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# Final report

Small research and development activity

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*project* **Strategic plan for ACIAR engagement in developing  
Indonesia's capture fisheries research and management  
capacity**

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# 1 Acknowledgments

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The project also benefited from input from researchers at CSIRO Oceans and Atmosphere, Murdoch University, the University of Wollongong and Charles Darwin University.

The support from the ACIAR Indonesian Country Office Staff was instrumental in the organisation of the workshops and meetings and progressing the project. Ms Emma Zalcman assisted in the structuring of the final draft strategic plan.

In addition to ACIAR, the project was supported by RCFMC, ABARES and CSIRO.

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## 2 Executive summary

Indonesia is ACIAR's largest partner-country program, due to its proximity and the imperative of reducing the large proportion of its population living in poverty. Indonesia is the fourth most populous country in the world, home to nearly 254 million people, and an estimated 49 per cent live on less than US\$2 per day. Extreme poverty tends to be most pervasive among communities dependent on agriculture, livestock, fisheries and forests for their livelihoods.

As an archipelagic country, Indonesia has a vast coastline, more than 17,500 islands and extensive marine waters, comprising one of the largest exclusive economic zone in the world. Most of the population, 65 per cent, live in coastal areas. Seafood and fisheries are important contributors to food security, livelihoods and potential economic and social benefits. Currently, Indonesia is the second largest producer from wild-capture fisheries worldwide, generating 6.1 million tonnes in 2013. Most capture fisheries production is consumed domestically. Seafood contributes more than 54 per cent of animal protein consumed. In terms of livelihoods, capture fisheries directly employ an estimated 2.7 million people. While the fishing sector is often perceived as a male domain, there is increasing recognition of the participation of women, particularly in small-scale fisheries and post-harvest activities.

Given the contribution of capture fisheries in Indonesia, there is concern over the state of fisheries resources and the need for effective governance to ensure fisheries remain a source of benefit for communities and provide pathways out of poverty. Recognising this, the ACIAR Fisheries Program has developed research partnerships and undertaken capacity building activities in Indonesia since 1995. The Program has aimed to strengthen Indonesia's fisheries research capacity to underpin improved fisheries management and governance.

This small research and development activity was undertaken in response to a request from the Indonesian Agency for Marine and Fisheries Research and Development (AMAFRAD), within the Ministry of Marine Affairs and Fisheries. The project has developed a draft *Strategic plan for ACIAR engagement in capture fisheries research and capacity development in Indonesia, 2015-25*. The priorities were developed through workshops in Indonesia and build on areas of previous success, as well as identifying new areas for focus.

The draft strategic plan identifies key areas for collaboration with ACIAR and Australian research partners across six priority areas:

- Productive and sustainable tuna fisheries
- Productive, sustainable and coordinated management of inland waters
- Evidence-based policy and management of marine protected areas
- Ecologically sustainable and healthy aquatic environments (marine and inland)
- Highly capable research institutions and research that contribute to evidence-based fisheries management and policy
- Effective engagement with women in stakeholder discussions, management and policy development.

The draft plan is aspirational, in that the priorities and strategies are potentially broader than ACIAR investment in the timeframe considered. However, the agreed approach was to maintain a broad view so that there was a range of opportunities for future engagement. Along with guiding ACIAR engagement, the draft plan can be used within AMAFRAD to assist their planning processes. The draft priorities informed ACIAR's focus for new Indonesian fisheries proposals in 2014.

It is anticipated that the draft plan will be launched in late 2015. The priorities should be regularly reviewed to ensure they continue to reflect Indonesia's needs and the best use of Australian-Indonesian partnerships through ACIAR.

### 3 Introduction

Seafood and fisheries play an important role in Indonesia, in terms of contributing to food security, providing livelihoods and potential economic and social benefits, particularly in coastal communities. In 2013, Indonesia produced an estimated 19.3 million tonnes of fisheries products, from both aquaculture and capture fisheries (FAO 2015). Indonesian exports of fisheries products were valued at US\$2.9 billion (2013; FAO 2015). Capture fisheries contributed an estimated 6.1 million tonnes of total production (2013; FAO 2015), making Indonesia the second highest producer from capture fisheries globally. Most of this production comes from marine fisheries, however, inland water fisheries can be locally important.

While Indonesia's capture fisheries production is substantial, this is in the context of high demand. Indonesia is the fourth most populous country in the world and 65 per cent of the population lives in coastal areas (Dahuri 2007; CIA 2013). Indonesia has one of the highest rates of seafood consumption in the world, estimated at 28.9 kg per person annually and contributing over 54 per cent of animal protein (FAO 2012). Most of Indonesia's marine capture fisheries production is consumed domestically.

Capture fisheries provide an important source of livelihoods, particularly in coastal communities. An estimated 2.7 million fishers are directly employed in capture fisheries in Indonesia (FAO 2013), mostly in small-scale fisheries. The number of fishers has continued to grow (Williams 2007). While the Indonesian fishing sector is often perceived as a male domain, there is increasing recognition of the participation of women, particularly in small-scale fisheries and post-harvest activities (Fitriana & Stacey 2012; Klieber et al 2014).

Given the contribution of capture fisheries in Indonesia, there is concern over the state of fisheries resources with ongoing overfishing and overcapitalization (Purwanto 2003; Williams 2007). Given the social and economic context there is an urgent need for effective governance to ensure capture fisheries remain a source of economic benefit for poor communities and provide pathways out of poverty. Despite the importance of fisheries, capacity in capture fisheries governance and management in Indonesia is limited. This (admittedly among other confounding factors) constrains the ability of the Indonesian government to manage its fisheries for the benefit of the nation, to meet obligations under international conventions and agreements, and results in economic and environmental losses.

Strengthening Indonesia's management capacity for capture fisheries should be underpinned by strengthened fisheries research and advisory capacity. The Government of Indonesia, through the Agency for Marine Affairs and Fisheries Research and Development (AMAFRAD), has recognised the constrained fisheries research and management capacity within the country and has worked with ACIAR to address elements of the issue over the past two decades. Recently (2010–11), AMAFRAD requested that ACIAR develop a strategic, long-term plan for enhancing capture fisheries research and associated institutional capacity development. The strategic research plan will also assist AMAFRAD to prioritise their capture fisheries research and staff development.

The aim of this small research and development activity was to improve Indonesia's capture fisheries management by providing a strategic and planned approach to ACIAR's capture fisheries research and capacity building. This will contribute to maintaining and enhancing the role of capture fisheries in economic growth, food security and livelihoods. In line with this, the specific objective of the project was to develop a 10 year strategic plan for ACIAR's Fisheries Program engagement in capture fisheries research and associated institutional capacity development in Indonesia.

The strategic plan builds on previous ACIAR initiatives and partnerships with Indonesian agencies. It also extends the *Net Returns: a human capacity development framework for marine capture fisheries management in South East Asia* (DAFF 2011) in the Indonesian

context. This capacity development framework was developed under the *Regional Plan of Action to promote responsible fishing practices including combating illegal, unreported and unregulated (IUU) fishing in the region* (RPOA IUU). The RPOA IUU was a joint initiative of the Indonesian and Australian governments that 11 South East Asian countries signed in 2007.

The original intention of this small research activity was also to provide training on specific elements of the use of fisheries research in policy development and management. However, after the project commenced it was determined that this was no longer a priority and the project activities should focus on the development of the plan through workshops in Indonesia. Participation in the process of developing the strategic priorities, including the use of the capacity development framework, provided some capacity development for Indonesian research management staff in approaches to research planning and prioritization.

The project has produced a draft strategic plan (Appendix 1) through engagement with AMAFRAD and in particular senior officers in RCFMC. There was also input to the priorities from the Directorate of Fish Resources within the Directorate General of Capture Fisheries and the Directorate General of Marine, Coasts and Small Islands Affairs. The draft strategic plan identifies the key areas for collaboration with ACIAR and the aspirational outcomes in the medium and long term (5 and 10 years respectively). It is anticipated that the current plan will be launched in late 2015 and updated through regular review with Indonesian agencies.

