas. These vessels were observed illegally trawling in the more powerful paired configuration of vessels and transhipping fish at sea, that is, transferring the catch from a fishing vessel to another ship, often to avoid on-shore surveillance of the catch.[134]

Many smaller Indonesian vessels now crossing into Australia use Merauke (Papua Province) as a home port. Shark fishing for high value shark fins for the Asian market is also attracting illegal vessels, including the small swift craft called *bodi*, originating from Merauke, Dobo (Aru Island), Saumlaki (Yamdena Island, Tanimbars) and Papela (Rote Island).[135] Several Indonesian fishing vessels and crew were arrested in PNG in July and August 2006 in cross-border incidents.

Indonesian illegal fishing should be seen in the larger context of fisheries developments. The greater activities in the 'MOU Box' appear to be a consequence of the growth in the Indonesian fishing industry, characterised by greater fishing intensity in all areas, larger and more motorised vessels, the spread in geographic range of Indonesian fishing activities and the strong domestic and international market pull for marine fish products. Elsewhere in Australian and Papua New Guinean waters, similar forces are in operation, and the development of greater activity by Chinese vessels in Indonesian waters is spilling over into Australian waters.

The Indonesian Government is acutely aware of the related problems of illegal fishing by its own vessels, by foreign vessels in its own waters and by its own vessels in home waters. In Bali in June 2006, the 8th Australia-Indonesia Ministerial Forum included illegal fishing on its agenda.[136] Ministers agreed to convene a regional ministerial meeting on illegal fishing, following preparatory meetings by officials in late 2006 and early 2007. This is a very positive step in the right direction to address a problem that is common to all countries in the region.





Indonesia and Australia are working together to address cross-border fishing and, in November 2006, agreed to joint patrols and joint education programs in Indonesia. Australia should be very careful in how it participates in the program to educate fishers in Indonesia as, on the surface, this would appear to be an Indonesian government responsibility. In addition, through the implementation of its new 2004 Fisheries Law and its licensing and justice provisions, the government is working on reining in domestic forms of illegal fishing, despite the formidable forces that support them.

### *Indonesia and international fisheries arrangements*

Despite its fishing power status, Indonesia is not a major contributor to regional fisheries management agencies and has not yet signed the 1995 United Nations Fish Stocks Agreement which is critical for arrangements for management of highly migratory and straddling fish stocks (see Annexure). Australia should use its special relationship with Indonesia and its membership of regional fisheries bodies to encourage Indonesia to take a more active part in the international arrangements.

# Chapter 5

## Thailand and Vietnam:

## the top Southeast Asian fish exporters

Southeast Asian countries already supply half of Australia's imported fish, and Australia's import needs are rapidly increasing because of a combination of limits to local production and increasing demand. Fish trade is the key fish connection with Thailand and Vietnam, the largest fish traders of Southeast Asia. In fisheries relationships with these countries, Australia would be more interested in the sources of traded fish, the sustainability of its production, product quality and safety and trade policies. This section addresses how Thailand and Vietnam fisheries developed major fish trading industries, built on large domestic fishing industries, and how Thailand came to be the world's leading trader in tuna, in terms of combined imports and exports.

### Thailand

Thailand is a world-ranking fish producer and trader. Its competitiveness in the fish processing and trading business developed through government and industry collaboration, on the back of stagnant catches from its overexploited domestic fisheries.

### *Size and scope of the fisheries sector*

In the 2004 figures for total production, Thailand ranked ninth in the world, with 4.02 million metric tonnes of fish and other aquatic products, of which 19 % of total fish production was from aquaculture.[137] In 2004, Thailand was the world's fourth-largest aquaculture producer (by volume).[138] From 1994 to 2000, Thailand was the largest fish exporter in the world by value but, in 2001, was overtaken by China.[139] In 2001, Thailand had a positive fish balance of payments, exporting US$4.1 billion and importing US$977 million.[140] Thailand is the world's largest importer of tuna by volume and second in value (after Japan); most of the tuna is canned and re-exported, making Thailand the world's largest exporter of canned tuna.[141]

In 2004-05, Australia imported 60,000 metric tonnes of fish from Thailand, valued at A$237 million (Table 2.1).[142] Most of the imports were processed; two-thirds by volume and half by value were canned fish, chiefly tuna. Prawns were the second largest category of Australian imports.

Thailand was ranked in the world's top ten fish-producing countries for the first time in 1972 but its main fisheries were considered already overfished by 1977. The total marine catch has plateaued at about 2.7 million metric tonnes (Figure 5.1).[143]

According to the comprehensive 1995 Census of Marine Fishery, the Thai total coastal fisheries (marine fisheries and aquaculture) labour force was 535,210 people, including employees of the enterprises, out of a (then) population of 58 million people.[144] Small-scale operators engaged in marine fisheries represent 85 % of fishing households (76,000 households).[145] The marine fisheries are still profitable for individual operators but many are marginal. Each would be much more profitable if the total number of vessels was much reduced.[146] In the 2000 Marine Fisheries Census, the average net return for four main types of small-scale fishers was US$1,898/household/year, only 7 % above the national poverty line and only 74 % of the average Thai household income.[147]

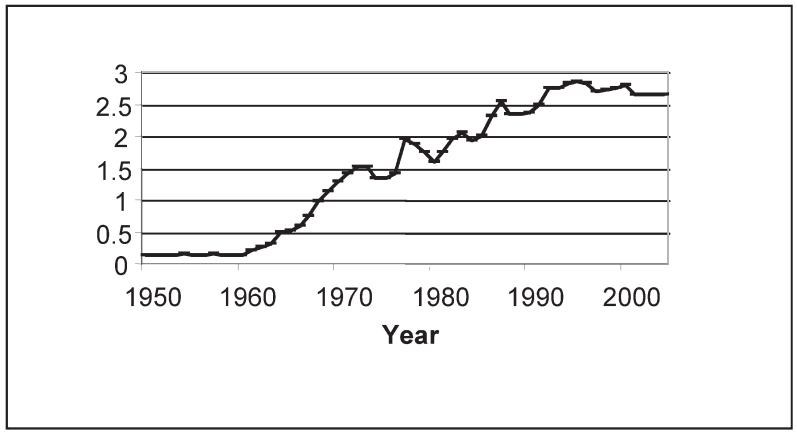
Yet, fishing intensity continues to increase. The number of vessels with inboard engines decreased from nearly 17,000 in 1985 to about 13,000 in 2000 but, at the same time, vessels with outboard engines and





non-motorised vessels increased from about 36,500 in 1985 to nearly 45,000 in 2000.[148] Many additional small-scale vessels are unlicensed. All classes of vessels increase their fishing power through equipment changes, by, for example adjusting mesh sizes, electronic fishing aids and mechanised net hauling.[149]

**Figure 5.1: Marine capture fisheries production in Thailand, 1950-2004 (millions of metric tonnes)**




*Source: FAO fisheries statistics accessed August 2006.*

The coastal fisheries of Thailand are categorised broadly into pelagic fisheries and demersal fisheries. Both types of fisheries are exploited by different gear types, and by small and commercial scale vessels.[150] Demersal fisheries became important in the 1960s when bottom trawling was introduced. In 1995, two-thirds of the total marine catch was by demersal fishing gears and vessels.

In Thailand in 2000, average fish consumption per capita was 28.7 kg per person.[151] This is projected to continue rising slowly to 2020.[152]

Fish production projections to 2020 for Thailand indicate that marine capture fisheries will not increase appreciably, but that marine

and freshwater aquaculture has good prospects.[153] Although exports are predicted to grow, imports will grow faster and Thailand will be importing more raw material for processing.

### *Fisheries resources and their status*

The two coastal fishing areas are the Gulf of Thailand and the Andaman Sea coast. The fisheries resources of the Gulf of Thailand are assessed by scientific trawl surveys that started in 1961.[154] Indeed, the Gulf of Thailand graph demonstrating the decline in demersal fisheries resources and flat catch levels, despite a large increase in fishing effort (not shown) is now the 'classic' diagram of tropical fisheries overexploitation (Figure 5.2). Thailand is the region's major fish trade power, but also hosts the most overexploited fisheries.

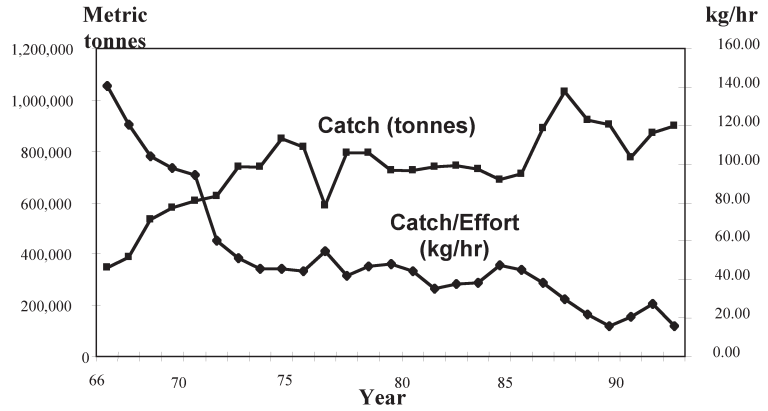
In the Gulf of Thailand between 1961 and 1991, fish density (metric tonnes of fish per square kilometre) declined by 86 %.[155] Not only has the quantity of fish declined severely, but so has the composition of the fish resources. Larger, longer-lived and more valuable fish species, such as groupers, snappers, sharks and rays, have declined; small and faster- growing species, such as cardinal fish, squids and octopus, have increased in relative abundance.[156] This pattern is typical of changes noted elsewhere in the region's heavily fished areas.[157] The shift to smaller fish in the catch, coincident with the rise in demand for fishmeal, including for use in aquaculture fish feeds, means that a significant share of the demersal catch is now going into fish feed. In the case of Thailand, 30 % of the total marine catch is sold as 'trash fish' for use in manufacturing fishmeal for aquaculture and animal feed.[158] In the Gulf of Thailand trawl fishery, for example, low-value and 'trash fish' make up to 60 % of the catch.[159]

With respect to the pelagic fisheries of the Gulf of Thailand, catches increased by 400 % between 1974 and 1994 but thereafter all the pelagic resources of the Gulf have been considered fully exploited or overexploited.[160]





**Figure 5.2: Gulf of Thailand trawl fishery catch and catch per unit of effort, 1966-1993**




*Source: Silvestre et al 2003b.*

### *Thailand's marine environment*

Mangroves, seagrasses and coral reefs occur in Thailand. Coral reef monitoring commenced in 1986 through the ASEAN-Living Coastal Resources Project. Although important resources, Thailand's fringing and patch reefs are much smaller in extent than those of Indonesia and the Philippines. Between 1994 and 2004, Thailand's monitoring programs showed mixed outcomes. In the Gulf of Thailand, some reefs improved in condition and others deteriorated; those in the Andaman Sea remained in good condition and unchanged.[161] Thailand was the only Southeast Asian country to report a large decline in the number of coral reefs monitored, from 420 in 1994 to 250 in 2004. This statistic may not reflect the true state of reef monitoring, however, as the full extent of monitoring was not captured.[162] Jurisdiction over coral reefs is spread over several government departments (environment, tourism and fisheries).[163] Half of the coral reefs in Thai waters are in marine-protected areas, but only 18 % of these are judged well managed.

By about 1980, nearly half of the 1961 mangrove forests had been removed for salt pans, extensive aquaculture, urban and agricultural use. By 2000, about 15% of the mangrove forests standing in 1980 had been removed.[164] After 1980, intensive prawn farming accounted for more than half the mangrove clearances.[165] More recently, prawn farming has been sited away from mangroves and the rate of mangrove loss has dropped accordingly. Stronger mangrove management is also having a positive effect in slowing mangrove loss, and shows the growing environmental awareness in Thailand's approach to fisheries.[166]

### *Fish supply chains*

Since the early 1990s, the Thailand Department of Fisheries and the fishing industry have engaged in whole of food chain activities, that is taking responsibility for the product all the way through the production process from environment to consumer. This is aimed at ensuring the safety and quality of fish products.[167] The procedures monitored and certified by the Department of Fisheries are conducted under HACCP systems as this is the one widely adopted by importing countries, especially the European Union countries, the United States, Japan and Australia, as well as the international food standards body, Codex Alimentarius. Thailand is a 'List 1' country for EU imports.[168]

Fish supply chains are well developed and the key actors have been innovators in developing and implementing quality control systems. Thailand is considered to have the most advanced post-harvest processing sector of all the developing Asian countries and also processes the greatest share of its fish production.[169] Beginning with the Second National Plan for Fisheries (1967-1971), the Thai Government encouraged fish exports.[170] In the 1970s, prawn aquaculture was first encouraged to supply export products.[171] In the 1990s, fish exports increased dramatically from US$2.3billion in 1990 to US$4.1billion in 1999. This increase was supported by successive national plans, especially the Eighth National Plan (1992-1996), that integrated coastal environmental and aquaculture development.[172]

Although HACCP requirements are voluntary and not mandated by legislation, a recent study considered Thai compliance rates





to be better than those in some other countries where HACCP is legislated.[173] One reason for this is that Thailand used an innovative two step process. In the first step, plants had to satisfy the standards for Good Manufacturing Practice — another product-quality system — before becoming eligible for HACCP certification procedures. The Department of Fisheries approach also included basic and extensive training of the fishing industry in HACCP, followed, from 1998, by training in HACCP audits and more advanced themes.[174] In 2000, the Department of Fisheries certified 201 fish-processing plants for HACCP and hygiene standards.[175] Thailand's policy success here could be shared with other countries through better regional fisheries cooperation.

Despite the attention to training, Thailand is not satisfied with its own industry and government officials' capacity in HACCP compliant processes and still regards this as one of its largest implementation obstacles to overcome.[176]

Of all Asian developing countries, Thailand produces the widest variety of fish products.[177] Fish processing has shifted from a predominance of traditional forms such as drying and smoking towards freezing and canning in large, modern factories (Table 5.1).