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## 4 Approach

The development of the draft strategic plan involved the use of a structured capacity development framework for identifying priorities, preparation of background contextual documents to inform discussions and workshops to agree the priorities. Input was also sought from Australian researchers who had worked on Indonesian ACIAR projects.

### Capacity development framework

The project used the *Net Returns: a human capacity development framework for marine capture fisheries management in South East Asia* (DAFF 2011) as the framework for identifying priorities. The preparation of the capacity development framework was a priority of the countries that participated in the RPOA (DAFF 2011). It was developed through a participatory, bottom-up approach that identified the capacity development needs for fisheries management agencies. Indonesian agencies were part of the participatory approach. The framework provides structured guidance for developing action plans within the individual country context.

This project used the relevant outcomes and activities from the framework, specifically:

- Outcome 3: Information systems strengthened
- Outcome 4: Regional and national scientific capacity strengthened to support fisheries management planning
- Outcome 7: Regional and international cooperation strengthened.

Appendix 6 provides the relevant components from the capacity development framework that were used to structure the workshop discussions. While the framework was developed in the context of marine fisheries, it was regarded as applicable to inland fisheries.

### Background contextual documents

ABARES provided background contextual documents to assist the identification of strategic priorities. Drafts of these documents were provided to the priority setting workshop.



## Priority setting workshop

A workshop to identify the priorities for the strategic plan was held in Bogor, Indonesia, 11 and 12 March 2014 (Appendix 2). The workshop's objectives were:

- To develop the priorities for the strategic plan for ACIAR's Fisheries Program engagement in capture fisheries research in Indonesia. Specifically:
  - Building on the relevant aspects of the *Capacity Development Framework for Marine Capture Fisheries Management* in the Indonesian context.
  - Confirm priority drivers for capture fisheries research in the Indonesian context.
  - Identify priority research themes in terms of fisheries, regions/locations and approaches (such as Ecosystem Based Fisheries Management).
  - Consider opportunities to progress previous projects along the impact pathway.

The workshop aimed to gather the priorities from the Indonesian agencies, and so most participants were from Indonesia agencies and the workshop discussion was conducted in Bahasa Indonesia.

The workshop outcomes were provided to key Australian researchers for comment on any potential gaps. The additional information provided from this process was considered at a follow-up meeting in Indonesia.

A follow-up meeting (Appendix 3) was held at RCFMC, Jakarta, Indonesia, 2 May 2014, to finalise and elaborate on the priorities identified in the March 2014 workshop. This meeting finalised the priorities in terms of species, regions and research issues. The final priorities were then provided to RCFMC for follow-up discussions with key agencies.

## Strategic plan

The draft strategic plan was drafted by ABARES based on the priorities identified in the Indonesian workshops. Drafts were provided to Indonesian colleagues for input and comment. The draft plan provides the context and high priority areas for ACIAR engagement in capture fisheries research and capacity building identified through the Indonesian priority setting workshop and follow-up meeting. The strategic plan has been structured around key result areas (the priorities) and for each of these, the medium (5 years) and long term (10 years) outcomes, strategies and measures of success are identified.

The agreed approach taken was to maintain a broad focus to portray the complete range of opportunities for future engagement. Therefore, the priorities and strategies are potentially broader than ACIAR investment in the timeframe considered.

The launch of the plan is anticipated in late 2015.

## Australian advisory group

The project had an Australian advisory group, with representatives invited from ACIAR, the Department of Agriculture, the Department of Foreign Affairs and Trade, the Department of the Environment and the Australian Fisheries Management Authority (AFMA). The advisory group met twice during the project to consider progress and provide input. Project updates were provided to the Indonesian – Australian Working Group on Marine Affairs and Fisheries.

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## 5 Achievements

### 1. Identification of priorities

The project team worked with senior officers within the key national agencies, primarily AMAFRAD, to identify their priorities for ACIAR's engagement in capture fisheries research and capacity development. The priority identification workshop had a high level of engagement from agencies at a senior level, with the acting Chairman of AMAFRAD opening the workshop (Appendix 2). There was participation by the Directorate of Fish Resources and the Directorate of Conservation and Marine National Parks, the policy and management agencies within the Ministry for Marine Affairs and Fisheries. This contributed to identifying research priorities that link to the policy and management drivers.

The priorities (key results areas) reflect the species and regions where ACIAR engagement was regarded as important and the most beneficial (Appendix 1). The priorities build on previous ACIAR engagement, where Indonesian agencies identified benefit in extending and expanding this engagement. The priorities also contain some areas of new focus, particularly in the fisheries – habitat conservation interface. This reflects the increasing focus of RCFMC in this area and the potential for collaboration and capacity building through ACIAR.

Opportunities for capacity development, for technical, research and science management staff, are a focus of the priorities. Elements of this would be delivered within fisheries specific projects. However, an explicit priority was identified to build capacity in areas that assist in integrating research outcomes with management and policy development. This includes building capacity to have closer and more effective engagement between research and management and policy areas and building capacity in the dissemination and communication of the research results.

There was a strong desire to replicate the human and institutional level capacity building that had occurred in Bali, demonstrated by the Research Institute for Tuna Fisheries (described in the information box in the draft strategic plan, Appendix 1). ACIAR was a key contributor to this institutional capacity development and there is an identified need for similar capacity development in the Bitung region of North Sulawesi.

A new focus that came through the priorities was increasing the understanding of women's role in fisheries and associated communities and the ability to more effectively engage with women stakeholders. ACIAR has a history of gender-related research in other programs in Indonesia, and there was a strong desire to build capacity and understanding of this within capture fisheries research. This was seen as important in assisting Indonesian agencies to improve the effectiveness of management and policy, assist in the implementation of the millennium development goals and link with the Ministry of Women Empowerment and Child Protection (Kementerian Pemberdayaan Perempuan dan Perlindungan Anak)

The draft priorities were used to inform ACIAR's focus for new Indonesian fisheries proposals in 2014. The priorities should be regularly reviewed to ensure they continue to reflect Indonesia's needs and the best use of Australian-Indonesian partnerships through ACIAR.

### 2. Draft strategic plan

The development of the draft strategic plan was the primary objective of the project and represents a key achievement (Appendix 1). The draft plan provides context to the importance of ACIAR's engagement in capture fisheries research and capacity

building in Indonesia, the past focus of ACIAR work and the future priorities. The priorities in this plan were identified by the Indonesian agencies.

The priorities in the plan are structured into six key results areas, which cover the four species/regions regarded as high priority for ACIAR engagement and then two capacity development priorities. The plan identifies outcomes and strategies that can be used to address these key results areas. The priorities and strategies in the plan are potentially broader in scope than future ACIAR investment. Along with guiding ACIAR engagement, the plan can be used within AMAFRAD and RCFMC to assist in their planning process, and can assist in informing other Australian agencies of the Indonesian priorities.

### **3. Experience in undertaking the structured strategic planning process**

The process of conducting the priority identification workshops, particularly the use of the structured capacity development framework provided participating Indonesian participants, primarily research managers, with an approach to organising and undertaking strategic planning. The use of the human capacity development framework meant that the project built on a framework that Indonesian agencies had participated in the development of, operationalising it for capture fisheries research. The framework provided a structured approach to considering the drivers, the outcomes that were needed and the activities that could contribute to those outcomes. It is hoped that this experience may assist in structuring internal planning process within RCFMC.

### **4. Background documents.**

The project produced background documents to inform the priority setting workshop and provide context and background to the discussion.

- *Australian – Indonesian partnerships on capture fisheries research* (Appendix 4). This provides the context of previous ACIAR projects, the drivers for these and previous impact assessment work (Martin 2008). The project outcomes were categorized with respect to the capacity development framework and it is clear that most projects contributed broadly across a range of capacity development outcomes. The document informed discussion about how far along the uptake pathway different projects had progressed. The document also provided a brief overview of the current ACIAR strategy, other Australian Government initiatives and major activities underway with other donors. A draft was provided to researchers that had been involved in Indonesian ACIAR projects for comment.
- *Overview of Indonesia's capture fisheries, 2013* (Appendix 5). This document provided a high level overview of Indonesian capture fisheries and global trends. It summarises trends in production, trade, demand and supply, highlighting the role of capture fisheries in Indonesia. This document includes information on projected global trends in seafood demand and supply and potential implications for Indonesia. The brief summary of management arrangements within Indonesia, the international agreements and implementation of the ecosystem approach to fisheries management provided some context to the complexity of Indonesian fisheries. A draft was provided to Indonesian collaborators for input and review.