HACCP-compliant plants cost more to construct and maintain than non-compliant plants. Small plants are at a particular disadvantage as their costs per unit of product are higher, although the better returns, through market access and better prices, mean that the plants are still profitable.[178]

The Thai fish trade has been assisted by lowering tariffs from between 50 to 90%, sometimes more. In 2005, Australia and Thailand entered into the Thailand-Australia Free Trade Agreement (TAFTA), in which tariffs for canned fish, including tuna, were reduced to zero.[179]

**Table 5.1 Number of Fish Processing Factories in Thailand**

| Type of Plant | 1979 | 1982 | 1987 | 1992 | 1997 | 1999 |
|---|---|---|---|---|---|---|
| Freezing (modern) | n/a | 41 | 80 | 120 | 130 | 134 |
| Canning (modern) | 13 | 24 | 41 | 49 | 44 | 42 |
| Steaming (traditional) | 63 | 147 | 78 | 71 | 52 | 78 |
| Smoking (traditional) | 9 | 170 | 86 | 28 | 24 | 19 |
| Dried shrimp (traditional) | 121 | 301 | 176 | 188 | 139 | 140 |

*Source: WorldFish Center 2005, Table 3:17.*

The Thai tariff structure has attracted fish imports from Burma, Cambodia and Vietnam for processing and re-export.[180] Indeed, since natural fisheries resources are overexploited, Thailand will need to import increasing amounts of fish to feed its processing factories, despite the growth of aquaculture.

Some fish used in processing, especially tuna, is caught by Thai vessels in the waters of other countries, especially in the western and central Pacific, and in the international waters of the Indian Ocean. The government is implementing plans to increase its catch in the Indian Ocean. In 2005, it joined the Indian Ocean Tuna Commission and announced a project to increase its new fleet of six purse seiners to 15 by 2010 to meet tuna cannery requirements.[181] The Thai private sector also has substantial holdings in canneries outside Thailand.

Since fish produced in HACCP-compliant factories is more expensive than other fish, it is out of the reach of poor domestic consumers. Thailand, which has a more cost effective HACCP system than those





in other Southeast Asian countries such as the Philippines and Malaysia,[182] is now working on HACCP requirements for domestic fish.[183] Thus, lessons learned by competing in export markets are leading to improvements in quality and safety for local fish consumers.

### *National fisheries policy — problems and their solutions*

Fisheries and aquaculture are managed by the Department of Fisheries, although matters such as environmental management, food standards certification and trade policies are handled jointly with other government departments and units. From 1962, a series of five-year national plans[184] have encapsulated government priorities for the sector as well as reflected the sector's progress and challenges. Natural resource conservation was first introduced in the third National Plan (1972-76); government efforts to assist some of the larger vessels in the fleets to embark on joint ventures and fish in distant waters in the fourth National Plan (1977-81) as Gulf of Thailand fisheries became overfished; and, later, efforts to assist the export drive and rehabilitate the fisheries and aquaculture environments were included.[185]

Despite the evident successes of Thai fishing and aquaculture, marine fisheries are suffering enormous challenges. In addition to resource and environmental degradation, the major problems include how to effectively rein in domestic fishing effort to a sustainable level, given the many means that fishers use to add fishing power and vessels to the fisheries despite government constraints; illegal and often destructive fishing; and conflicts between different fishers, especially between the small and large-scale operators. An additional recent problem is the increase in fuel prices.[186]

Two policy issues are relevant to Australia's interests, namely Thailand's international fisheries engagement and reducing effort to achieve sustainable fisheries.

### *Engagement in international fisheries arrangements*

Thailand has signed few international agreements and participates in few regional and international fisheries organisations (see Annexure), although it is host to several regional and international body headquarters.

Thailand has signed but not ratified the 1982 United Nations Convention on the Law of the Sea. This lack of interest in the international and regional norms of fishing by the Thai Government acts against using their provisions in international fisheries engagements. As the trade agreement TAFTA shows, however, Thailand actively uses bilateral instruments to serve its purposes. Australia should encourage Thailand to take a more active role in regional and global fishing agreements given the country's significant role in world fish markets

### *Reducing fishing effort*

Rebuilding fish stocks means controlling fishing. Most efforts to do this have fallen short, partly because they have been opposed by the assertive Thai domestic and international fishers' organisations.

Vessel registration, as a first step to reducing fishing capacity, has not succeeded in reducing vessel numbers and so, in the latest national plan, the government embarked on a new program of seasonal closures and gear restrictions. Some initiatives included: three-month closures for the Gulf of Thailand Indian mackerel fish spawning areas; broad community-based fisheries management projects, for example for the mixed fishery in Pha Nga Bay on the Andaman Sea coast;[187] and improving local fisheries management skills. The community-based management arrangements were ushered in after the 1997 Thai Constitution[188] devolved administrative powers to local authorities and increased support and recognition to community-based fisheries management.[189]

Concerted efforts to protect key pelagic fish stocks, such as the Indo-Pacific mackerel, began as early as 1953 but initial efforts failed as fishers repeatedly challenged area and seasonal closures.[190] However, the new systems are based on better knowledge of the fish stocks and their habits, gained through years of research, and greater stakeholder consultation in the process to determine the best closure sites and times.[191]

As Thai fishing in the waters of other countries in Southeast Asia and the Pacific became more prevalent from the late 1970s onwards, illegal fishing incidents became common, including illegal cross-border





fishing in neighbouring countries such as Burma, Cambodia, Indonesia and Vietnam, and illegal tuna transhipment in Papua New Guinea waters.[192]

## Vietnam

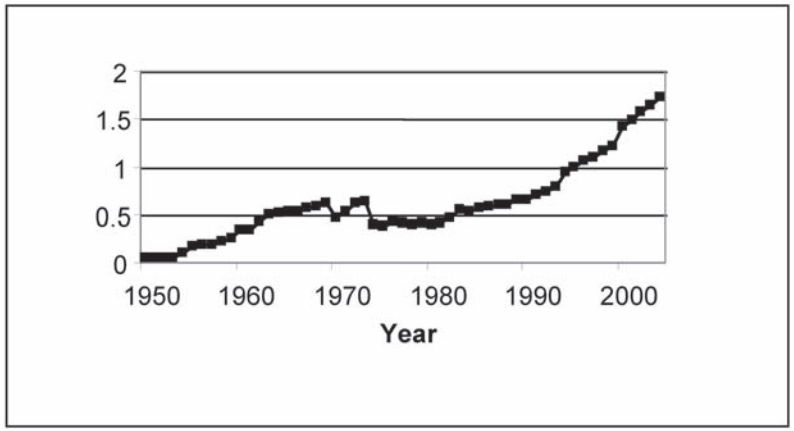
Vietnam fisheries and aquaculture developed slowly during the war years and in the period immediately after, picking up when national economic policies changed and stimulated rapid growth. Vietnam is now among the major fish-producing and trading countries. In the 2000s, Australian fish imports from Vietnam grew strongly. Vietnam is a new, rising fishing power, joining the more traditional Southeast Asian powers like Indonesia, Thailand and the Philippines and adding to the overall competition for Southeast Asia's increasingly pressured fish resources.

### *Development status of the fisheries sector*

In 2004, Vietnam was the world's tenth largest producer of fish and aquatic products, producing 3.1 million metric tonnes, a dramatic increase from the half million metric tonnes produced in 1975 at the end of the war. Marine capture fisheries contributed 1.7 million metric tonnes and are still increasing (Figure 5.2). Vietnam's aquaculture growth is particularly strong, making it the largest aquaculture producer in Southeast Asia and third in the world in 2004, behind China and India, at 1.1 million metric tonnes.[193] Advances have been greatest in aquaculture in Vietnam despite its late start and it now comprises more than a third of total fish production.

In 2001, by value, Vietnam was the world's tenth largest fish exporter, selling US$1.8 billion. Although formal statistics are not yet available, news reports indicate that exports in recent years have risen rapidly,[194] to US$2.6 billion (estimated 2006).

**Figure 5.3: Marine capture fisheries production in Vietnam, 1950-204 (millions of metric tonnes)**




*Source: FAO fisheries statistics accessed August 2006.*

In 2004-05, Vietnam was the third largest source of Australia's fish imports, after Thailand and New Zealand, supplying 18,000 metric tonnes worth A$122 million. More than half the imports (A$70 million) were prawns and frozen fish fillets (A$35 m). Australia exports less than 1,000 metric tonnes (A$10 million) to Vietnam (Table 3.1).[195] Exports to Australia have been increasing in recent years, whereas those from other countries were stable or slightly down apart from China.

Marine fisheries support about three million fishers[196] out of a population of about 80 million. Most are small scale operators using small scale fishing equipment and vessels. Of all fishing vessels 94 % have only small engines. However, the number of vessels and their size and power is increasing. To date, most fishing has been coastal but the government is now encouraging offshore and distant water fishing.

In coastal waters, trawling is the dominant fishing method, producing 45 % of total marine fish, followed by purse seine fishing, which produces about 20 %. The remainder is taken by more traditional fishing methods, especially small scale hook-and-line fishing and gill netting.[197]





### *Fisheries resource and marine environment status*

From a fish production curve that remained flat until the mid-1980s, marine capture fisheries production increased steeply and continues to do so. This aggregate fish production masks underlying signs of overexploitation such as loss of larger, slower growing fish species, a shift to smaller sizes of all species, and an overall lower abundance of fish. Thus, whereas marine capture fisheries production increased threefold between 1981 and 1999, catch per unit effort, an indicator of fish abundance, declined in all coastal inshore fishing areas and for all major types of fishing gear. Between 1987 and 1997, the total horsepower capacity of fishing boats increased threefold but the total catch only doubled.[198] The decline in fish abundance has been most severe in the north in the Gulf of Tonkin, a fishing ground shared with China (see below) — the 1997 catch rate was only one-quarter of the 1985 rate.[199]

In Vietnam, the rapid pace of economic development has adversely affected marine and coastal environment quality and, combined with the lack of financing to ameliorate the impacts, has created conditions in which coral reefs, mangroves, seagrasses and the shallow continental shelves are under the greatest threat in Southeast Asia.

Between 1994 and 2004, Vietnam's coral reefs experienced some of the greatest declines in Southeast Asia; most recent surveys show that the majority of reefs have low levels of coral cover.[200] National reef monitoring only began in 1998 but the number of reef monitoring sites, although still modest and limited by funding and infrastructure, rose from three in 1994 to 11 in 2004. Several new marine parks have been designated and existing parks extended, but the effectiveness of management does not yet match needs. The protection of coral reefs comes under the Ministry of Fisheries.[201] Several high profile demonstration projects on marine protected areas, such as the Halong Bay World Heritage Site, have been developed in Vietnam, involving the national government, international conservation organisations, local communities and development assistance agency grants.

In 2000, the extent of mangrove forest cover in Vietnam was only 46 % of that in 1960.[202] Despite official efforts to promote mangrove

rehabilitation to protect the coasts against tropical storms, strong pressures for further conversion to aquaculture and other land uses remain strong.[203] Lack of financial incentives and land tenure impede rehabilitation efforts.[204]

Seagrasses cover at least 440 square kilometres, mainly in southern and central Vietnam[205] and are subject to similar pressures from land-based activities as are coral reefs. They also suffer from the effects of trawling.

### *Fish supply chains*

The 1985 'Doi Moi' reforms introduced a more market based system and opened up domestic fish trading. However, fish supply chains still retain elements of the cooperative and government managed market systems. Auctions and bidding are not used, but rather a system involving middle persons of medium and large scale.[206] For domestic products, trading is then mediated through small scale family trading enterprises which undertake retail trade, transport, processing and storage.[207] Both small and large scale traders ensure stability of supply through credit relationships according to their means.[208]

Vietnam's export fish trade is impressive. Vietnam recently ratified its World Trade Organization (WTO) membership agreement and, in January 2007, became a member of the WTO. As a WTO observer over the last several years, it paid attention to WTO regulatory requirements in its export market countries, made its own regulations more transparent and gave private exporters an increasing role.

In 2003, 80 % of the export processing facilities were state owned and 20 % were privately owned.[209] Processing factories are generally equipped with modern facilities. HACCP requirements are voluntary but the Vietnamese government gives priority to improving certification and compliance. Vietnam is a 'List 1' country for imports to the EU[210] but, nevertheless, Vietnamese exports have experienced some quality problems,[211] suffering sanitary/phytosanitary problems for prawn exports to the EU and non-tariff and tariff barriers for catfish exports to the US (Box 3).





**Box 3 – Catfish: turning export setbacks into successes**

The story of Vietnam's exports of its native, cultured catfish to the US market is a good illustration of its dynamic approach to fish trading. In 2000, United States catfish farmers, producing a different species of catfish, protested the use of the name 'catfish' for the Vietnamese product on the American market. The US Food and Drug Administration accepted the use of the name but US producers continued to protest that the imports denigrated the trade name 'catfish'. The Vietnamese exporters then marketed under the name 'Mekong basa' and 'Mekong tra' and trade continued to blossom, as production of the Vietnamese catfish increased. The American Catfish Farmers Association then brought dumping charges against the Vietnamese and, in 2003, the US imposed a 37-53 % tariff on imports on the grounds that the non-market economy of Vietnam was subsidising fish production.

Despite a 20 % drop in export value in 2003, the Vietnamese government and industry, through such groups as the Vietnamese Association of Seafood Exporters and Processors, acted swiftly to improve product quality and find new markets such as Australia and the EU, branding and developing new value-added products. Exports recovered and increased. The 2004 production was about 400,000 metric tonnes and a target of 800,000 metric tonnes has been set for 2010.[212] The government and exporters are actively and successfully pursuing international trade promotion to gain additional export markets.

### *National fisheries policy — challenges and solutions*

The far-reaching Doi Moi policy permitted market mechanisms and private ownership of boats.[213] In the marine fisheries sector, the growth of vessel numbers, mechanisation of the fleet and the consequent rapid growth in fish production, along with the depletion of resources, all date

from this period. Similar signals appear in the trends in aquaculture growth and the boom in exports.

The fishing sector is now receiving greater policy attention due to its size and value to the economy, particularly in export value.[214] On 1 July 2004, a new Fisheries Law took effect.[215] This law builds on earlier policies such as the 1997 legislation that provided financing for offshore vessels and encouraged their construction; decentralised and established fisheries departments in all coastal provinces; prohibited destructive fishing practices; required that all vessels be registered and established export and fish processing requirements. The new law starts to provide for stakeholder involvement in fisheries management.[216] Along with this, a new fisheries master plan was developed. Plans were also developed at the commune, district and province levels.

Fisheries rights are considered to be clearly defined, with rights classification dominated by the government. Formal and legal instruments appear to provide sufficient fishing rights assurances.[217] Government management capacity, however, is not highly self-rated. Planning, implementation and social conflict resolution is rated only moderately adequate and of low effectiveness.[218] Fisheries support services, namely, research and development, human resource skills, credit facilities, administration, and market arrangements are all considered poor, whereas extension and training services are rated as fair.[219]

When the government recognised that inshore coastal fisheries were depleted, it responded with policies and programs to encourage more offshore fishing, especially for tuna. It recently announced a plan to equip tuna vessels with modern equipment to fish offshore and in international waters, to conduct resource surveys and to improve fish handling to meet export quality standards.[220] However, concerns are already being expressed at the need for better management of the offshore fisheries since their exploitation has increased rapidly.[221] Little attention seems to be given to the difficult issues of rehabilitating depleted inshore fisheries, fraught as this is with social equity issues.

Many of Vietnam's maritime boundaries are still in contention. Vietnam is one party in the difficult South China Sea boundary issues, along with China, the Philippines, Malaysia, Taiwan and Indonesia.





However, it has settled a fisheries agreement with China over the shared Gulf of Tonkin boundary and, by mid-2005, over 1,300 Vietnamese fishing vessels had registered to fish in the common fishing area.[222]

Vietnamese vessels are frequently apprehended for illegal fishing in the waters of Malaysia (Sabah and east coast peninsular Malaysia), Thailand and the Philippines, creating a source of diplomatic tensions.

# Chapter 6

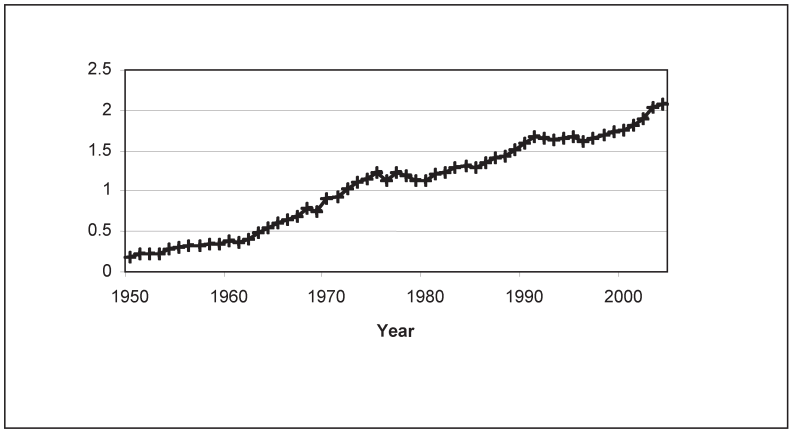
## Philippines and Papua New Guinea: other tuna fishing countries

Thailand and Indonesia, which have been covered in previous sections, are major tuna- fishing and trading countries. The Philippines is also of particular interest to Australia because of its importance in Pacific and Indian Ocean tuna fishing and processing.[223] Papua New Guinea is a new force in regional tuna fishing and, as with Indonesia, shares several fish stocks and maritime boundaries with Australia

### The Philippines

In 2004, the Philippines was the world's twelfth largest fish producing country (by all methods), recording 2.7 million metric tonnes. Total marine fish production has experienced several plateaux (Figure 6.1). The rise in recent years is the result of increases in small pelagic species catches, especially scads, and tuna caught in municipal as well as offshore waters.[224] That the increases are mainly in these species and areas, combined with related scientific information on the status of all fish stocks, reaffirms that Philippine marine fisheries production is also at or beyond its long term sustainable level

**Figure 6.1: Marine capture fisheries production in the Philippines, 1950-2004 (millions of metric tonnes)**




*Source: FAO statistics, accessed August 2006.*

Fishing is a major sector of the economy, producing in the order of 4 % of GDP,[225] and providing direct employment for nearly one million people (of a population of 85 million). It is the source of about half the animal protein in the diet,[226] and a source of valuable foreign exchange. The country has a large number of inshore, small scale fishers, termed municipal fishers, whose catch dominated the total until the 1980s. Now they produce only about one-third of the total marine fish production and their share is projected to decline further, with larger commercial operators taking the majority.[227] Trawlers, from small ('baby trawlers') to large in size, purse seiners and numerous small scale fishing vessels and gears are used.

Throughout the Philippines, most marine fisheries resources were estimated to be overexploited by the 1980s. The average size of fish caught is small and, in some areas, catch rates are as low as 10 % of rates when resources were lightly fished.[228] The marine environment of coral reefs, coastal mangrove forests and seagrasses are also severely damaged and showing few signs of recovery.[229]





Over the last three decades, the Philippines has become a major world tuna power. In the west and central Pacific Ocean area of the WCPFC, Philippines vessels may catch as much as 20 % of the two million metric tonnes of tuna landed.[230] Half of this catch is of the larger oceanic tuna species (skipjack, yellowfin and big eye) for which stocks are shared with other nations. Philippines tuna fishing developed initially by combining small scale and larger scale methods such as pole and line fishing. Eventually, industrial purse seine fishing took over, often combined with fish aggregating structures, that is man-made floating structures, usually anchored, that attract the tuna and make them easier to catch. In the Philippines, the fish aggregating devices are often attended by small scale tuna fishers in pump boats.

In the 1960s and 1970s, tuna fishing spread from the southern Philippines, and, in the 1980s into extensive operations in the waters of Indonesia, Papua New Guinea and in international waters.[231] In 2005, the Indonesian government terminated the foreign fishing agreement with the Philippines, on the grounds that Indonesia gained little benefit. Like Thailand, the Philippines is also a major tuna canning and exporting country, a factor that also drives the catching sector.

However, overall, the Philippines is not a large fish exporter.[232] In 2001, it was 32nd in the world. Also, it is not a large fish importer, bringing in about one tenth the value of fish compared to Thailand, and less than Australia, Malaysia and Singapore respectively.[233] Australia imported only 666 metric tonnes of fish from the Philippines in 2004-05, worth A$2.5 million, plus an additional A$2.9 million of inedible marine products, most likely pearls.[234]

### *Fish supply chains*

HACCP regulations for export products are mandated by the 1998 Philippine Fisheries Code and, on joining the WTO, the Philippines was one of the first Southeast Asian countries to reduce its tariff levels on fisheries products. However, it has a much higher cost structure for constructing HACCP-compliant processing plants than that of Thailand,[235] thus affecting trade competitiveness.

Throughout the archipelago, domestic fish trade is carried out by multiple layers of agents. Improvements are impeded by poor transport, erratic fish supply and frequent natural disasters.[236] Women traders are key actors.[237] Fish is a mainstay of food stall and restaurant menus; sales of fish through fast food and retail outlets are increasing, from small stalls to large supermarkets.

### *National fisheries policies*

National fisheries policy and management is under the 1997 Agricultural and Fisheries Modernization Act and the 1998 Philippine Fisheries Code. The latter legislation was nearly a decade in development and incurred difficult negotiations in Congress over equity for small scale fishers, coastal communities, versus the powerful demands of the larger commercial fishers and fish pond owners who control valuable coastal land.[238]

Control of fishing effort and capacity has not been effective. However, the Philippines has led Southeast Asia in introducing the practice and concepts of community based management and co-management following the 1991 Local Government Code promulgated for decentralisation. Institutions concerned with fisheries policy and planning, implementation and resolution of social conflicts are considered to have only a low level of effectiveness.[239] However, some of the local fishing management arrangements are very effective.[240]

National fisheries management capacity is low, partly because the fisheries management agency is only a Bureau (Bureau of Fisheries and Aquatic Resources), a unit in the Department of Agriculture. The decentralisation process has helped to strengthen fisheries management capacity where the provincial and local government units have shown an interest, often supported by non-government organisations and local universities with good capacity in fisheries education and research. The University of the Philippines in the Visayas, and the University of the Philippines Marine Science Institute in Lingayen Gulf are examples. The Philippines arrangements show that decentralisation can contribute to fisheries' management if capacity is built at the local level. However, the commercial fishing and other sectoral interests





usually hold sway over responsible fisheries management, should there be a conflict.

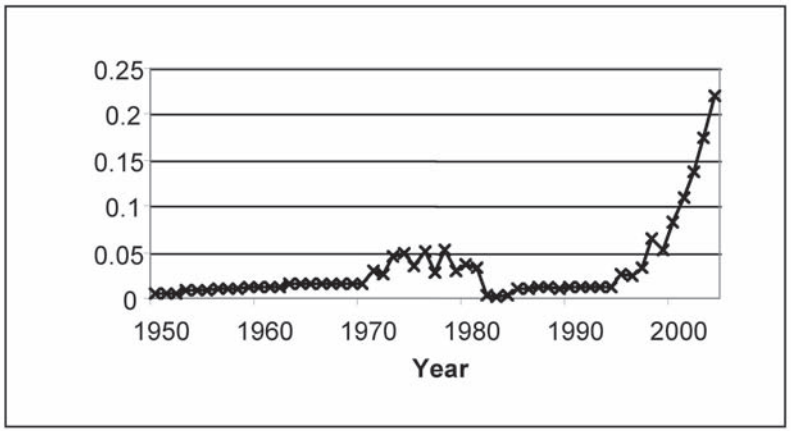
## Papua New Guinea

Papua New Guinea (PNG) is an increasingly important Pacific regional fishing country. Australia and PNG share a common border in the Torres Strait. In 1985, the Torres Strait Treaty, signed by the two governments in 1978, came into force, covering, among other matters, the maritime boundaries, sovereign and joint responsibilities for the fisheries of the defined Torres Strait Protected Zone, covering traditional and commercial fisheries. In 1984, for the Australian part of the Zone, the Commonwealth and Queensland Governments established the Torres Strait Protected Zone Joint Authority. The managed fisheries, each with appropriate management and scientific committees, are prawns, tropical rock lobsters, pearl shell, beche-de-mer, trochus, finfish (including Spanish mackerel and barramundi as special cases) and traditional fishing (including turtle and dugong).[241]

The Torres Strait Treaty has been described both as ahead of its time and as one of the most complicated boundary declarations in the world, due to the interactions of international law, national bilateral agreements, state laws and native sea title claims over the seabed.[242] Despite this, to date, the border fisheries have not been a source of contention between Australia and PNG. It can act as a good example for future regional fishing agreements between Southeast Asia and Australia.

In 2004, tuna landings (195,000 metric tonnes) dominated Papua New Guinea's marine fisheries production of more than 200,000 metric tonnes (Figure 7). An additional 115,000 metric tonnes was caught by foreign-licensed vessels in PNG's fishing zone.[243] In PNG, new economic measures are linking the landing of nationally associated vessels to onshore processing and other investments.[244] Australia is providing technical support for the domestication of the tuna fishery.[245]

**Figure 6.2: Marine capture fisheries production in Papua New Guinea, 1950-2004 (millions of metric tonnes)**




*Source: FAO fisheries statistics accessed August 2006.*

The second largest commercial fishery in PNG after tuna is the Gulf of Papua prawn fishery. Australia has been providing scientific assistance to PNG on the management of this fishery.[246]

Australia and PNG also share and jointly manage the important tropical rock lobster stock. Australia-PNG fisheries cooperation has worked quite well and shows that natural fishing connections like shared stocks do not automatically become points of bilateral tensions. Certainly, this cooperation has been aided by the breadth and scope of the bilateral relationship in general.



# Chapter 7

## The other Southeast Asian countries

Australia's fisheries connections and shared interests with the remaining Southeast Asian countries are of less importance than those described above. Their fish and fishing profiles are each dealt with briefly below.

### Brunei Darussalam

Brunei Darussalam has a small fishing zone from which 2,000 metric tonnes was caught in 2004.[247] The fisheries resources resemble those of Malaysian's Sabah and Sarawak.

### Burma

Little is known about the marine fisheries of Burma as they have been conducted in isolation. Marine capture fisheries production nearly doubled between the mid-1990s and 2004, to 1.13 million metric tonnes.[248] Although Burma does not figure in the published Australian trade statistics, Burmese fish, such as fillets of cultured barramundi/seabass, appear in the Australian market. In addition, Burma is receiving assistance from Vietnam on the culture of basa and tra catfish.

## Cambodia

Cambodia has one of the world's largest inland fisheries in the Mekong River and the Great Lake (Tonle Sap). Its marine fisheries are small — 56,000 metric tonnes in 2004.[249] Cambodia supplies freshwater fish to Australia and this market holds further promise.[250]

## East Timor

East Timor became independent in 2001 and so has no time series of fisheries information. It has fisheries aspirations but it will take time to achieve significant fisheries capacity, given its current political and economic problems. Around the Arafura and Timor Seas, East Timor, Indonesia and Australia have created a technical facility, the Arafura and Timor Sea Experts Forum (ATSEF), to support the sustainable use of resources and economic development of the people through sharing data and expert advice. ATSEF is developing its action plan, supported by governments, universities and non-government agencies.[251]

## Malaysia

Malaysia is a mid-sized fish producer, largely from marine capture fisheries on the east and west coasts of peninsular Malaysia; in 2004, it produced 1.34 million metric tonnes. In 2004-05, Australia imported 5000 metric tonnes of fish from Malaysia, worth A$6.8 million (Table 3). In 2001, Malaysia itself was a significant importer of fish, bringing in 353,000 metric tonnes; it exported 126,000 metric tonnes.[252] Malaysia's inshore fisheries are severely depleted, down to 6% of original abundance in some areas and the government is encouraging investment in offshore and oceanic tuna fisheries.[253] Labour on larger vessels is sourced from Indonesia, Burma, China and other Asian labour exporters.

Illegal fishing is a major issue for Malaysia. It occurs internally by transgression of large vessels into inshore zones reserved for small scale operators, by illegal gear and multiple vessels with the same name,





and by vessels from neighbouring Thailand, Indonesia, Vietnam and Philippines. Some maritime borders are being jointly patrolled, for example, in the Straits of Malacca with the Thai Navy. In addition, Malaysia has reorganised its maritime patrol capacity to create the Malaysian Maritime Enforcement Agency or coastguard.[254]

## Singapore

Singapore has given little priority to its own fisheries and, in 2004, produced just over 2000 metric tonnes of fish. However, it maintains traditions dating back more than 100 years,[255] as an important fish trans-shipment port, as well as importing for domestic and tourist consumption. In 2001, it exported 102,000 metric tonnes of fish at a value of US$388 million, having imported 173,000 metric tonnes at a value of US$489 million. A high but variable proportion of the imports are tuna products from Indonesia, possibly bound for further processing and re-export.[256]

# Chapter 8

## Two options for Australia and policy recommendations

The country and regional descriptions covered in this study have explored how Australia and Southeast Asia are enmeshed in a net of shared maritime boundaries, shared fish stocks and fish stocks of common interest, plus the bonds of common needs and competition in fish trade. Recent history and trends suggest that the net is more likely to tighten regional fisheries connections rather than loosen them.

On a bilateral and multilateral basis, Australia is already well engaged with its Southeast Asian neighbours, but the developments in fisheries will continue to throw up new challenges.