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## 6 Conclusions and recommendations

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### 6.1 Conclusions

- The project has developed the draft *Strategic plan for ACIAR's engagement in capture fisheries research and capacity building in Indonesia, 2015-25* (Appendix 1) The draft strategic plan identified the priorities (key results areas), that cover four species/regions and two cross-cutting capacity development priorities:

- Productive and sustainable tuna fisheries
- Productive, sustainable and coordinated management of inland waters
- Evidence-based policy and management of marine protected areas
- Ecologically sustainable and healthy aquatic environments (marine and inland)
- Highly capable research institutions and research that contribute to evidence-based fisheries management and policy
- Effective engagement with women in stakeholder discussions, management and policy development.

- The plan identifies outcomes and strategies that can be used to address these priorities. The processes used to develop the plan provide confidence that the plan represents a sound basis for future ACIAR investment and wider engagement in research and capacity building. The launch of the plan is anticipated in late 2015. Longer term, the priorities should be regularly reviewed to ensure they reflect Indonesia's ongoing needs.

- The priorities identified by the Indonesian agencies build on past successes, where ACIAR partnerships have contributed to addressing key research issues and building human and institutional capacity. The priorities include new areas of focus, such as understanding the role of women in fisheries and increased capacity to engage with women stakeholders. There is also increased emphasis on capacity development within the research institutions to enable researchers to contribute to evidence-based management and policy development.

- The strategic planning process built on the human capacity development framework developed under the RPOA IUU (DAFF 2011). This provided an opportunity to extend this framework in the Indonesian context and experience in the application of a structured, strategic planning tool.

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### 6.2 Recommendations

- The draft *Strategic plan for ACIAR engagement in capture fisheries research and capacity development in Indonesia 2015-25*, be used to focus for detailed discussion on future ACIAR projects.

- After the launch of the strategic plan the priorities and progress against these priorities should be regularly reviewed.

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### 7.2 List of publications produced by project

Draft *Strategic plan for ACIAR engagement in capture fisheries research and capacity development in Indonesia, 2015-25* (Appendix 1)

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## **8 Appendixes**

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**8.1 Appendix 1: Draft Strategic plan for ACIAR engagement in capture fisheries research and capacity development in Indonesia 2015-25**

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**8.2 Appendix 2: Priority identification workshop for the Strategic plan for ACIAR's Fisheries Programme engagement in capture fisheries research and associated institutional capacity development in Indonesia, Workshop Report**

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**8.3 Appendix 3: Priority identification workshop for the Strategic plan for ACIAR's Fisheries Programme engagement in capture fisheries research and associated institutional capacity development in Indonesia, Follow-up Meeting**

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**8.4 Appendix 4: Australian-Indonesian partnerships on capture fisheries research**

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**8.5 Appendix 5: Overview of Indonesia's capture fisheries, 2013**

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**8.6 Appendix 6: Extracts from *Net Returns: a Human Capacity Development Framework for Marine Capture Fisheries Management in South East Asia***

# Draft Strategic plan for ACIAR engagement in capture fisheries research and capacity development in Indonesia 2015-25

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## Background

Indonesia is the fifth most populous country in the world. Home to nearly 254 million people, 65% of the population lives in coastal areas<sup>1,2</sup>. While the country has achieved strong progress in poverty reduction in recent years, 49% of the population still live on less than US\$2.00 a day<sup>3</sup>. In addition most of the extreme poverty tends to occur in communities that depend on agriculture, fisheries and forests for their livelihoods<sup>3</sup>. Strengthening the fisheries and aquaculture sectors, is therefore critical for poverty reduction and equitable development across Indonesia.

Indonesia, as the world's largest archipelago stretching between the Pacific and Indian Oceans (Map), has some of the most diverse aquatic and fisheries resources. In many cases these resources are shared with neighbouring countries and high seas areas. Indonesia is the world's second largest producer of wild-capture fisheries yield, generating 6.1 million tonnes in 2013 or 6.5 per cent of the global production<sup>4</sup>. Most of this production, 5.7 million tonnes comes from Indonesian marine capture fisheries<sup>4</sup>. Indonesia's inland water fisheries, in reservoirs, lakes, floodplains and rivers, while small in comparison to marine systems in production terms (413 187 t in 2013<sup>4</sup>), are important to local communities as a source of food and income.

Indonesia is one of the world's leading exporting countries of fisheries products (both aquaculture and wild-caught), generating US\$2.9 billion of exports in 2013, contributing to 2.8% of the total value of global fish exports<sup>5</sup>. In contrast, Indonesia imports much less fisheries production, US\$216.5 million in 2013<sup>5</sup>.

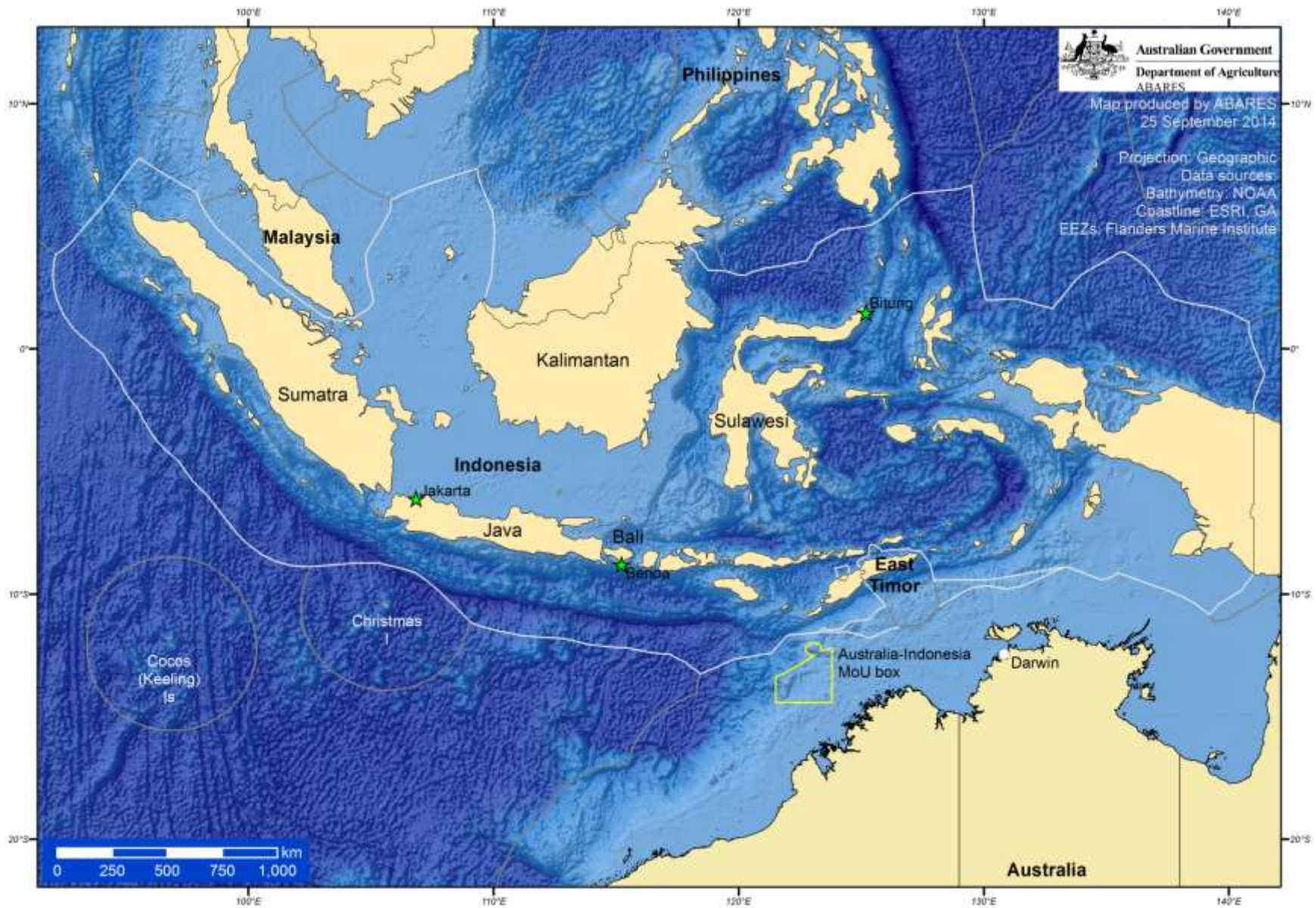
To deliver this wild-capture fisheries production, Indonesia has one of the largest fishing fleets in the world, with more than 620 000 fishing vessels in the marine capture fisheries<sup>6</sup>, most of which are small coastal vessels (<5 gross registered tonnage)<sup>7</sup>. These small vessels usually operate within 4 nautical miles of the coast and are managed at the district level. The larger vessels, licensed at the provincial (<30 gross registered tonnage) or central government level (>30 gross registered tonnage), are not permitted to fish as close to the coast and fish the waters of Indonesia's exclusive economic zone (EEZ) or on the high seas.