One such challenge is how to manage in the long term the burgeoning illegal fishing by vessels spilling over from the increasingly depleted Indonesian waters and inadequately defined historic fishing allowed in the Australian EEZ around Ashmore and Cartier reefs. A second is the challenge of the unbalanced needs and capacities in managing shared stock of snapper, shark and tuna. Australia's immediate neighbours, Indonesia and Papua New Guinea, lack significant capacity to contain the exploitation of the parts of the shared stocks in their own waters and the effects of this weakness are exacerbated by the attraction to fishers

of the resource on the Australian side. A third challenge is bringing Southeast Asian countries fully into regional management of tunas. The fourth challenge concerns Australia's rapidly changing fish trade with Southeast Asia. This last challenge is related to the other three as it is driven by the underlying trends of supply and demand for food. It also contains some potential levers for control, through the market, of the other two challenges.

What are Australia's options for dealing with these challenges? One is 'business as usual' and another is a more comprehensive and strategic engagement that integrates Australia's fisheries interests in a more coherent way with its overall national interests in Southeast Asia. The justification for the comprehensive approach is that the current approach may be too reactive for future needs and already has mounting and unpredictable costs and coordination needs.

## Business as usual

This is not a do-nothing, nor even a low-cost, scenario but rather one in which Australia continues in much the same way as at present. Thus, Australia continues its strong surveillance and monitoring efforts; provides modest development assistance for fisheries, mainly through research partnerships; maintains its strong and high profile roles in routine regional cooperation on fisheries through bilateral arrangements and such regional fisheries bodies as the APEC Fisheries Working Group, the FAO's Asia-Pacific Fisheries Council, CCSBT, NACA. However, it also means that Australia takes little further action to better integrate and coordinate ongoing actions.

In terms of solving the first hot fisheries issue of illegal fishing, the 'business-as-usual' approach relies strongly on enforcement. Some social science research has been done to better understand the sources of the problem but an examination of how to place the issue in the larger context of Indonesian fisheries development and Australia's overall relationship with Indonesia has not commenced. With the second hot issue, shared fish stocks, a low key and gradual approach is being employed, defining the shared stocks and their status, moving towards





engaging in shared stock management and working with Indonesia to tackle the regional economic and fisheries forces that are generating the large increase in illegal fishing. The scientific collaboration is excellent in quality yet minimal in quantity. However, this valuable element buys time to gain a better understanding of the issues and build non-threatening links via the scientific and academic community, although action on both sides should not await full knowledge. Under business as usual, tuna management and trade will also be handled in an active, though not proactive manner.

The question that hangs over this approach is whether enough is being done, in a far sighted way and with sufficient speed. The answer is no, except in the case of the defence oriented actions. The last two years of intrusions by illegal fishers from Indonesian waters, have shown that the reactive approach can carry a high cost, albeit with some deterrent effect. Fox described some of the reasons for this in the rapidly evolving shark fisheries, most being based on lack of detailed information on the location, timing and form of the illegal operations.[257] Indeed, the Australian approach to dealing with illegal Indonesian fishing needs to be constantly better informed from on-the-ground analysis and detailed operational information on likely incursions. At the same time Australia must work with Indonesia on fisheries and diplomatic solutions.

The defence actions need to be complemented by other forms of engagement, more effort put into finding the sources of support for the illegal fishers and sales of the products and working with Indonesian authorities at several levels of government to help them solve the problem.

## Comprehensive engagement over fisheries

This option would step up coordinated action, intelligence gathering and strategic collaboration with Southeast Asian countries in a major and proactive move on Australia's current 'hot issues' and their 'hot spots' in Southeast Asian fisheries. The driver for this option is the increasing pressure on budgets, on fish resources, the marine environment and on regional relations. The foreseeable fisheries conservation and market supply problems are sufficiently well understood to appreciate the need to

act ahead of their consequences which include depleted regional fish stocks, greater competition for these stocks and rising market demand for fish. In a proactive regional approach, Australia would stimulate joint actions that create greater coherence among fisheries cooperation, research, fish trade, development assistance, the environment and defence.

In the comprehensive engagement option, a two stage process is suggested. Australia would first take stock of its own current fisheries engagements in Southeast Asia, across the whole range of Commonwealth portfolios: fisheries, foreign affairs, trade, defence, customs, overseas development assistance including research, environment, heritage and science. The portfolios of the relevant state agencies in Northern Territory, Queensland and Western Australia should also be included.[258] At this stage, Australia could consider options for bilateral and regional actions and its own priorities. However, it should not develop definitive positions on the options until after the second stage — regional discussions — is held.

For the region, the benefits would be to create a platform on which Australia and Southeast Asian countries could share experiences and jointly solve some of their fisheries management challenges. Efforts should be made to place comprehensive cooperation on fish and fishing topics and should not be confined to fish trade on regional political agendas. At the same time the realities of national responsibilities in the sector, such as securing resource sustainability, feeding people and creating economic returns need to be recognised.[259] At present, in the reactive 'business-as-usual' mode, symptoms of fisheries problems, such as border security issues, are addressed but not the underlying problems such as excess fishing capacity or lack of fish rights.

How could Australia stimulate a comprehensive engagement with its regional partners? One possible entry point is the agreed Australia-Indonesia regional ministerial conference on illegal fishing, a common basis for regional concerns. The inclusion of illegal fishing in the 2006 Agreement on the Framework for Security Cooperation (the Lombok Treaty) provides new scope for bilateral cooperation and action. This or other suitable fora could be used to persuade countries in the region to engage on more substantive fisheries actions than are presently





emerging from the region's fisheries departments and economic organisations such as ASEAN.

Funds would be necessary to sustain the actions generated and Australia would need to work out, in advance, what actions it could support through various budgetary channels. Who and which agency/agencies could champion the efforts in Australia and the region? However, the funds would be modest in comparison to the scale of funds for border defence.

Since fisheries are increasingly diplomatic matters, as well as resource, industry and environmental matters, any international action must be placed in the context of the national interests.[260] This larger context would be mindful of any links between the fishing industries and illegal activities such as illegal immigration, drugs and terrorism, and concerns over the influence of other bilateral fisheries relations in the region, particularly China, Japan, Taiwan and Thailand.

Although lead agencies would be those that support the key ministers (Foreign Affairs and Trade, Agriculture, Fisheries and Forestry and Environment and Heritage), many other agencies also have important roles to play, including aid (AusAID and ACIAR) for site-specific livelihood programs, Department of Defence, Australian Customs Service, and certain State/Territory departments.

Is such an engagement politically feasible[261] and will it return economic, social and sustainability benefits? In the initial domestic phase suggested above Australia should make such assessments. It now has a growing base of relevant data on future fisheries scenarios and can calculate the costs of action and inaction. Nevertheless, Australia needs to add a political analysis to the scientific and economic analyses on the feasibility of achieving objectives.

The Australian Government may even consider forming a central regional fisheries intelligent unit, hosted in an existing agency such as DAFF, to collate and analyse multi-sectoral information of relevance to the comprehensive engagement.

A major challenge for Australia in stimulating and participating in the second stage will be working out the best manner in which to use its own experience. Not only are Australia's fisheries different to

those of the region, but its economic, social and demographic structures are also quite dissimilar. Indeed, Australia applies a very different approach to managing its fisheries and marine environment than do its Southeast Asian neighbours. Some of the thinking now central to Australian fisheries approaches includes the primacy of making resource extraction sustainable, the need to mitigate the impact of fisheries on the environment and the preparedness to make available large sums for structural adjustments to achieve economically viable fisheries.

Australia will not be joining in in order to teach direct lessons from its fisheries experience, but rather to share expertise, learn about the differences, offer creative and appropriate contributions to the analysis of problems and development of solutions, to help build fisheries management capacity and work in direct partnership on common problems, such as illegal fishing. Australia can admit its own problems with mangrove and seagrass degradation. The behaviours adopted in the early stages of engagement will be important in setting the diplomatic tone for the longer term fisheries relationships.

## What is a workable model for multilateral fisheries engagement?

An important question for Australia and the region to consider is whether an additional formal fisheries institution is required. Except for the case of the three tuna commissions (the IOTC, CCSBT and the WCPFC), Australia and the Southeast Asian region lack institutions to address the controversial fisheries management issues. Creating a new institution needs careful consideration. On the one hand, Southeast Asia is already endowed, perhaps over-endowed, with regional fisheries institutions of overlapping memberships and mandates. Adding to this plethora of agencies could further complicate regional fisheries cooperation.

In lieu of a new institution, an existing regional agency or an informal international arrangement may be preferred. The informal arrangement could draw on Australia's experience in forming APEC and the Cairns Group. On the other hand, most of the existing





institutions are advisory and technical agencies and do not have binding management responsibility. In addition none addresses the specific questions of shared fisheries stocks management, except for that of the abovementioned commissions for tunas and highly migratory species.

A major weakness exists in most countries, and, importantly, regionally, in regular fisheries assessment, including that of shared resources. The experience of developed countries indicates that fisheries resource management cannot succeed without these assessments, although the EU experience also shows that assessment alone does not automatically lead to good management when the fisheries negotiations are politicised and multilateral. Built on lessons of the success of the marine environment assessments that originated from the Australian-ASEAN Living Coastal Resources program of the 1980s and 1990s, Australia could work with relevant regional bodies such as APFIC, ASEAN and SEAFDEC to institute a regional process of fisheries resource assessments very directly targeted to providing advice to fisheries managers, and in a form suitable for their use. Such a resource assessment arrangement should learn from but not copy the various scientific assessment systems of developed countries, including those in Australia, New Zealand, the European Union and the United States. The Southeast Asian system should be designed around the current country and regional fisheries arrangements and should aim to provide public and regular assessments in the medium term.

At the heart of a new initiative would be the aim to stimulate a wider public and commercial demand, as well as a political demand, for sustainably managed fisheries. Therefore, Australia's comprehensive regional fisheries' engagement should aim to provide stakeholder consultation with non-government actors, private sector and academic researchers. As national government fisheries departments in the region have not yet been able to control fishing effort on their own, additional inclusive measures, for example co-management with community and industry involvement, and market based solutions should be explored. Other key stakeholders are sub-national government agencies, especially in the decentralised government arrangements (Indonesia, the Philippines, Thailand, Vietnam), the private industry sector and

non-government organisations (especially in the Philippines and, to some extent, Thailand and Indonesia).[262]

Australia's recent country-of-origin labelling is a major first step towards informing consumers about the source of fish. The next steps could well be more specific fisheries labelling of the product according to how the fisheries and aquaculture ventures that produce it are managed. Reputable fish traders, consumers, fishing companies, fishers' representatives, environmentalists and fish retailers are increasingly active in strengthening the legitimate fish supply chains and in responding to public interest in sourcing products from sustainably managed legal fisheries. Large multinational retailers and fast food chains, many of whom are trading in Southeast Asian countries and Australia, are taking a strong interest in certifying their fish for sustainability.[263] A regional fisheries management engagement by the governments could structure means for representatives of these stakeholders to contribute to help achieve sustainability.

## Policy recommendations

Analysis of these two options indicates a clear advantage to going beyond 'business as usual' and attempting a comprehensive engagement. Indeed, 'business as usual' may soon be more expensive and counter-productive to Australia's interests as it tends to ignore the fundamental drivers of the tensions in international relationships concerned with fish and fishing. A series of steps could achieve the preferred option. Nevertheless, some specific actions would be helpful regardless of the option chosen.

### *A staged comprehensive fisheries approach*

Australia's regional fisheries engagement would benefit from a comprehensive strategy to guide its future contributions. The strategy and an overarching plan of action for the relevant Commonwealth and State/Territory government agencies could form the framework for regional bilateral and multilateral fisheries relations. Such a strategy should be well informed by the current position and outlook for fisheries in each country.





A two stage approach is suggested, beginning first with a national analysis of the issues and options, and, secondly, engaging Australia's neighbours following the national analysis.

The first stage would be under the joint leadership of the Departments of Agriculture, Fisheries and Forestry, Environment and Heritage and Foreign Affairs and Trade, and would be a national analysis of the need for and future form of a comprehensive fisheries engagement of Australia with the countries of Southeast Asia and Papua New Guinea. The initial analysis and forward planning should include at least the following Commonwealth agencies: DAFF, AFMA, DFAT, DEH, AusAID, ACIAR, Australian Customs Service, Department of Defence, CSIRO and AIMS, plus relevant state fisheries and other agencies.

The Lowy Institute is encouraged to take the analysis beyond government agencies by placing the issue of Australia and Southeast Asian fisheries on its work agenda, It could, for example, host a dialogue between Australian and Southeast Asian experts on the types of reforms recommended by this paper.

On the basis of the above analyses and the development of the proposed national approach thereby developed, and under the coordination of an agreed Australian lead agency or team, Australia should seek to stimulate interest in dialogue and engagement among Southeast Asia and Papua New Guinea governments. A list of possible themes, with the emphasis on making policy implementation effective, should include:

1. Effectively reducing fishing capacity (boats, gear and the number of fishers) and creating alternative options for today's fishers.

    a) Developing and implementing fisheries right systems.
    b) Improving fish quality and strategies for getting the greatest return from limited catches.
    c) Finding common grounds for action on non-tariff barriers to trade.

2. Making fisheries regulation effective.

    a) Research and development cooperation, focused on research inputs to policy and management.
    b) Implementing improved fisheries management, co-management and stakeholder inclusion in management.
    c) How ecosystem-based fisheries management can be implemented in the region and finding a stronger voice for fisheries in ocean and coastal policy and planning.
    d) Incorporating actions to reverse or mitigate the effects of the degrading environment and ecosystem into fisheries management.

### *General principles of Australia's fisheries engagement*

Whether 'business as usual' or the comprehensive approach prevails, Australia could embed a number of general principles into all its bilateral and multilateral fisheries discussions and support. Southeast Asian governments are challenged in attempting to make their fisheries sustainable and yet analyses of development assistance show that investments such as loans that enable the necessary changes will repay themselves. However these investments must be multi-faceted and mutually reinforcing.[264] Therefore, Australia's fisheries policy-related assistance to Southeast Asian countries should pay off in terms of a rigorous cost benefit analysis, although the assistance would not take the form of loans. All collaboration and assistance should be guided by underlying principles with proven benefit in achieving better fisheries outcomes, such as inclusive management processes, establishing fisheries rights and looking beyond the catching sector to take a fish supply chain approach.

Australia should give priority to helping Southeast Asian countries to build their capacity for fisheries management, policy development, research and information management in fields in line with the needs of improving country and regional fisheries management. Part of this capacity development would be to help fisheries department personnel to extend their activities beyond the fisheries domain to





where many of the fisheries problems originate. Examples include habitat destruction and coastal pollution including within integrated coastal management schemes.

Australia should embed the principle of stakeholder inclusion in its fisheries interventions, stressing to regional partner countries the importance of including views from fishers' representatives, environmental organisations, community and women's interests, consumers and the private sector representing the retail, food service and fish processing sectors.

With appropriate sensitivity to other countries' priorities, Australian fisheries cooperation programs should help these countries to develop rights based fisheries management systems that are suited to the fisheries political, cultural and economic circumstances.

Given the rudimentary state of knowledge of many of the key fisheries resources, their fisheries and supply chains, Australia should substantially increase its number of cooperative fisheries and level of marine conservation research to support the needs of a long term comprehensive engagement with fisheries.

Australia should join with regional bodies such as APFIC, ASEAN and SEAFDEC to create a regional process of fisheries resource assessments targeted to providing advice to fisheries managers, and in a form suitable for their use. The resource assessment system should use the current country and regional fisheries arrangements and should aim to provide regular assessments within the next three to five years.

In cooperative actions with neighbouring countries, especially Indonesia, Australia should be careful to clarify national responsibilities and exercise care not to step over national lines in its enthusiasm for fast action. For example, the joint program to educate Indonesian fishers on Australian fisheries laws would appear to be an Indonesian government responsibility and Australia should take an appropriate back seat.

### *Improving regional fisheries management organisations*

Australia should continue active work through its membership of regional fisheries and economic bodies to persuade Indonesia, Thailand, the Philippines and other Southeast Asian countries to sign and ratify

international fisheries agreements and conventions. The three regional tuna fishing agreements and their supporting bodies are of the highest priority, namely those for southern bluefin tuna, Pacific and Indian ocean tuna. Australia should also continue and even accelerate programs of technical assistance to build the capacity of these countries to monitor, collect accurate statistics and manage their tuna fishing fleets.

### *Fixing up the 'MOU Box' arrangements*

With the cooperation of the Government of Indonesia to help understand and define the historical, current and likely future patterns of fishing vessels, Australia should make changes that will be suitable for the long term to access for traditional Indonesian fishers to parts of Australian waters under the Ashmore and Cartier reef area (termed the 'MOU Box') of northwest Australia. The long-term plan should be based on Australia's decision to protect the resources of the Box through the marine parks, while honouring the non-obligatory decision Australia made in the 1970s to preserve some access to Indonesian boats with historical linkages. The modern interpretation of such historical linkages and the current rights need to be carefully crafted to prevent the area becoming, as it has, a refuge for large numbers of illegal vessels fishing elsewhere in the Australian EEZ.

### *Informing consumers*

In Southeast Asia, Australia should promote market-based instruments such as country-of-origin labelling and identification of the complete chain of custody for more fisheries products to help in the fight against illegal fishing and in increasing public awareness of and pressure for sustainable fish products.

### *Making decentralisation work*

Australia's experience with the Offshore Constitutional Settlement and, more generally, its three tiered government system, could offer insights, albeit to a different and more complex coastline, of how management authorities and accountabilities may be approached.





### *Supporting the marine environment*

Australia's regional marine planning approach, as embraced in Australia's Oceans Policy, could offer models for ecosystem-based approaches across levels of government. Australia should also continue to support its marine environmental assessment work with global and regional networks for coral reefs, mangroves and seagrasses. It should also see how marine-conservation efforts in the region, such as COREMAP, could ensure that more attention is given to seagrass assessment and protection, given the importance of seagrass habitats in fisheries.

# Chapter 9

## Conclusions

As Southeast Asian fishers strive harder and venture further, fishing both legally and illegally, Australia and its neighbouring Southeast Asian countries, plus Papua New Guinea, are increasingly enmeshed in a web of shared fish stocks, illegal domestic and cross-border fishing and closer trade relationships.

In its public policy, Australia has moved far down the road towards responsible ecosystem-based fisheries management and safe, fair food trade. Southeast Asian countries, several of whom are major world fishing and fish-trading nations, are more inclined to still view their fisheries as means to shorter-term economic and social development goals. All have realised the need to reverse the decline in fish stocks and have acknowledged the ways forward, for example with the commitment made at the August 2006 APFIC meeting. What remains is the execution of this commitment, a non-trivial undertaking in political and financial terms, as Australia well knows. Southeast Asian governments lack the capacity and the financial resources to expedite all the necessary steps.

Although Australia does not make development assistance loans, its contribution to the reform processes could still be highly effective through a long-term, regional comprehensive fisheries engagement such as described in this paper. Technical cooperation, research collaboration,

capacity building and sustained international diplomacy on fisheries and the marine environment would be Australia's mechanisms. This new wave of engagement could also lead more Southeast Asian countries to give priority to development loans for improving their fisheries and marine environment management. It could also support initiatives for fisheries to have a more integrated role in ocean and coastal management policy.

The comprehensive engagement would be based on Australia's current and productive roles in regional fisheries and marine environment bodies, its fisheries research and development assistance capacity and be based on Australia's national interests in the region. The engagement should proactively include non-government actors, especially from the fishing industry, retail, food service and fish trade arms of the private sector and competent conservation organisations. Australia has shown from its past endeavours, such as the ASEAN-Living Coastal Resources project, its Pacific regional fisheries support, and its scholarship programs, that timely, well-focused and delivered investments have lasting benefits long after the project is over. Now is the time to make the next investment for the future of fish, fishing and the marine environment.



# Glossary

*Aquaculture:* The farming of aquatic organisms in inland and coastal areas, involving intervention in the rearing process to enhance production and the individual or corporate ownership of the stock being cultivated.**

- *Brackish water aquaculture:* Farming of fish and other aquatic life in brackish water (water of lower salinity or saltiness than that of the sea). Most prawn (shrimp) culture is carried out in brackish water ponds.
- *Freshwater aquaculture:* Farming of fish and other aquatic life in freshwater ponds or cages in lakes, rivers, reservoirs. Fish may also be cultivated in rice field floodwaters.
- *Marine aquaculture (mariculture):* Farming or artificial rearing of fish and other aquatic life in marine waters, especially in cages (fish), on racks (shellfish) and in coastal ponds.
- *Restocked and stock enhanced fisheries:* Fisheries for which juveniles are released into the wild to augment or rebuild wild populations. This technology is not well developed yet in Southeast Asia and Australia.

*Billfish:* A group of tuna-like fish species comprising marlins, sailfish and spearfish which are characterised by a snout which extends into a bill or spear.*

*Bycatch:* Or *by-catch*. Part of a catch of a fishing unit taken incidentally in addition to the target species towards which fishing effort is

directed. Some or all of it may be returned to the sea as discards, usually dead or dying.*

*Capture fishery (plural fisheries):* The sum (or range) of all activities to harvest a given fish resource. It may refer to the location (e.g., Morocco, Gearges Bank), the target resource (e.g., hake), the technology used (e.g., trawl or beach seine), the social characteristics (e.g., artisanal, industrial), the purpose (e.g., (commercial, subsistence, or recreational) as well as the season (e.g., winter).*

- *Inland capture fisheries:* Activities that harvest fish and other aquatic life from natural stocks in fresh waters (mainly rivers and lakes).
- *Marine capture fisheries:* Activities that harvest fish and other aquatic life from natural stocks in marine waters (along coasts and in seas and oceans). In Australia and Southeast Asia, a wide range of sizes and types of fishing vessels and fishing equipment (termed fishing gears) are used to capture the many different types of fish, crabs, prawns, squid and other marine life.

*Demersal:* Living in close relation with the bottom and dependent on it. Example: cods, groupers and lobsters are demersal resources. The term 'demersal fish' usually refers to the living mode of the adult.*

*Fish:* Used as a collective term, includes molluscs, crustaceans and any aquatic animal that is harvested.*

*Fisher:* A gender-neutral name for a person (male or female) participating in a fishery*

*Fishmeal:* Protein-rich meal derived from processing whole fish (usually small pelagic fish, and by-catch) as well as residues and by-products from fish processing plants (fish offal). Used mainly as agriculture feeds for poultry, pigs and aquaculture feeds for carnivorous aquatic species.*

*Food fish:* A fish that is eaten directly by humans for food.

*Gillnet:* Or entangling net. With this type of gear, the fish are gilled, entangled or enmeshed in the netting … These nets can be used either alone or, as is more usual, in large numbers placed in line ... According to their design, ballasting and buoyancy, these nets may be used to fish on the surface, in midwater or on the bottom.*

*Longline:* A fishing gear in which short lines carrying hooks are attached





to a longer main line at regular intervals. Longlines are laid on the bottom or suspended horizontally at a predetermined depth with the help of surface floats. The main lines can be as long as 150 km and have several thousand hooks (e.g., in tuna fisheries).*

*Non-edible products (fish):* Products that are not eaten, such as those for ornament, e.g., pearls, mother-of-pearl, for recreation e.g., aquarium fish, bait.

*Overfished (overexploited):* A stock is considered 'overfished' when exploited beyond an explicit limit beyond which its abundance is considered 'too low' to ensure safe reproduction. In many fisheries fora the term is used when biomass has been estimated to be below a limit biological reference point that is used as the signpost defining an 'overfished condition'. This sign post is often taken as being FMSY but the usage of the term may not always be consistent.*

*Pelagic fish:* Fish that spend most of their life swimming in the water column with little contact with or dependency on the bottom. Usually refers to the adult stage of a species.*

*Pump boat:* A pump boat is an outrigger canoe powered by a small gasoline or diesel engine. (*http://en.wikipedia.org/wiki/Pump_boat)*

*Purse seine*: Nets characterised by the use of a purse line at the bottom of the net. The purse line enables the net to be closed like a purse and thus retain all the fish caught. The purse seines, which may be very large, are operated by one or two boats …*

*Sea cucumber:* Animals of the same scientific group as starfish, also called sea slugs. When boiled, dried, and smoked the flesh, called *beche de mer,* is used in Asian cuisine, especially Chinese. Many species are taken. In Indonesia, the dried product is called *trepang,* and in Malaysia, *gamat*.

*Trap fishing*: Fishing by means of devices able to trap fish in confined environment (traps, pots) often designed and baited to catch a particular species: crab pot, lobster pot, tuna trap.*

*Trawl:* A cone or funnel-shaped net that is towed through the water by one or more vessels.*

* FAO glossary of fisheries www.fao.org/fi/glossary/default.asp

** Glossary of aquaculture www.fao.org/fi/glossary/aquaculture.

## Common and scientific names of species referred to in this paper

Where the common name used in the text can be referred to an accepted scientific name, these pairs of names are given in this table. Where the name or group of fish may cover a large number of species or where the species covered by the common name are unclear in some way, a general description appears in the glossary above, e.g., billfish. In this era of electronic information, such a listing provides a link to scientific papers on any of the species mentioned and enables policy and review information such as that presented in this paper to be located. In the case of finfish, the source reference is the electronic encyclopaedia, FishBase — www.fishbase.org. Note that categories for many of the aggregate species mentioned in the text may include several to hundreds of species.

| **Common Name Used in this paper** | **Scientific name** |
|---|---|
| Abalone (tropical) | *Haliotis asinine* |
| Barramundi (also called sea bass in Southeast Asia) | *Lates Calcarifer* |
| Basa (and Mekong basa) (a catfish) | *Pangasius bocourti* |
| Snapper:<br>Gold-banded snapper<br>Red snappers | *Pristipomoides multidens*<br>*Lutjanus erythropterus, L. malabaricu* |
| Green snail | *Helix aperta* |
| Kembong (Malaysia); Indian mackerel, Indo-Pacific mackerel (Thailand) | *Rastrelliger brachysoma, R. neglectus, R. Kanagutta* |
| Mud crab | *Scylla serrata, S. paramamosain, S. olivacea and S. tranquebarica* |





| | |
|---|---|
| Oceanic tuna (main species): | |
| • Bigeye tuna | *Thunnus obesus* |
| • Skipjack tuna | *Katsuwonus pelamis* |
| • Yellowfin tuna | *Thunnus albacares* |
| • Southern bluefin tuna | *Thunnus maccoyii* |
| Prawns | *Penaeus* species, *Metapenaeus* species, *Fenneropenaeus* species, and others |
| Small pelagic species (includes many species, only a few are mentioned here) | |
| • Kembong | (see above) |
| • Round scad (galunggong – Philippines) | *Decapterus* species |
| • Scads | *Decapterus macrosoma, D. russeli,* |
| • Sardinella | *Sardinella fimbriata*, others |
| Spanish mackerel | *Scomberomorus commerson* |
| Tra (also Mekong tra) (a catfish) | *Pangasius hypothalamus* |
| Trepang (sea cucumber, beche de mer) | *Holothuria scabra, H. timana, H. nobilis, H. fuscogilva* |
| Trochus | *Trochus niloticus* |
| Tropical rock lobster, rock lobster | *Panulirus ornatus* |

## Source of figures

### *1. Fisheries Statistics*

Where possible, FAO statistics (www.fao.org/fi/statist/statist.asp) are used as these are fully comparable across countries. For greater detail on Australian statistics, ABARE statistics are used (ABARE. Australian fisheries statistics 2005). FAO statistics are collected by the countries themselves and then reported to FAO for the compilation of aggregated statistical information. However, to ensure common standards, FAO statistical officers work closely with staff from country fisheries agencies in compiling and reporting the information.

Please note that in the FAO statistics, fish catches are allocated to countries on the basis of flag of the catching vessel, and therefore include more than catches within the marine boundaries of the countries. The text describes that Thailand, Indonesia and the Philippines have substantial fishing operations outside their EEZs.

### *2. Currencies*

Value in this report are given either in Australian dollars (A$) or US dollars (US$).