An estimated 2.7 million Indonesians are employed directly in capture fisheries, mostly in small-scale fisheries. In poor rural and coastal areas, wild-capture fisheries provide employment and cash income to resource poor households<sup>9</sup>. While the Indonesian fishing sector is often perceived as a male domain, there is increasing recognition of the participation of women, particularly in small-scale fisheries and post-harvest activities<sup>10,11</sup>. Consideration of women's participation is particularly important in understanding the role of fisheries in the context of food security and livelihoods<sup>11</sup>.

In addition to the economic benefits of marine fisheries, Indonesia has one of the highest rates of seafood consumption in the world, estimated at 28.9 kg per person per year (2011) and contributing 54.8% of animal protein consumed<sup>12</sup>. Seafood consumption increases with income, however lower income households spend a greater proportion of their food expenditure on seafood than higher income households<sup>13</sup>. Due to its large population, Indonesia is the greatest consumer of fisheries products in the ASEAN region (estimated at 7 million tonnes per year, 2011<sup>12</sup>) with an estimated 80 per cent of Indonesia's marine capture fisheries production consumed domestically. With a growing population (currently estimated at 0.95% per year<sup>1</sup>) and increasing affluence the demand for seafood is expected to continue to grow.



Appendix 1



### Information Box: Indonesia's Capture Fisheries in Numbers

Capture Fisheries	Indonesia	Global
Capture fisheries production (2013) <sup>4</sup>	6.1 million tonnes 2 <sup>nd</sup> highest production globally 6.5% of total global production Composed of: <ul style="list-style-type: none"> <li>• 5.7 million tonnes marine</li> <li>• 413,187 tonnes freshwater</li> </ul>	Global total production 93.8 million tonnes
Marine fishing fleet (2012) <sup>6</sup>	620 830 vessels (28% non-powered, 39% out-board engine)	
Inland waters fishing fleet (2012) <sup>6</sup>	184 900 (78 per cent non-powered)	
Capture fisheries direct employment (2012) <sup>8</sup>	2.7 million fishers	Global total estimate 39.4 million fishers
<b>Seafood consumption</b>		
Total seafood consumption (2011) <sup>12</sup>	7 million tonnes per year	Global total seafood consumption 132.1 billion tonnes
Seafood consumption, apparent (2011) <sup>12</sup>	28.9 kg per person per year	Global apparent consumption 18.9 kg per person per year
Seafood as a proportion of animal protein consumption (2011) <sup>12</sup>	54.8%	Global average 16.7%
<b>Trade in fisheries commodities (both wild-capture and aquaculture)</b>		
Exports (2013) <sup>5</sup>	US\$2.9 billion 2.8% of global exports	Global fisheries commodities exports \$100.2 billion
Imports (2013) <sup>5</sup>	US\$216 million 0.2% of global imports	Global fisheries commodities imports \$99.7 billion

## Partnership with ACIAR

Indonesia and Australia are close neighbours, sharing a long maritime boundary (Map) and a history of cultural and trade links. Many fish stocks straddle the exclusive economic zones of both countries and maybe fished by both Australian and Indonesian fishers. Both countries participate in regional fisheries management organisations for highly migratory fish stocks, such as tuna and billfish, which straddle their maritime boundaries and are also fished on the high seas. One of the most valuable fish stocks shared by Australia and Indonesia is southern bluefin tuna, with the only known spawning ground for this species occurring in the waters off Indonesia and Australia<sup>14</sup>.

There is a Memorandum of Understanding (MoU) 1974<sup>a</sup> between the Governments of Australia and Indonesia that covers an area of Australian waters in the Timor Sea (the MoU Box, Map) where Indonesian traditional fisheries, using traditional fishing methods only, are permitted to operate<sup>15</sup>. This access was granted in recognition of the long history of traditional Indonesian fishing in the area. The MoU provides Australia with a tool to manage access to its waters while for Indonesia; it enables traditional fishers to continue their customary practices.

Indonesia is ACIAR's largest partner-country program, due to its proximity and strategic importance to Australia, and to the imperative of reducing the large proportion of its population living in poverty<sup>16</sup>. ACIAR has worked with Indonesian and Australian partners on capture fisheries research and capacity building since 1995. In 2008, ACIAR undertook a review and impact assessment of its Indonesian capture fisheries projects<sup>17</sup> which identified that the projects had succeeded in delivering research outputs that have the potential to deliver significant economic, social and environmental benefits. The review concluded that the projects improved the understanding of fisheries and delivered the proposed management plans for some major fisheries that crossed national boundaries. The projects also enhanced the capacity of Indonesian researchers and research agencies and developed partnerships between Australian and Indonesian researchers and agencies.

## Previous capture fisheries research and capacity building

The ACIAR program of capture fisheries research and capacity building in Indonesia has responded to priorities at a range of levels.

### 1. Fisheries and species

Projects have focused on three key types of species or capture fisheries;

- Species or fisheries that are important at the local or province level, particularly when knowledge can be transferred from studies elsewhere, such as projects on Terubuk (Toli shad, a herring species)<sup>18</sup> fish species used for bait in tuna fisheries<sup>19</sup> and capture fisheries in freshwater reservoirs<sup>20</sup>. ACIAR fisheries projects were part of the international response to the 2009 tsunami, by contributing to rebuilding strategies, primarily the Aceh province<sup>21</sup>.
- Fish stocks that may be shared across national boundaries and important to fisheries in both northern Australia and Indonesia, such as the tropical snappers<sup>22</sup>, sharks and rays<sup>23</sup>; and
- Highly migratory stocks of regional and national importance, in particular tunas and other pelagic species<sup>24</sup>.

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<sup>a</sup> Australia-Indonesia Memorandum of Understanding regarding the Operations of Indonesian Traditional Fishermen in Areas of the Australian Fishing Zone and Continental Shelf – 1974

## 2. Multidisciplinary approaches

The ACIAR capture fisheries program in Indonesia has been characterised by multidisciplinary projects and approaches. This reflected the need to provide the fundamental data and science around the fisheries and stocks, improve the understanding of the social and economic characteristics of the fishers and associated communities and build management and policy making capacity. Previous ACIAR projects have covered many aspects of the information required to inform an ecosystem approach to fisheries management (EAFM)<sup>12</sup>. The multidisciplinary focus contributed to strengthening the evidence-base for management, policy and decision-making and the translation of the ACIAR project results into draft policy and management plans.