## Annexure

**Australia and Southeast Asia memberships in key regional and international multi-lateral organisations, accessions to treaties and conventions relevant to fisheries.**

| **Global arrangements** | | | | |
|---|---|---|---|---|
| **Country** | **UNCLOS[1]** | **UNFSA[2]** | **WTO[3]** | **OIE, Codex Alimentarius[4]** |
| **Australia** | R | R | M | OIE, C.A. |
| **Brunei** | R | - | M | C.A. |
| **Burma** | R | - | M | C.A. |
| **Cambodia** | - | - | M | OIE, C.A. |
| **East Timor** | - | - | - | - |
| **Indonesia** | R | S | M | OIE, C.A. |
| **Malaysia** | R | - | M | OIE, C.A. |
| **Papua New Guinea** | R | R | M | C.A. |
| **Philippines** | R | S | M | OIE, C.A. |
| **Singapore** | R | - | M | OIE, C.A. |
| **Thailand** | S | - | M | OIE, C.A. |
| **Vietnam** | R | - | M | OIE, C.A. |

| Regional arrangements | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Country** | **APEC (FWG, MRCWG)[5]** | **ASEAN[6]** | **IOTC[7]** | **CCSBT[8]** | **WCPFC[9]** | **CCAMLR[10]** | **FAO-APFIC[11]** | **SEAFDEC[12]** |
| **Australia** | M | - | M | M | M | M | M | - |
| **Brunei** | M | M | - | | - | | M | M |
| **Burma** | - | M | - | | - | | M | M |
| **Cambodia** | | M | - | - | - | - | M | M |
| **East Timor** | | - | - | | - | | ? | - |
| **Indonesia** | M | M | C | ? | S | ? | M | M |
| **Malaysia** | M | M | M | | - | | M | M |
| **Papua New Guinea** | - | - | - | | M | | M | - |
| **Philippines** | M | M | M | C | S | | M | M |
| **Singapore** | M | M | - | | - | | < | M |
| **Thailand** | M | M | M | | - | | M | M |
| **Vietnam** | M | M | - | | - | | M | M |

*M = member; R = signed and ratified; S = signed but not yet ratified; O = observer; C = cooperating non-member; OIE = Office International des Epizooties; CA = Codex Alimentarius*





Annexure Notes

1 United Nations Convention on the Law of the Sea 1982 (UNCLOS)
2 United Nations Agreement for the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks 1995 (UNFSA)
3 World Trade Organization
4 Office International des Epizooties
5 Asia Pacific Economic Forum (Fisheries Working Group, Marine Resources Conservation Working Group)
6 Association of Southeast Asian Nations
7 Indian Ocean Tuna Commission
8 Commission for the Conservation of Southern Bluefin Tuna
9 Western and Central Pacific Fisheries Commission, the agency established by the Convention for the Conservation and Management of Highly Migratory Fish Stocks of the Western and Central Pacific
10 Convention for the Conservation of Antarctic Marine Living Resources
11 Food and Agriculture Organization of the United Nations (Asia Pacific Fisheries Council)
12 Southeast Asian Fisheries Development Center

# Notes

1 Throughout, the term 'fish' is used to encompass fish and shellfish, including prawns, crabs, oysters, mussels and other animals eaten as seafood. Also, the term 'seafood' is used to encompass all foods derived from aquatic sources, including marine and freshwater.

2 The most authoritative outlook on world fish stocks is provided in the latest biennial report on world fisheries and aquaculture by the Food and Agriculture Organization (FAO), in FAO, *State of world fisheries and aquaculture 2006*, Rome, FAO, 2007.

3 Ibid. World average per capita aquatic food consumption was nine kg per person in 1961 and 16.5 kg in 2003, although China's growth had a big impact on this rise. In that time, world population has gone from three billion in 1950 to 6.3 billion in 2003. A quarter of fish production does not go to direct human consumption. C L Delgado, N Wada, M W Rosegrant, S Meijer, and M Ahmed, *Fish to 2020: supply and demand in changing global markets*. IFPRI and WorldFish Center, 2003. Southeast Asians have long eaten more than the world average for fish and even their consumption rose by a third between 1973 and 1997.

4 Delgado et al, 2003.

5 Marine Stewardship Council, Seafood sustainability: 97% of Australians are concerned, 2007 www.msc.org/html/ni_279.htm (Accessed 10 June 2007).

6 This paper uses the current ASEAN countries to define Southeast Asian countries. In the main, only the coastal nations are referred to, namely, Burma, Cambodia, Indonesia, Malaysia, Philippines, Singapore, Thailand, Vietnam.

[7] A Caton, and K McLoughlin, (eds) *Fishery status reports 2004: status of fish stocks managed by the Australian government*. Canberra, Bureau of Rural Sciences, 2004.

[8] Australia ranked number 51 in production volume in 2004 (FAO FISHSTAT 2006. www.fao.org/fi/statist/statist.asp)

[9] Many aquatic organisms grown in aquaculture require feeding as natural food in their ponds and cages is not sufficient for good growth. A key ingredient of most fish feeds is other fish, notably lower value and small fish that are either incidental to the target catch, or deliberately caught for the purpose of manufacture into fishmeal and fish oils. Fish based feeds are also used for terrestrial animals and fertilizer. As aquaculture grows, so does the need for fish feed. Thus, the growth of aquaculture puts an additional pressure on natural fish stocks that also provide the fish via feeds.

[10] W T White, P R Last, J D Stephens, G K Yearsley, Fahmi, Dharmadi, Economically important sharks and rays of Indonesia. (Hiu dan pari yang bernilai ekonomis penting di Indonesia). *ACIAR Monograph No. 124*, 2006 (in English and Bahasa Indonesia).

[11] FAO FISHSTAT 2006. www.fao.org/fi/statist/statist.asp.

[12] P Kailola, M J Williams, P Stewart, R Reichelt, A McNee & C Grieve, *Australian fisheries resources.* Bureau of Resource Science & Fisheries Research and Development Corporation, 1993.

[13] B Kearney, B Foran, F Poldy and D Lowe, *Modelling Australia's fisheries to 2050: policy and management implications*. Canberra, Fisheries Research and Development Corporation, 2003.

[14] ABARE, *Australian fisheries statistics 2005*. Canberra, ABARE, 2006.These figures are based on estimates from the Australian Bureau of Statistics and are considered to be underestimates. However, survey methods preclude publication of better estimates, according to ABARE.

[15] This survey was conducted by the Australian Bureau of Statistics, reported in ABARE, 2006.

[16] ABARE, 2006.

[17] ABARE, 2006.

[18] *National competition policy review of Commonwealth fisheries legislation*.

[19] *Looking to the future: a review of Commonwealth fisheries policy.* Canberra, Commonwealth Department of Agriculture, Fisheries and Forestry — Australia (DAFF), 2003.





[20] *Australia's oceans policy.* Canberra, Commonwealth of Australia, 1988.

[21] AFMA and Natural Heritage Trust (undated), Guide to the ecological risk assessment framework and management, available on www.afma.gov.au

[22] J W Penn, W J Fletcher and F Head, (eds) *State of the fisheries report 2004/05*. Perth, Department of Fisheries, Western Australia, 2005. The Western Australian state managed marine fisheries are reported in four eco-regions.

[23] Commonwealth of Australia, *Ashmore Reef national nature reserve and Cartier Island marine reserve (Commonwealth waters) management plans.* Canberra, Environment Australia, 2002; and M Kospartov, M Beger, D Ceccarelli and Z Richards, *An assessment of the distribution and abundance of sea cucumbers, trochus, giant clams, coral, fish and invasive marine species at Ashmore Reef National Nature Reserve and Cartier Marine Reserve, 2006.* Uniquest Report for the Department of Environment and Heritage, 2005.

[24] J J Fox and S Sen, *A study of socio-economic issues facing traditional Indonesian fishers who access the MOU Box*. Canberra, Environment Australia, 2002.

[25] N Stacey, *Crossing borders: implications of the Memoradum of Understanding on Bajo fishing activity in northern Australian waters*. South Pacific Regional Environment Programme, Report for Environment Australia, 2001; N Stacey, *Boats to burn: Bajo fishing activity in the Australian fishing zone.* ANU Asia-Pacific environment monograph 2, 2007.

[26] Fox and Sen, 2002.

[27] P Gooday, *Economic aspects of fisheries policy.* ABARE Report 04.18, prepared for the Australian Government Department of Agriculture, Fisheries and Forestry, Canberra, 2004.

[28] AFMA, *Future operating environment for Commonwealth fisheries*. 2005.

[29] P Shoulder, Commonwealth fisheries management — what does the future hold? paper prepared for the ABARE outlook conference 2006, 2006.

[30] AFMA, 2005. The consultation documents, released in March 2007, are at www.daffa.gov.au/fisheries/domestic/harvest_strategy_policy;

[31] Minister for Defence, Minister for Justice and Customs, Minister for Fisheries, Forestry and Conservation, $388.9m budget boost in fight against illegal foreign fishing in Australian waters, Australian Government Budget 2006-07. Press release, 9 May 2006.

[32] G R Morgan and D J Staples, The history of industrial marine fisheries

in Southeast Asia. *FAO RAP Publication 2006/12*, Food and Agriculture Organization of the United Nations Regional Office for Asia and the Pacific, 2006.

33 P Zeroni and L Wood, Fishery status reports 2004. *Fisheries and mines, fishery report No. 82,* Department of Primary Industry, 2004.

34 With respect to the co-occurrence of species, in the Australian, Indonesian and German trawl study of the early 1980s, scientists identified that 31% of the 1138 fish species recorded in the Northwest Shelf, Timor Sea and Indian Ocean south of Java Island, occurred both in Indonesian and in Australian waters (T Gloerfelt-Tarp and P Kailola, *Trawled fishes of southern Indonesia and northwestern Australia.* AIDAB/DGF/GTZ, 1984). Similarly, 60 out of 137 species (44%) of sharks, rays and chimeras occurred in both Australian and Indonesian waters (W T White, P R Last, J D Stephens, G K Yearsley, Fahmi, Dharmadi, Economically important sharks and rays of Indonesia (Hiu dan pari yang bernilai ekonomis penting di Indonesia). *ACIAR Monograph No. 124,* 2006. This does not mean, however, that all the stocks of the co-occurring species are shared.

35 See Australian Department of Agriculture, Fisheries and Forestry, www.daff.gov.au

36 Blaber et al, 2005; P Zeroni and L Wood, 2004.

37 G Williams, Torres Strait lobster fishery, in *Fishery status reports 2004: status of fish stocks managed by the Australian Government*. A Caton and K McLoughlin (eds), Canberra, Bureau of Rural Sciences, 2004. pp 43-52.

38 In 2004 the Asia-Pacific Fisheries Commission of FAO reviewed the regional arrangements for fisheries in the broader Asia-Pacific region (APFIC. Regional Arrangements for Fisheries: An Analysis of Gaps and Opportunities. 28th Session, APFIC, Chiang Mai, Thailand, 3-5 August 2004). The report documented 35 'arrangements' among countries, classified as regional fisheries management bodies, economic cooperation arrangements, combined environmental and fisheries arrangements and science arrangements. Australia would be party to or supportive of many of these arrangements.

39 M Osborne, *Southeast Asia: an introductory history*. Sydney, Allen & Unwin, 9th edition, 2004.

40 Butcher described the economic history of fisheries in peninsular Malaysia and western Indonesia from 1850 to the 1960s and for the whole Southeast Asian region from 1850 to 2000 (J Butcher, The marine fisheries of the Western Archipelago: towards an economic history, 1850 to the 1960s, in *Baseline studies in biodiversity: the fish resources of Western Indonesia.* D Pauly and P Martosubroto (eds), ICLARM Stud. Rev. 23 1996, pp 24-39; and J G Butcher, *The closing frontier: a history of the marine fisheries of Southeast Asia c. 1850-2000,* Singapore, ISEAS, 2004). Silvestre, Pauly, Stobutzki and many scientists from the region studied the fisheries of the region from about 1950 to the present (G Silvestre, G I Stobutzki, M Ahmed, R A Valmonte-Santos, C Luna, L Lachica-Alino, P Munro, V Christensen and D Pauly, *Assessment, management and future directions for coastal fisheries in Asian countries.* Penang, WorldFish Center Conference Proceedings Vol. 67, 2003 and www.worldfishcenter.org/trawl/ 2003); and for sharks and whales, HMAP, *Census of marine life: history of marine animal populations*, 2006, www.coml.org

41 For the early 1900s, Butcher highlighted the linkages in dried and salted fish trade between Sumatra, Java and the Malaya and Burma, Thailand and Vietnam in Southeast Asia, as well as Hong Kong, India and Arabia outside the region (Butcher, 1996).

42 Butcher, 1996. However, small quantities of fish flavoured sauce could require much larger quantities of fish as a base.

43 For example, for the late 1800s, Butcher,1996 described an earlier 'commercial revolution' in fishing in the region that was due to urban population growth, economic growth in mining and plantation agriculture and served by the economics of fish processing and transport.

44 Butcher, 2004.

45 M J Williams, The transition in the contribution of living aquatic resources to food security, *International Food Policy Research Institute: Food agriculture and the environment discussion paper No. 13*, April 1996.

46 C Bene, When fishery rhymes with poverty: a first step beyond the old paradigm of poverty in small scale fisheries. *World development,* Vol. 31, 2003. pp 949-975.

47 WorldFish Center, 2005.

48 WorldFish Center, 2005.

49 Delgado et al, 2003.

50 Delgado et al, 2003.

[51] Alexander Downer, Minister for Foreign Affairs, *Australian Aid: Promoting growth and stability. A White Paper on Australia's overseas aid program*, Canberra, AusAID, 2006.

[52] See www.fishforall.org for an extract of the relevant sections on fisheries in the WSSD Plan of Implementation.

[53] APFIC, Asia agrees to reduce trawling and push net fishing. Press release, 23 August 2006.

[54] Recent studies have examined the progress and effectiveness of RFMOs, concluding that many are becoming effective fisheries management bodies and highlighting the key factors that impede effectiveness. See A Willock and M Lack, *Follow the leader: learning from experience and best practice in regional fisheries management organizations.* WWF International and TRAFFIC International, 2006; J Swan, Decision-making in regional fishery bodies or arrangements: the evolving role of RFBs and international agreement on decision-making processes. *FAO fisheries circular No. 995*, Rome, FAO, 2004.

[55] For example, Malaysia and Indonesia are still negotiating sea territory in the Sulu Sea off the northeast coast of Borneo/Kalimantan, involving the islands of Sipadan, Ligitan and, separately, the Ambalat oil block. Malaysia won a decision of the International Court of Justice in 2002 on Sipadan and Ligitan but Indonesia is establishing settlements on small islands in the Sulu Sea to assist further claims. Indonesia also has borders to be settled with the new nation of East Timor, Singapore and some of its Australian boundary.

[56] A D Lewis, Review of tuna fisheries and the tuna fishery statistical system in the Philippines. Paper prepared for the Preparatory Conference for the Commission for the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific, with funding from the Australian Centre for International Agricultural Research, by the Oceanic Fisheries Programme, Secretariat of the Pacific Community, Noumea, New Caledonia, November 2004.

[57] Western and Central Pacific Fisheries Commission, 2nd Session 12-16 December 2005, Report of the Scientific Committee held 8-19 August 2005.

[58] C H Proctor, I Gede, S Merta, M Fedi, A Sondita, R I Wahju, T L O Davis, J S Gunn and R Andamari, A review of Indonesia's Indian Ocean tuna fisheries. *ACIAR Project FIS/2001/079*, December 2003.





[59] L Clark, The potential of fisheries to contribute to growth and poverty reduction — input paper to roundtable discussions. Pacific 2020 reported that the fisheries for highly migratory species provided $US8-900 million to the Pacific Island countries in 2005, an increasing share of which was being caught by vessels owned by these countries and processed in plants in their countries.