## 3. Consideration of shared management and policy challenges

The shared nature of some of the fish stocks and common participation in regional and international fisheries forums, results in management and policy challenges that are shared by Australia and Indonesia. ACIAR's program has included work to assist in addressing gaps in Indonesia's national fisheries policy and regulatory frameworks against international or regional requirements (See Information Box). One area of focus has been increasing Indonesia's capacity to manage illegal, unreported and unregulated (IUU) fishing<sup>25</sup>. In March 2001, the United Nations Food and Agriculture Organisation (FAO) introduced the *International Plan of Action to Prevent, Deter and Eliminate IUU Fishing*. Both Indonesia and Australia are signatories to the *Regional Plan of Action to promote responsible fishing practices including combating IUU fishing in the region (RPOA IUU 2007)*. ACIAR projects contributed to the development of a draft *National Plan of Action to Prevent, Deter and Eliminate IUU (NPOA IUU)* for Indonesia<sup>25</sup>.

ACIAR projects contributed to the development of Indonesia's draft *National Plan of Action for the Conservation and Management of Sharks (NPOA Sharks)*, in line with the FAO *International Plan of Action for the Conservation and Management of Sharks (2000)*<sup>23</sup>.

## 4. Strong partnerships

The ACIAR capture fisheries projects have involved strong partnerships with the central government research agencies, primarily within the Indonesian Ministry for Marine Affairs and Fisheries. Projects have also partnered with other central government research agencies, such as Centre for Agro-Socio Economic Research and Development, universities, district and provincial governments. Projects have also involved direct engagement with communities and industry including their involvement in sampling or research, communication of project results and the development and discussion of potential management approaches.

In addition, ACIAR projects in Indonesian capture fisheries have been aligned with other research and capacity building activities in Indonesia and Australia. The ACIAR shark and ray projects built on research in northern Australia, supported by the Fisheries Research and Development Corporation and the then-Environment Australia. The ACIAR tuna and pelagic species projects (see Information Box) have complemented work supported by AusAID and the Global Environment Fund (GEF) in collaboration with the Western and Central Pacific Fisheries Commission (WCPFC) and the Indian Ocean Tuna Commission (IOTC).

## 5. Capacity building

Capacity building has been a central part of ACIAR's mandate and a critical outcome for projects. ACIAR's engagement in Indonesian capture fisheries has included a range of capacity building activities focused at a range of levels, from individual to institutional level capacity development, including:

- *Direct research training*, as Indonesia research partners work with Australian researchers, undertaking joint sampling, analysis and publication of the research. At times this was

complemented with specific training workshops held in Indonesia. This has covered technical areas (such as fish ageing, or data management) as well as research planning, database development and management.

- *Study trips* by Indonesian partners to work and undertake training in Australia, this has included laboratory based techniques such as genetics, histology and ageing, as well as stock assessment and data analysis.
- *On-the-ground capacity development* through the development and implementation of enumerator and observer programs and training in regional areas.
- *Post-graduate research*, Indonesian scientists have undertaken post-graduate research, associated with the research projects and supported by the ACIAR fellowships.
- *Policy development*, ACIAR projects have supported the development of the Indonesian *NPOA Sharks* and *NPOA IUU*, as well as a framework for bilateral cooperation (Indonesia – Philippines) to address IUU fishing in the Sulawesi Sea.
- *Institutional capacity building*, such as the Research Institute for Tuna Fisheries in Bali (see Information Box). The ACIAR tuna projects, along with other initiatives, have contributed to the development and formalisation of this monitoring capacity and the research station. Other examples include the provision of equipment to enable ageing studies and the development of a centralised database for tuna catch and effort. The ACIAR projects have also increased the capacity of Indonesian agencies to meet reporting and data submissions requirements of relevant regional fisheries management organisations.

## Information Box: Indonesia – Australia Collaborations on Tuna Fisheries in Bali

In 1992 Australia's CSIRO Division of Fisheries joined with the Central Research Institute for Fisheries Indonesia (CRIFI) and Research Institute for Marine Fisheries (RIMF) to establish a monitoring and sampling program at Bena Fishing Port in Bali. This was in recognition of a lack of information on the scale of catch of southern bluefin tuna by the Indonesian tuna longline fleet on the SBT spawning ground, south of Java and Bali, and the need for research to better understand the reproductive dynamics of the spawning population. Bena was at the time, and still remains, the main base and catch landing port for the tuna longline fleet, operating in the Indian Ocean. The early focus was on obtaining estimates of the number of southern bluefin tuna landed and processed, fish lengths and weights, and sampling of otoliths for ageing and gonads for reproductive biology research.

Through 1992 – 1993 the enumeration and sampling was done by one contracted staff to CRIFI and by one staff of the largest fishing company PT Perikanan Samudera Besar. Key scientists from CSIRO, CRIFI and RIMF provided regular supervision. Through the remainder of the 1990s, the number of enumerators involved in the monitoring activities increased to four. The sampling and associated histological analysis of southern bluefin gonads included a Fisheries and Research Development Corporation project during 1998- 2001, and included collaboration with the Research Institute for Mariculture at Gondol (north Bali).

In 2002, Indonesia's Research Centre for Capture Fisheries (RCCF) joined with Indian Ocean Tuna Commission (IOTC), Overseas Fishery Cooperation Foundation (OFCF) – Japan, and CSIRO to expand the focus of the port-based monitoring program to include all species (tunas, billfish, tuna-like species, and bycatch species), and to extend the enumeration to two other key tuna landing ports: Muara Baru in north Jakarta, and Cilacap on south coast of Central Java.

Australia's contributions to this new phase of fisheries monitoring were done through activities of ACIAR Project FIS/2001/079 and with additional funding from the then Department of Agriculture, Fisheries and Forestry (DAFF). At this time, the base of operations in Bena was a single-room, small office, rented from one of the fishing companies, PT Sari Segara, and the enumerator team included 7 full time staff. At conclusion of the ACIAR project the monitoring and biological sampling continued with funding support from DAFF and OFCF, and supervision from CSIRO, IOTC, and Indonesian partner agencies. In 2004, the operations moved to a significantly larger rented office adjacent to the former office, and in 2005 also became the base for a trial observer program for the longline fishery; an activity of ACIAR Project FIS/2002/074. This increased the total number of staff in the office to thirteen (7 enumerators and 6 observers).

In late 2008, RCCF began renovations of a rented building within the Bena Fishing Port precinct, to provide more office space and a lab area for the Bena-based monitoring and observer activities. This new facility became operational in February 2009, achieving new status as a formal research institute within Agency of Marine and Fisheries Research and Development (AMAFRAD) and with title "Research Institute for Tuna Fisheries" (RITF). During the next 5 years, staff numbers increased to around 25.

From 1993 to present, the Bena monitoring and sampling program has provided important information and biological samples for the annual assessment of the southern bluefin tuna spawning population as part of the Scientific Committee process of the Commission for Conservation of Southern Bluefin Tuna (CCSBT) and assisting Indonesia to meet its international reporting requirements to CCSBT and IOTC.

A recent, exciting development has seen RITF move to a new location, a few kilometres outside of the Bena Fishing Port, into a newly constructed building with three levels of extensive office, laboratory and meeting-room facilities. During the coming years, staff numbers are hoped to increase to 60 – 70. There is an expectation of continued Indonesia – Australia collaborations in tuna fisheries research, to

capitalize on the expanded research facilities and build on the more than 20 years of collaborations to date.

## Development of the strategic plan

This strategic plan was developed in response to a request from the Research Centre for Fisheries Management and Conservation (RCFMC) within the Indonesian Ministry of Marine Affairs and Fisheries. The process was led by RCFMC and ABARES in collaboration with CSIRO. The priorities were identified through workshops in Indonesia that included participation from RCFMC, across its research institutes and research and operational divisions. The workshops included participation from the Indonesian Directorate of Fish Resources, in the Directorate General of Capture Fisheries, and the Directorate of Conservation and National Parks, in the Directorate General of Marine, Coasts and Small Island Affairs. The draft priorities were circulated to key Australian researchers for input and comment, prior to further consultation and finalisation in Indonesia.

The plan builds on the capacity development framework *Net Returns: a Human Capacity Development Framework for Marine Capture Fisheries Management in South East Asia*<sup>25</sup>. This framework was developed under the RPOA IUU (2007) through a participatory approach involving the RPOA members. The RPOA IUU (2007) was a joint initiative of the Indonesian and Australian governments that 11 South East Asian countries signed in 2007. The overall goal of the framework is to increase the capacity of people and institutions involved in marine capture fisheries within RPOA participating countries to develop their abilities, to ensure the sustainable development of the region's marine capture fisheries. This strategic plan used the framework and applied it across marine and freshwater capture fisheries in Indonesia.

## Drivers and Challenges

### Global Context

The global context for wild-capture fisheries has and continues to, change rapidly and this has implications for future research and capacity building requirements in Indonesia. Over the past three decades universal seafood consumption has increased by 50% and seafood now accounts for 16% of all animal protein consumed worldwide<sup>4</sup>. Looking forward, increased demand for seafood, population growth, efforts to reduce poverty, issues relating to food security and increasing emphasis on market-based process are all likely to drive and challenge capture fisheries research and capacity building in Indonesia.

### Internal Challenges

For Indonesian capture fisheries to capitalise on the increased global and local demand for seafood in a way that is sustainable and equitable there is a need to take into account some internal challenges. Key challenges identified during the workshops to develop this plan include:

- Increasing the effectiveness of decentralised fisheries management, including: effective governance and implementation of regulations with the associated monitoring, control and surveillance; improving research capacity within all levels of government, including data collection and reporting; and the implementation of international commitments;
- The complex nature of Indonesian fisheries, often multi-species, multi-gear fisheries that may span the levels of governance. This complexity also reflects a large number of stakeholders, within industry and the associated communities, that may have differing objectives for engagement in the fisheries;
- The overexploited state of many fish stocks and the effectively open access nature of most fisheries, resulting in overcapacity in the associated fisheries; and
- The impacted and degraded nature of many Indonesian aquatic habitats and ecosystems. Given the high reliance on coastal areas and increasing development, the level of loss and



degradation of marine habitats is high. Some of this has been caused by destructive fishing practices, but coastal development, pollution and other anthropogenic impacts have also contributed. Inland waters are also impacted by similar issues, as well as the introduction of alien species. This impacts the ecosystems ability to support productive fisheries.

## Strategic Plan 2015-2025

### High Priority Areas

This strategic plan identifies high priorities for potential research and capacity building activities across fisheries, regions and technical areas (Table 1). It is important that these activities build on previous partnerships and existing programs supported by other partners and donors because resources are finite. Implementing research to address these priorities should continue to pursue a multidisciplinary approach and support capacity building from the individual to institutional level. The priorities are divided into six key results areas that are described below. The first four priority areas focus on fisheries or aquatic ecosystem issues. The last two priorities are cross-cutting and could be addressed within projects that are focused on the first four priorities, or could be addressed through targeted projects.

#### 1) Productive and sustainable tuna fisheries

Indonesia is a significant tuna producing nation and previous ACIAR partnerships have been founded on the shared importance of tuna fisheries and the need to engage effectively in the international decision making forums. This strategic plan will continue to build on this relationship and previous achievements, contributing to expanding it to the neritic tunas that are locally important in coastal areas.

Research and capacity building is needed to support the national tuna management plans and related policy, management and decision-making at the national, province and district levels. It is also needed to support effective engagement in regional fisheries management organisations and bilateral discussions, as well as the implementation of agreed international management measures. This builds on the effective partnerships centred on Indian Ocean and Pacific tunas, relating to engagement in Commission for the Conservation of Southern Bluefin Tuna (CCSBT), the Indian Ocean Tuna Commission (IOTC) and the Western and Central Pacific Fisheries Commission (WCPFC). The priorities also reflect the need to understand the neritic tuna fisheries and support the implementation of fisheries management plans and EAFM for these fisheries. There is also a need for focus on the 'ecologically related species' in these fisheries, particularly sharks and bycatch of threatened species such as turtles and seabirds.

The potential high priority activities include continued support and further development of the research capacity at Research Institute for Tuna Fisheries, in (Bali) and the long-term goal of development of similar capacity in Bitung (North Sulawesi), for Pacific and neritic tunas. There is a need for research to improve the understanding of the social and economic characteristics of the Pacific and neritic tuna fisheries and associated communities.

#### 2) Productive, sustainable and coordinated management of inland waters

While inland waters in Indonesia are much smaller than the marine areas and their associated capture fisheries production less, they remain locally important. The strategy builds on the previous ACIAR research on inland fisheries and the interaction with other uses for inland waters. There is a need for research and capacity building to support floodplains, reservoirs and river capture fisheries management, policy and decision making. Currently data on the area and uses of inland waters is poor and there is a need to understand the extent and potential of these waters. This area of research would also continue to focus on the interactions between competing uses in the freshwaters, including freshwater cage culture to inform local management decisions. This high priority builds on previous ACIAR work with the aim of building ongoing local government implementation of management. In this area the need for water quality monitoring systems and

early warning systems to enable fishers and farmers to respond was also identified. The recently established SEAFDEC Centre of Inland Fisheries Research provides an opportunity for collaboration and capacity building. Understanding the social and economic aspects of these fisheries and associated communities is a high priority, including gender related research to understand the role of women and increase their engagement in decision making and management.

### **3) Evidence-based policy and management of marine protected areas (MPA)**

There is significant engagement in Indonesia by donors and researchers focused on marine protected areas and in particular, their development and implementation. There is a need for supporting MPA policy and decision-making engagement, particularly in terms of the potential role and interaction with fisheries management. The priorities recognise the need to support the scientific basis for the design of MPAs, including improved understanding of connectivity among areas and systems, as well as monitoring the effectiveness of MPAs. Potential activities in this area include research and capacity building that increases the capacity to contribute to the design and establishment of fisheries refugia and other management measures. There is a clear need for improved understanding of the social and economic aspects of the fisheries and associated communities, including gender specific research, to inform decision-making and management. Activities in this area could link to the initiatives coming out of the Coral Triangle Initiative<sup>26</sup> and other initiatives in this area.

### **4) Ecologically sustainable and healthy aquatic environments (marine and inland)**

There is a need for research and capacity building that focuses on aquatic environments, particularly in terms of mitigating the degradation, rehabilitation and enhancement of aquatic habitats that support marine and inland water fisheries. There is also a need to increase research capacity related to the conservation of endangered aquatic species, such as the freshwater Irrawaddy dolphin (pesut mahakam). This is an area where there is a need for research advice to support policy, management and decision making at all levels of government.

### **5) Highly capable research institutions and research that contribute to evidence-based fisheries management and policy**

The need to build capacity in research management and leadership was identified as a high priority. This includes the capacity to formulate and implement research plans that are aligned with management and policy objectives. This integration with policy and management objectives would contribute to strengthening evidence-based policy, management and decision making. A key element of this is the need for capacity building to ensure effective communication and dissemination of research results to decision-makers and stakeholders. Activities in this area could assist in identifying and establishing processes and relationships that increase uptake of research outputs to inform decision making, this could include elements such as fishery status reporting which would build on the work of the national stock assessment committee. This was seen as an area that could contribute to long-term, institutional capacity building.

### **6) Effective engagement with women in stakeholder discussions, management and policy development**

There are limited data and information on the role of women in Indonesian fisheries. However, gender related research is providing increasing evidence that women have important roles in fishing, processing and marketing, particularly in small-scale fisheries<sup>10</sup>. This is highlighting that women are potentially important stakeholders in local fisheries management and decision making. The limited engagement of women in stakeholder discussions, management efforts or policy development can result in lost opportunities to improve conservation practices and ensure secure, viable livelihoods.

There was a clearly identified gap in understanding the role of women in fisheries and associated communities and also the need for capacity building to improve engagement with this stakeholder group. This is seen as a high priority to support improved policy, management and decision-making at national, provincial and district level and in support of pursuing the Millennium Development Goals.