[60] www.aseansec.org

[61] B Rivera, Fishers planning summit protest alarmed by security measures. *Philippine Daily Inquirer*, 6 December 2006.

[62] M Heazle, Regional fisheries regulation as a solution to Southeast Asia's emerging fisheries crisis. Paper presented at People and the sea IV MARE, University of Amsterdam, July 2005.

[63] AusAID currently supports the six-year $A45 million ASEAN-Australia Development Cooperation Program that includes two fisheries and seafood elements, namely, Operationalise guidelines on responsible movement of live food finfish and Strengthening aquatic animal health capacity and biosecurity in ASEAN.

[64] The three global networks that grew out of this project are the Global Coral Reef Monitoring Network; mangrove status reporting by the International Society of Mangrove Ecosystems and SeagrassNet and its seagrass global monitoring program.

[65] Butcher, 2004 provides considerable detail on the role of Japanese fishers and fishing methods in Southeast Asian countries from the early years of the 20th Century.

[66] PEMSEA (Partnerships in Environmental Management for the Seas of East Asia), *Sustainable development strategy for the seas of East Asia: regional implementation of the World summit on sustainable development requirements for the coasts and oceans*. Quezon City, PEMSEA, 2003.

[67] Agreement between the Republic of Indonesia and Australia on the Framework for Security Cooperation, 2006. www.dfat.gov.au/geo/indonesia/ind-aus-sec06.html

[68] Silvestre et al 2003; and E Lubis, A B Pane, I Y Kurniawan, J Chaussade, C Lamberts and P Pottier, *Atlas of fisheries and fishing ports of Java: A geographical approach to Indonesian fisheries.* CNRS-LETG UMR 6554, Geolittomer, University of Nantes (France) and Program Kajian

Kepelabuhanan Perikanan dan Transportasi Maritim, Lembaga Penelitian — Institut Pertanian Bogor (Indonesia), 2005. p119.

69 Butcher, 2004.

70 FAO, 2005, State of world fisheries and aquaculture 2004. Rome, pp153.

71 Lubis et al, 2005.

72 Lubis et al, 2005.

73 B E Priyono, Socioeconomic and bioeconomic analysis of coastal resources in Central and Northern Java, Indonesia, in *Assessment, management and future directions for coastal fisheries in Asian countries*. G Silvestre et al (eds), 2003. pp 479-516.

74 I Siason et al, Women in fisheries in Asia, in *Global symposium on women in fisheries. Sixth Asian Fisheries Forum.* M J Williams, N H Chao-Liao, P S Choo, K Matics, M C Nandeesha, M Shariff, I Siason, E Tech and J M C Wong (eds), 29 November 2001, Kaohsiung, Taiwan, 2002. p 21-48.

75 Purwanto, Status and management of the Java Sea fisheries, in *Assessment, management and future directions for coastal fisheries in Asian countries.* G Silvestre et al 2003. pp 793-832; and Lubis et al, 2005.

76 Lubis et al, 2005.

77 Priyono, 2003.

78 Priyono, 2003.

79 Priyono, 2003.

80 Lubis et al, 2005.

81 Purwanto, 2003.

82 Priyono, 2003; Purwanto, 2003.

83 WorldFish, 2005.

84 Scientists have only just begun to explore the biogeography of marine species in Indonesia, exploring the extent to which species and different genetic stocks within a species are shared and separated across Wallace's Line, Lydekker's Line and across the tectonic plates — the Indian-Australian Plate and the Eurasian Plate (on which Indonesia and the Philippines rest). The studies do not rule out either the sharing of fish stocks or that sharing is more the exception than the rule, with the balance of evidence mounting that many stocks are separated by one or the other line (K E Carpenter and V G Springer, The centre of the centre of marine shore fish biodiversity: the Philippine Islands. *Environmental biology of fishes,* Vol. 72, 2005. pp 467–480; B B Collette, Is the east-west division of haplotypes of the three-spot seahorse along Wallace's Line novel among marine organisms? *Journal of Biogeography* Vol. 32, 2003. p 1281).

85 J Findlay, Southern Bluefin Tuna Fishery, in *Fishery status reports 2004: Status of fish stocks managed by the Australian Government*. A Caton, and K McLoughlin (eds), Bureau of Rural Sciences, Canberra, 2004. pp 85–96.

86 C H Proctor, I Gede, S Merta, M Fedi, A.Sondita, R I Wahju, T L O Davis, J S Gunn and R Andamari, A review of Indonesia's Indian Ocean tuna fisheries. ACIAR Project FIS/2001/079, December 2003.

87 Source: www.ccsbt.org; Commission for the Conservation of Southern Bluefin Tuna: Report of the Twelfth Annual Meeting of the Commission, 15 October 2005, Narita, Japan.

88 ACIAR project FIS/2002/019: Management and policy frameworks for illegal, unreported and unregulated (IUU) fishing in Indonesian and Philippine waters; and project FIS/2002/074: Capacity development to monitor, analyse and report on Indonesian tuna fisheries (details available on www.aciar.gov.au ).

89 ACIAR Project FIS/2003/037, Artisanal shark and ray fisheries in Eastern Indonesia and their relationships with Australian resources. (details available on www.aciar.gov.au ); W T White, et al, 2006.

90 S J M Blaber, C M Dichmont, R C Buckworth, B Badrudin, S Sumiono, B Nurhakim, B Iskandar, D C Fegan, J P Ramm, Salini, Shared stocks of snappers (Lutjanidae) in Australia and Indonesia: Integrating biology, population dynamics and socio-economics to examine management scenarios. *Reviews in fish biology and fisheries,* Vol.15, 2005 pp111-127.

91 Butcher, 2004.

92 These assessments are prepared by the National Committee on Stock Assessment and published by the Directorate General of Fisheries, under the title: *Potensi dan Penyebaran Sumberdaya Ikan Laut Di Perairan Indonesia.*

93 Several papers in D Pauly and P Martosubroto, (eds) Baseline studies of biodiversity: the fish resources of Western Indonesia. *ICLARM Stud.Rev*. Vol. 23, 1996; and Priyono, 2003.

94 P Martosubroto, W Subagyo, S Utoyo and S C Venema, Report of the working group on management, in S C Venema (ed.), *Indonesia/FAO/Danida workshop on the assessment of the potential of the marine fishery resources of*

*Indonesia*, Jakarta, 13 - 24 March 1995. FAO, Rome, Italy,1997. p 41 - 62.

[95] T H Brown, D Bengen, M Knight, 2005. *Future scenario analysis of marine fisheries in Indonesia: Economic role, industry trends, regional trends, future potential*. CRMP II and Bappenas, Jakarta, Indonesia, 2005.

[96] Silvestre et al, 2003b.

[97] Purwanto, 2003.

[98] See McElroy, The Java Sea purse seine fishery: A modern day 'tragedy of the commons'. *Marine Policy* Vol.15, 1991. pp 255-271. Cited in J Butcher, 2004.

[99] J Widodo and J-R Durand, Java Sea pelagic fisheries assessment project issues final report. *EU fisheries bulletin,* Vol. 10, 1997. pp19-21.

[100] Brown et al, 2005.

[101] K Tun, L M Chou, A Cabanban, V S Tuan, T Philreefs, Yeemin, Suharsono, K Sour and D Lane, Status of coral reefs, coral reef monitoring and management in Southeast Asia, in *Status of coral reefs of the world: 2004* Vol. 1. C Wilkinson (ed.), Australian Institute of Marine Science, Townsville, Queensland, Australia, 2004. pp 235-275.

[102] Tun et al, 2004.

[103] Then named AIDAB.

[104] M K Moosa, Implementing policy and strategy for coral reef rehabilitation and management: Lessons learnt from Indonesian effort, in *Economic valuation and policy priorities for sustainable management of coral reefs*. M A Ahmed, WorldFish Center, 2004. pp159-169.

[105] In the 1920s and 1930, Japanese fishing companies introduced one of the first destructive fishing practices to the reefs in Indonesia, Philippines and Singapore, namely, *mouri ami* fishing using large teams of fishers who herded fish into a large net by forming a moving wall of people and lines stretching to the reef. The lines ended in rocks that were banged against the coral as part of the herding action. This method was later taken up by Southeast Asian countries, outlawed in the 1980s but still continues sporadically to the present. As well as damaging the reefs, the method was so effective that the fishing teams did not revisit the same reefs for some months or even years after the first visit. The introduction of this fishing method is described in J Butcher, 2004, and has been the subject of films and documentaries in the Philippines, including the issue of child labour used by current operators.





[106] M L Wilkie, and S Fortuna, FAO status and trends in mangrove area and extent worldwide. Forest Resources Assessment *Working Paper No. 63*. Forest Resources Division, FAO, Rome. 2003. (Unpublished).

[107] Wilkie and Fortuna, 2003.

[108] R R Lewis (III), M J Phillips, B Clough and D J Macintosh, *Thematic review on coastal wetland habitats and shrimp aquaculture. Report prepared under the World Bank, NACA, WWF and FAO consortium program on shrimp farming and the environment. Work in progress for public discussion.* Published by the Consortium, 2003.

[109] T E Kuriandewa, W Kiswara, M Hutomo, and S Soemodihardjo The seagrasses of Indonesia, in *World atlas of seagrasses.* E P Green and F T Short (eds), United Nations Environment Program and World Conservation Monitoring Center, 2003. pp 171-182. Interest in the study of seagrasses in Indonesia effectively began with the 1986-1994 ASEAN-Australia Living Coastal Resources project, funded by AIDAB/AusAid and implemented by AIMS and other institutes mainly involved in research.

[110] Kuriandewa et al, 2003.

[111] WorldFish Center, 2005.

[112] M M Dey, M A Rab, K M Jahan, A Nisapa, A Kumar and M Ahmed, Food safety standards and regulatory measures: implications for selected fish exporting Asian countries. *Aquaculture economics & management,* Vol. 9. pp 217-236.

[113] WorldFish Center, 2005.

[114] Indonesia bans imports of shrimp from six countries. *Antara*, 3 December 2005.

[115] M J Williams, Who will supply world demands for fish? Second International Conference on Cage Aquaculture in Asia, Hangzhou, China, 3-6 July 2006. A recent study in the United Kingdom by Greenpeace claimed that supermarkets sell 90% of retail fish in the UK (Greenpeace 2005. A Recipe for Disaster: Supermarkets' Insatiable Appetite for Seafood.www.greenpeace.org.uk )

[116] Indonesia Investment Coordinating Board, Thai fishing firms to invest in RI. *Jakarta Post,* 11 August 2006.

[117] Law No. 22/1999 on Regional Administration (1999).

[118] WorldFish Center, 2005.

[119] WorldFish Center, 2005.

[120] Article 10 of Law No 22/1999 on Regional Administration (1999). Update 2004 Law 32.

[121] RI suffers US $3 billion loss due to illegal fishing. *Antara*, 30 May 2007. www.antara.co.id/en/arc/2007/5/30/ri-suffers-us-3-billion-loss-due-to-illegal-fishing

[122] R Hannesson, D Fraser, S Garcia, J Kurien, Z Makuch, M Sissenwine, G Valdimarsson, M Williams, *Governance for a sustainable future: II fishing for the future*, a report by the World Humanity Action Trust, 2000.

[123] J J Fox, Dedi Supriadi Adhuri and Ida Aju Pradnja Resosudarmo, Unfinished edifice or Pandora's box? Decentralisation and resource management in Indonesia, in *The politics and economics of Indonesia's natural resources.* B P Resosudarmo (ed.), Singapore, ISEAS, 2005. pp 92-108.

[124] G T Silvestre, L R Garces, I Stobutzki, M Ahmed, R A V Santos, C Z Luna and W Zhou, South and South-East Asian coastal fisheries: Their status and directions for improved management: conference synopsis and recommendations, in *Assessment, management and future directions for coastal fisheries in Asian countries.* G Silvestre, L Garces, I Stobutzki, M Ahmed, R A Valmonte-Santos, C Luna, L Lachica-Aliño, P Munro, V Christensen and D Pauly (eds), Penang, WorldFish Center conference proceedings, Vol. 67, 2003. pp 1-40.

[125] An optimistic view of the new devolved arrangements comes from I M Dutton, The challenges of coastal and marine resource management, in *The politics and economics of Indonesia's natural resources.* B P Resosudarmo (ed.), Singapore, ISEAS, 2005. pp 162-178. Dutton argues that Indonesia is heading in the right direction for sustainable co-management and the attempt deserves long term donor support. Fox et al, 2005 provide a more cautious view that this complex new set of arrangements will be able to surmount the demarcation ambiguities and deliver, with sufficient urgency, the strong natural resource management needed. In addition, corruption is now viewed as more diffuse with greater opportunities for bribe-taking throughout the government levels. See B P Resosudarmo, Introduction, in B P Resosudarmo (ed.), 2005. pp 1-9.

[126] Australia's Oceans Policy, 1998.

[127] Lubis et al, 2005; T Wagey, Arafura and Timor Seas Expert Forum (ATSEF), Prepare for impact! When people and the environment collide in the tropics, paper presented at Charles Darwin University Symposium Series, May 12, 2006; and B Fegan, Box 10.1 Offshore Fishing, in B P Resosudarmo (ed.), 2005. pp 168-169.

[128] MRAG, Review of impacts of illegal, unreported and unregulated fishing on developing countries, *Final Report for DFID, UK*, 2005.

[129] MRAG, 2005.

[130] Lubis et al, 2005; Wagey, 2006. Note that Wagey's work presents the results of an exercise by the Indonesian Ministry of Maritime Affairs and Fisheries to predict the most likely hot spots of fisheries law violations, including from pollution. The analysis was based on the most important and productive fishing areas, areas where illegal activities are already recorded such as dynamite fishing sites, and sites of urban pollution and mining.

[131] Department of Defence announcement 5 April, Darwin Naval Base.

[132] E Abetz, Progress in the war against illegal fishing. Press release, 4 January, 2007.

[133] Wagey, 2006.

[134] Wagey, 2006. In addition, during a personal sailing voyage through Indonesian waters in early 2006, the author counted 57 Chinese trawlers in the Arafura sea on one February morning — this within a horizon of about five nautical miles in radius.

[135] J J Fox, *Report on illegal fishermen in Australian waters: shark fishermen from Merauke, Dobo, Saumlaki and Papela*, Canberra, Australian National University, Research School of Pacific and Asian Studies, 2005.