**Table 1 Key Results Areas, Outcomes, Strategies and Measures of Success**

Key Results Area	Outcomes (Timeframe for achieving outcomes)	Strategies	Measures of Success
<b>i) Productive and sustainable tuna fisheries</b>	1. Effective engagement and cooperation on tuna fisheries management with neighbouring countries and Regional Fisheries Management Organisations (RFMOs) (Long term)	1.1 Increased scientific capacity to support bilateral and RFMO engagement  1.2 Increased capacity to meet RFMO data and reporting requirements	Research papers submitted to RFMO meetings and in support of bilateral discussions  RFMO data and reporting requirements met  Research plans for RFMO and bilateral engagement developed and implemented
	2. National tuna management plans for neritic tunas are based on sound research and support implementation of the ecosystem approach to fisheries management (EAFM) (Long term)	2.1 Increased research capacity and understanding of neritic tunas and the associated fisheries to inform management (see 3.1)  2.2 Research and capacity building to support the implementation of EAFM	Research projects undertaken to increase the understanding of neritic tunas and the associated fisheries  Capacity building activities undertaken to support EAFM implementation with respect to neritic tunas.  Communication activities undertaken to extend the research results to managers and policy makers.  Management decisions and policy development processes explicitly consider research outcomes.
	3. Improved knowledge and understanding to support evidence-based management of tuna fisheries including neritic tunas, at national, province and district levels (Medium term)	3.1 Research and capacity building in the areas of: <ul style="list-style-type: none"> <li>• Catch and effort data collection (including scientific observer programs where appropriate), data management and analysis</li> <li>• Fisheries status reporting and stock assessment, including approaches for data poor stocks or fisheries</li> <li>• Biology and population dynamics</li> </ul>	Research plan to support tuna fishery management plans developed and implemented  Research projects undertaken address key areas  Capacity building activities undertaken and researchers trained in key areas.

Appendix 1

Key Results Area	Outcomes (Timeframe for achieving outcomes)	Strategies	Measures of Success
		<ul style="list-style-type: none"> <li>• Characterisation of habitats, including feeding and spawning areas and understanding the oceanographic and environmental variables that influence distribution and abundance</li> <li>• Stock structure (genetics)</li> <li>• Impact of climate change on tunas and the associated fisheries</li> </ul>	<p>Communication activities undertaken to extend the research results to managers and policy makers.</p> <p>Tuna management decisions and policy development processes, at national, province and district levels explicitly consider research outcomes.</p>
	<p>4. Improved understanding of the social and economic characteristics of tuna fisheries and associated communities to support evidence-based management of tuna fisheries (Medium term)</p>	<p>4.1 Research into the social and economic characteristics of tuna fisheries (industrial and small-scale), and the associated communities. This could include:</p> <ul style="list-style-type: none"> <li>• Understanding the dependence of fisheries and communities on different species</li> <li>• Understanding supply chains and markets.</li> <li>• Evaluation of the social and economic implications of different management options.</li> </ul>	<p>Research plan to support tuna fishery management plans developed, including social and economic components and implemented</p> <p>Research projects undertaken address key areas</p> <p>Capacity building activities undertaken and researchers trained in key areas.</p> <p>Communication activities undertaken to extend the research results to managers and policy makers.</p> <p>Tuna management decisions and policy development processes, at national, province and district levels explicitly consider research outcomes.</p>
	<p>5. High quality research being conducted at the Research Institute for Tuna Fisheries (RITF) in Bali (Medium term)</p>	<p>5.1 Research and capacity building activities undertaken at RITF in Bali, including collaborations with RFMOs and other initiatives. This work could cover elements identified under 3.1 and 4.1.</p>	<p>Research projects undertaken at RITF in Bali</p> <p>Capacity building activities undertaken at RITF in Bali</p> <p>Collaboration with RFMOs and other initiatives in research and capacity building</p>

Appendix 1

Key Results Area	Outcomes (Timeframe for achieving outcomes)	Strategies	Measures of Success
	<p>6. High quality research and capacity building contributing to building institutional capacity and the potential establishment of a research facility in Bitung, North Sulawesi (Long term)</p>	<p>6.1 Research and capacity building activities undertaken in Bitung, this should continue collaborations, such as with WCPFC. This work could cover elements identified under 3.1 and 4.1.</p>	<p>Research projects undertaken at in Bitung</p> <p>Capacity building activities undertaken in Bitung</p> <p>Collaboration with RFMOs and other initiatives in research and capacity building</p> <p>ACIAR support recognised as contributing to the institutional capacity and potential establishment of a research facility.</p>
	<p>7. Improved understanding of ecologically related species (in particular bycatch) in tuna fisheries to support the implementation of the EAFM and RFMO conservation and management measures (Long term)</p>	<p>7.1 Data collection and analysis to characterise and monitor ecologically related species by gear/fishery and region.</p> <p>7.2 Research and capacity building in approaches for risk assessment, stock assessment and management strategies for data poor fisheries and species.</p> <p>7.3 Research to characterise the social and economic importance of ecologically related species in these fisheries.</p> <p>7.4 Research and capacity building in support of the implementation of EAFM.</p>	<p>Data collection and analyses processes in place for fisheries/regions</p> <p>Research projects undertaken on ecologically related species in tuna fisheries.</p> <p>Capacity building activities undertaken and researchers trained in risk assessment, stock assessment and management strategies for data poor fisheries and species.</p> <p>Research projects undertaken on the social and economic importance of ecologically related species in these fisheries.</p> <p>Research and capacity building activities undertaken to support EAFM implementation.</p> <p>Communication activities undertaken to extend the research results to managers and policy makers.</p> <p>Tuna management decisions and policy development processes, at national, province</p>

Appendix 1

Key Results Area	Outcomes (Timeframe for achieving outcomes)	Strategies	Measures of Success
			<p>and district levels explicitly consider research outcomes.</p> <p>Capacity building activities undertaken to support the implementation of RFMO conservation and management measures.</p>
<p><b>ii) Productive, sustainable and coordinated inland waters management</b></p>	<p>8. Local management decisions are informed by research on the interactions between competing freshwater uses (including cage culture) (Medium term)</p> <p>9. Social and economic aspects of inland fisheries and associated communities (including the role of women) are understood and inform management decisions (Medium term)</p>	<p>8.1 Continue the research and capacity building activities for capture fisheries in reservoirs, investigating the interactions with other activities and co-management approaches. This would include:</p> <ul style="list-style-type: none"> <li>• capture fisheries data collection and analysis</li> <li>• habitat modification, including sedimentation</li> <li>• monitoring of invasive alien species</li> <li>• support for the implementation of EAFM.</li> </ul> <p>8.2 Extend the work in Citarum reservoirs (FIS/2002/111) to associated rivers and floodplains</p> <p>8.3 Collaboration and capacity building with the Centre of Inland Fisheries Research (SEAFDEC)</p> <p>9.1 Research the social and economic characteristics of inland waters capture fisheries (including the role of women)</p>	<p>Research projects undertaken to increase the understanding of and build capacity in inland fisheries research</p> <p>Capacity building activities undertaken in inland water fisheries research.</p> <p>Communication activities undertaken to extend the research results to managers and policy makers.</p> <p>Management decisions and policy development processes explicitly consider research outcomes.</p> <p>Research project to extend work undertaken in Citarum reservoir to associated rivers and flood plains.</p> <p>Collaboration and capacity building activities undertaken with the Centre of Inland Fisheries Research.</p> <p>Research projects undertaken to document the social and economic characteristics of inland waters capture fisheries (including the role of women)</p>



Appendix 1

Key Results Area	Outcomes (Timeframe for achieving outcomes)	Strategies	Measures of Success
			<p>Communication activities undertaken to extend the research results to managers and policy makers.</p> <p>Management decisions and policy development processes explicitly consider research outcomes.</p>
	10. Water quality monitoring and early warning systems in place so farmers and fishers can respond rapidly to potential threats (Long term)	<p>10.1 Research water quality monitoring and management, including impacts of eutrophication and water quality</p> <p>10.2 Develop and trial water quality monitoring systems and early warning systems.</p>	<p>Research projects on water quality monitoring and management undertaken</p> <p>Water quality monitoring and early warning system trialled in inland waters.</p>
	11. National level inland waters policy is underpinned by robust data on the extent of inland waters (Medium term)	11.1 Data collection on the area of inland waters.	Survey of the extent of inland waters.
<b>iii) Evidence-based policy and management of marine protected areas (MPA)</b>	12. The design of marine protected areas is guided by research findings (Medium term)	12.1 Data collection and analyses to underpin advice on MPA development, zonation and the interaction with fisheries management and the implementation of EAFM.	<p>Research projects on research to inform MPA design and the role in the implementation of EAFM</p> <p>MPA development and zonation decisions are informed by research outcomes</p>
	13. The effectiveness of marine protected areas is monitored regularly (Long term)	13.1 Research and capacity building on approaches to measure and monitor the effectiveness of MPAs	<p>Capacity building activities undertaken on measuring and monitoring the effectiveness of MPAs</p> <p>Research projects on MPA monitoring undertaken</p>
	14. Fisheries refugia and other management measures are established when appropriate (Medium term)	14.1 Research to identify important habitats/areas for species and contribute to the design of fish refugia and other related management measures (such as open and closed seasons)	<p>Research projects undertaken to identify habitat use by species.</p> <p>Management decisions are informed by research in this area</p>