[136] Minister for Foreign Affairs Australia, Joint Statement, Bali, 29 June 2006. 8th Australia-Indonesia Ministerial Forum.
Ministers welcomed the increased cooperation between Australia and Indonesia in the field of marine affairs and fisheries, covering fisheries management and conservation on shared stock, combating illegal unreported and unregulated (IUU) fishing, enhanced better understanding and management of the MoU Box, and partnership and coordination. Ministers noted the good progress being made on bilateral cooperation to formulate a fisheries management plan for red snapper stock supported by joint research. Ministers reiterated that the problem of illegal fishing in both countries posed significant risks and costs to their natural environments

and economy that need to be solved collaboratively, including through information campaigns, improved information sharing, joint study on illegal fishing, expanding cooperation on coordinated fisheries surveillance activities and enhancing surveillance capacity. Ministers noted the effort by both countries to identify and register fishing vessels in East Nusa Tenggara and Moluccas that entered the MoU Box in order to enhance conservation outcomes in the area. Ministers noted work underway to expand alternative livelihood projects for Indonesian fishing communities. Ministers discussed provisions of the 1982 United Nations Convention on the Law of the Sea, including the obligation of both states under article 73, and in that context the Australian policy of rapid repatriation. Ministers reiterated the importance of the 1997 Perth Treaty entering into force as soon as practical, acknowledging some work needed to be undertaken. Ministers reconfirmed the importance of pursuing cooperative naval activity, where possible.

Ministers agreed that Australia and Indonesia would convene a regional Ministerial Meeting to discuss measures to address the shared problems of illegal fishing. The Ministerial Meeting will be preceded by a senior officials meeting in Jakarta.

137 FAO, 2006.

138 FAO, 2006.

139 FAO, 2006.

140 FAO, 2006.

141 H Josupeit, Global world tuna markets. Paper presented at INFOFISH Tuna Conference, Bangkok, 3-5 June 2004.

142 ABARE, 2006.

143 ABARE, 2006.

144 P Boonchuwongse, and W Dechboon, Socioeconomic assessment of marine fisheries of Thailand, in *Assessment, management and future directions for coastal fisheries in Asian countries.* G Silvestre et al (eds), 2003. pp 577-628.

145 WorldFish Center, 2005.

146 Silvestre et al, 2003b. In fisheries economic theory, maximum economic yield in a fishery occurs when the amount of fishing effort on the resource is somewhat less than the amount of fishing effort at which the maximum sustainable yield is achieved. In the case of most Southeast Asian fisheries, the fishing effort levels are well beyond that for maximum sustainable





(biological) yield and thus even further beyond maximum economic yield.

147 Tokrisna, Renewal fishery resource abundance and poverty eradication for coastal fishermen in Thailand, IIFET 2006, Portsmouth Proceedings, 2006.

148 Tokrisna, 2006.

149 P Saikliang, Managing fisheries and habitat linkages in Thailand: the Prachuap Khiri Khan – Chumphon fisheries *Refugia*. Paper presented at the East Asia Seas 2006 Congress, Haikou, China, 12-14 December 2006.

150 Saikliang, 2006.

151 Silvestre et al, 2003 b.

152 WorldFish Center, 2005.

153 WorldFish Center, 2005.

154 A Kongprom, P Khaemakorn, M Eiamsa-ard and M Supongpan, Status of demersal fishery resources in the Gulf of Thailand, in *Assessment, management and future directions for coastal fisheries in Asian countries.* G Silvestre, et al (eds), 2003. pp 137-152.

155 Silvestre et al, 2003b.

156 Silvestre et al, 2003b.

157 APFIC, 2005.

158 WorldFish Center, 2005.

159 R Tokrisna, APFIC Regional workshop on low value and 'trash fish' in the Asia-Pacific region, Hanoi, Viet Nam, 7-9 June 2005. FAO Regional Office for Asia and the Pacific, 2006; APFIC 2005, Bangkok.

160 Boonchuwongse and Dechboon, 2003.

161 C Wilkinson, (ed.) *Status of coral reefs of the world: 2004* Vol. 1. Townsville, Australian Institute of Marine Science, 2004.

162 Wilkinson, 2004.

163 Wilkinson, 2004.

164 Wilkie and Fortuna, 2003.

165 Lewis et al, 2003.

166 Lewis et al, 2003.

167 S Suwanrangsi, Experiences in the application of HACCP for export and local markets: The case of Thai fisheries, in *Food safety management in developing countries*. E Hanak, E Boutrif, P Fabre, M Pineiro (scientific editors), Proceedings of the International Workshop, CIRAD-FAO, 11-13

December 2000, Montpellier, France, CIRAD-FAO. CIRAD CD-ROM, Montpellier, France, 2002. p 12.

168 Dey et al, 2005.

169 WorldFish, 2005.

170 Tokrisna, 2006.

171 Butcher, 2004 described the strong impact on Southeast Asian countries of the rise in world demand for prawns (shrimp) as a result of consumer markets in Japan in the 1960s and later North America and Europe recognising the convenience of dishes based on prawns.

172 Tokrisna, 2006.

173 Tokrisna, 2006.

174 Suwanrangsi, 2002.

175 Suwanrangsi, 2002.

176 Suwanrangsi, 2002.

177 WorldFish Center, 2005.

178 WorldFish Center, 2005.

179 Department of Foreign Affairs and Trade, *A business guide to the Thailand-Australia Free Trade Agreement (TAFTA),* 2004.

180 Dey et al, 2005.

181 Thailand Ministry of Agriculture and Cooperatives 2006. Project Document: Tuna fishing Fleets. www.acfs.go.th

182 WorldFish Center 2005. For example, construction costs for a HACCP compliant factory in Thailand was estimated at $US381-405,000, compared to US$2.3 million in the Philippines and $US3 million in Malaysia.

183 Suwanrangsi, 2002.

184 Tokrisna, 2006

185 Tokrisna, 2006

186 Tokrisna, 2006; and W Janetkitkosol, H Somchanakij, M Eiamsa-ard and M Supongpan. Strategic review of the fishery situation in Thailand, in *Assessment, management and future directions for coastal fisheries in Asian countries.* G Silvestre et al (eds), 2003. pp 915-956.

187 Jate Pimoljinda and Veera Boonraksa, Community-based fisheries co-management case study: Phang-Nga Bay, Thailand, Proceedings of the international workshop on fisheries co-management, 2001 www.worldfishcenter.org/Pubs/Way%20Forward/way-forward.htm





188 The military coup in Thailand on 19 September 2006 suspended the 1997 Constitution. The eventual impact of this on decentralisation and fisheries management is unknown. A military government, however, could be expected to prefer more centralised arrangements.

189 WorldFish Center, 2005.

190 Saikliang, 2006.

191 Saikliang, 2006.

192 MRAG, *Review of impacts of illegal, unreported and unregulated fishing on developing countries*. Final Report for DFID, UK, 2005; J Butcher, 2004 documented the 'diaspora' of Thai trawlers fishing illegally and under agreements and the subsequent changes that have accompanied the access of the trawlers to the EEZs of neighbouring countries over the last 25 years. At times, large scale fishing by these vessels has been carried out in a 'cat and mouse' fashion with the navies of the receiving countries, especially Burma and Indonesia.

193 FAO, 2006.

194 FAO, 2006. However, 2003 exports had risen to $2.3 million (Ministry of Fisheries and World Bank 2005) press reports for 2005 and 2006 indicated rapid increases in exports, perhaps partly due to the preference for fish over poultry after the advent of avian influenza in Vietnam (*Viet Nam News*, Vietnam News Agency, Seafood export value up over 25%. 29 May 2006).

195 Australian statistics from ABARE, 2006. The frozen fish fillets would be predominantly freshwater catfish fillets (marketed mainly in Australia as 'basa').

196 Silvestre et al, 2003b.

197 WorldFish Center, 2005.

198 WorldFish Center, 2005.

199 D M Son, and P Thuoc, Management of coastal fisheries in Vietnam, in *Assessment, management and future directions for coastal fisheries in Asian countries*. G Silvestre et al (eds), 2003. pp 957-986; the two China-Vietnam agreements on demarcation and fisheries in the Gulf of Tonkin were signed in 2000 and became operational in June 2004 (Press release: Conference on implementation of Tonkin Gulf demarcation and fisheries agreements, Vietnam News Agency, 7 July 2004).

200 Tun et al, 2004.

201 Tun et al, 2004.

[202] Wilkie and Fortuna, 2003.

[203] Lewis et al, 2003.

[204] Lewis et al, 2003.

[205] M Fortes, The seagrasses of Philippines and Vietnam, in *World atlas of mangroves.* E P Green and F T Short (eds), United Nations Environment Program and World Conservation Monitoring Center, 2003. pp 183-184.

[206] Long, A preliminary analysis on the socioeconomic situation of coastal fishing communities in Vietnam, in *Assessment, management and future directions for coastal fisheries in Asian countries.* G Silvestre et al (eds), 2003. pp 657-688.

[207] WorldFish Center, 2005.

[208] Long, 2003, WorldFish Center 2005.

[209] Long, 2003. Ministry of Fisheries and World Bank 2005 study recommended that the state divest itself of processing factories.

[210] Dey et al, 2005.

[211] Ministry of Fisheries and the World Bank, 2005.

[212] Case description based on: (1). Le Thanh Luu Tariff and non-tariff barriers - Case of Vietnam. Paper, in 'Accessing and meeting requirements of markets for aquaculture rroducts, Regional seminar. The Network of Aquaculture Centres in Asia-Pacific (NACA), the Bureau of Fisheries and Aquatic Resources, Department of Agriculture, Philippines, Philippine International Convention Centre, Manilla, 3-7 February 2003, www.enaca.org/modules/tinyd4/index.php?id = 9 (2). S De Silva, and M Phillips, 2006. Cage culture in Asia — An overview, presented at the 2nd International Conference on Cage Aquaculture in Asia, 4-7 July 2006, Hangzhou, China.

[213] Long, 2003.

[214] WorldFish Center, 2005.

[215] Ministry of Fisheries and the World Bank, 2005.

[216] Minister of Fisheries and the World Bank, 2005.

[217] WorldFish Center, 2005.

[218] WorldFish Center, 2005.

[219] WorldFish Center, 2005.

[220] Tuna fishing a top priority: ministry, *Vietnam News Service*, 19 August 2006.

[221] Ministry of Fisheries and the World Bank, 2005.

[222] Over 1,350 ships register for operation in Tonkin Gulf common fishing area, 15 May 2005, www.vnanet.vn





[223] In the Indian Ocean Tuna Commission area, the Philippines reported an average catch of just over 2,000 metric between 2001-2003 (IOTC, Report of the Tenth Session of the Indian Ocean Tuna Commission, Goa, India, 22-26 May 2006). The Philippines may have caught as much as 400,000 metric tonnes of tuna in the WCPFC region (Western and Central Pacific Fisheries Commission, 2nd Session 12-16 December 2005, Report of the Scientific Committee held 8-19 August 2005).

[224] FAO fisheries statistics (accessed online 16 September 2006) indicate that unidentified scad species, probably of the genus *Decapterus*, made up nearly half of the general small pelagic fish category. Landings of this mixed species category, plus big-eye scad and Indian mackerel (several *Rastrelliger* species), have all increased in the last five years. Past peaks and troughs in landings are common for small pelagic species and Barut et al 2003 describe some of these for the Philippine fisheries in their paper.

[225] N C Barut, M D Santos, L L Mijares, R Subade, N B Armada and L R Garces. Philippine coastal fisheries situation, in *Assessment, management and future directions for coastal fisheries in Asian countries*. G Silvestre et al (eds), 2003. pp 885-914.

[226] This estimate is quoted in A Cruz-Trinidad, Socioeconomic and bioeconomic performance of Philippine fisheries in the recent decades, In *Assessment, management and future directions for coastal fisheries in Asian countries.* G Silvestre et al (eds), pp 543-576. However, the richest income quintile of Filippinos consumed 3.4 times as much as the poorest (Y T Garcia, M M Dey and S M M Navarez, Demand for fish in the Philippines: A disaggregated analysis. *Aquaculture economics & management*, Vol. 9, 2005. pp 141–168).

[227] Barut et al, 2003; and WorldFish Center, 2005.

[228] Silvestre et al, 2003b.

[229] Wilkinson, 2004 reported continued degradation in coral reef conditions. According to Wilkie and Fortuna, 2003, the mangrove cover of the Philippines continued to decline at the annual rate of 1.4% between 1990 and 2000.

[230] In its 2005 report, the WCPFC Scientific Committee estimate that the Philippines take of 400,000 metric tonnes was deduced through a detailed exploratory process, supported by Australia and other members of the WCPFC, in an effort to gain comprehensive statistics for fisheries management and stock assessment.

[231] J Butcher, 2004; A D Lewis, 2004. Review of tuna fisheries and the tuna fishery statistical system in the Philippines. Prepared for the Preparatory Conference for the Commission for the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific, with funding from the Australian Centre for International Agricultural Research, by the Oceanic Fisheries Programme, Secretariat of the Pacific Community, Noumea, New Caledonia, November 2004.

[232] Note, however, that the Philippines is one of the largest producers and exporters of seaweeds, an industry which the present study does not address.

[233] FAO, 2006.

[234] ABARE, 2006.

[235] WorldFish Center, 2005; Dey et al, 2005. A possible reason for the high cost structure of plants is that most of the fish processing equipment is imported from Europe or the United States.

[236] WorldFish Center, 2005.

[237] WorldFish Center, 2005; I Siason, Women in fisheries in the Philippines, in *International symposium on women in Asian fisheries: fifth Asian fisheries forum, Asian fisheries society.* M J Williams, M C Nandeesha, V P Corral, E Tech and P S Choo (eds), 13 November 1998, Chiang Mai, Thailand, 2001. pp 69-77.

[238] Former Senator Leticia Shahani, personal communication, December 2003.

[239] WorldFish Center, 2005.

[240] A C Alcala, G R Russ, A P Maypa, and H P Calumpong, A long-term, spatially replicated experimental test of the effect of marine reserves on local fish yields. *Canadian journal of fisheries and aquatic science,* Vol. 62, 2005. pp 98-108.

[241] Information for the Australian Department of Agriculture, Fisheries and Forestry website, plus discussions with officials in Canberra, www.daffa.gov.au/fisheries/international/regional/png

[242] D M Schug, Changes and challenges among traditional fisheries of Torres Strait, in *Conference on marine environmental politics in the 21st century,* Institute of International Studies, University of California, Berkeley, 30 April-2 May 1999, available on www.globetrotter.berkeley.edu/macarthur/





marine/; S Kaye, Torres Strait native title sea claim: Legal issues paper, 2, National Native Title Tribunal, Occasional paper series, 2004.

[243] FAO, 2006; WCPFC, 2005.

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