Appendix 1

Key Results Area	Outcomes (Timeframe for achieving outcomes)	Strategies	Measures of Success
	15. Social and economic aspects of MPA are understood (including gender) (Medium term)	15.1 Research social and economic aspects of MPAs and the associated fisheries and communities including gender factors	Research projects undertaken to document the social and economic aspects (including gender factors) of MPAs and the associated fisheries and communities.
<b>iv) Ecologically sustainable and healthy marine and inland waters environments</b>	16. Evidence based management plans are implemented for the conservation of species, habitats and ecosystems (Long term)	<p>16.1 Research and capacity building on inland water habitat changes including sedimentation rates, wetlands improvements to reduce sedimentation, pollution types and approaches to habitat rehabilitation</p> <p>16.2 Research and capacity building in marine waters conservation including coastal, mangrove, sea grass and coral reef habitat monitoring and environmental engineering strategies (e.g artificial reefs)</p> <p>16.3 Build capacity to provide status reports on at-risk species that include stock structure, risk assessment, trajectories and rehabilitation strategies.</p> <p>16.4 Collect social and economic data to inform management plan development and decision making.</p>	<p>Capacity building activities undertaken on inland water habitats</p> <p>Research projects on inland water habitats changes undertaken</p> <p>Capacity building activities undertaken on marine waters conservation</p> <p>Research projects on marine waters conservation undertaken</p> <p>Status reports completed on at-risk species.</p> <p>Data on social and economic aspects of habitat change collected and considered in decision-making</p>
	17. Effective conservation of endangered aquatic species (Long term)	17.1 Studies are conducted that provide improved information on conservation approaches to endangered aquatic species.	
<b>v) Highly capable research institutions and researchers that contribute to</b>	18. Institutional integration of scientific outputs into management plans and policy development (Medium term)	18.1 Institutional processes and relationships are established that strengthen the links to, and consideration of, research outcomes by policy and decision makers and managers.	Formal and informal institutional processes established to strengthen links between research agency and policy and management agencies.

Appendix 1

Key Results Area	Outcomes (Timeframe for achieving outcomes)	Strategies	Measures of Success
evidence-based fisheries management and policy			Management plans and policy development processes explicitly consider research outcomes.
	19. Research programs, projects and activities are explicitly linked to fishery management plans and policy priorities (Medium term)	19.1 Capacity building in strategic research planning processes that include researchers and end-users of the research (policy and decision makers and managers)	Capacity building activities undertaken for staff members that have research management roles to develop strategic research plans  Capacity building activities undertaken with policy and management staff on the role of research in evidence-based policy development and management.
	20. Research results and implications are disseminated more effectively to key stakeholders (Medium term)	20.1 Capacity building for researchers in effective communication with key stakeholders.  20.2 Establishment of processes that formalise research dissemination, such as: <ul style="list-style-type: none"> <li>• Fishery status reporting</li> <li>• Harvest strategy development.</li> </ul> 20.3 Post Graduate Scholarships (John Allwright and John Dillon Fellowship)	Capacity building activities on effective communication for research staff undertaken within ACIAR projects  Researchers participate in capacity building activities on communication  Formal and informal processes established to disseminate research results among government agencies.  Fishery status reporting commenced, building on national stock assessment reports.  Capacity building activities on harvest strategy development undertaken for technical staff, research management and policy makers.  Post graduate scholarships associated with ACIAR projects.

Appendix 1

Key Results Area	Outcomes (Timeframe for achieving outcomes)	Strategies	Measures of Success
	<p>21. Integrated information management systems for data collection, exchange and analysis at national and provincial level. This would facilitate reliable information on aspects such as: stock abundance, catch rate, species composition, size composition, selectivity gear, production value, trade statistics and market intelligence available within institutions (Long term)</p>	<p>21.1 Develop data sharing systems and processes.</p> <p>21.2 Train enumerators and observers</p> <p>21.3 Identify other institutions that hold related data and then develop metadata</p> <p>21.4 Establish electronic databases that link traceability and trade</p>	<p>Data sharing systems further developed (noting work underway in current pelagic fisheries project)</p> <p>Enumerators, observers trained</p> <p>Metadata available for related data held by other institutions</p> <p>Database and sharing system established for traceability and trade data</p>
	<p>22. Institutional capacity to undertake research to inform fisheries management, policy development and decision making (Long term)</p>	<p>22.1 Capacity building in key fisheries related research including biological, ecosystem, social and economic areas.</p> <p>22.2 Capacity building towards increased publications in international journals.</p> <p>22.3 Capacity building in research program management.</p> <p>22.3 Researchers undertaking post-graduate degrees and further training.</p>	<p>Researchers trained, within projects or capacity building activities across biological, ecosystem, social and economic areas.</p> <p>Researchers trained, within projects or capacity building activities to increase their ability to publish in international journals.</p> <p>Staff with research management roles trained within projects or capacity building activities in research program management.</p> <p>Researchers undertake post-graduate qualifications in association with ACIAR projects.</p>
<p><b>vi) Strong engagement with women in stakeholder discussions, management and policy development</b></p>	<p>23. Key stakeholders are aware of the role of women in fisheries and associated communities (Medium term)</p>	<p>23.1 Data and information collection to understand the role of women in fisheries, pre-production and post-harvest activities and associated communities</p> <p>23.2 Incorporation of gender specific research into social and economic research activities, considering livelihoods and food security</p>	<p>Projects explicitly collect data and information on the role of women</p> <p>Project undertake social and economic research that explicitly considers gender factors</p> <p>Management and policy decisions are informed by research on the role of women.</p>

Appendix 1

Key Results Area	Outcomes (Timeframe for achieving outcomes)	Strategies	Measures of Success
		23.3 Evaluations of the social and economic impacts of policy and management include consideration of gender factors.	
	24. Women are engaged in every level of fisheries management, from community consultation to government policy planning (Long term)	24.1 Capacity building to improve engagement with women in fisheries.	<p>Capacity building activities undertaken within ACIAR projects</p> <p>Staff participate in capacity building activities</p> <p>Fisheries related engagement activities explicitly and effectively engage women</p>

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Priority identification workshop for the  
Strategic plan for ACIAR's Fisheries Program engagement  
in capture fisheries research and associated institutional  
capacity development in Indonesia (FIS/2011/030)  
11<sup>th</sup> & 12<sup>th</sup> March 2014  
Bogor, Indonesia

## Workshop Report

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## Ringkasan Ketua Sidang

Dalam RPJP 2005-2024 dinyatakan bahwa Pembangunan Jangka Menengah Nasional untuk 2015-2019 diarahkan untuk memantapkan pembangunan secara menyeluruh dengan menekankan pada pembangunan keunggulan kompetitif perekonomian yang berbasis SDA yang tersedia, SDM yang berkualitas, serta kemampuan iptek. Optimisasi pemanfaatan sumberdaya ikan untuk mendukung pembangunan nasional secara berkelanjutan perlu dibarengi dengan upaya mengatasi sejumlah issue antara lain ancaman kelestarian sumberdaya ikan karena pemanfaatan sumberdaya ikan secara berlebihan. Untuk itu perlu penguatan pengelolaan perikanan dan konservasi sumberdaya ikan, yang didukung dengan data dan informasi hasil penelitian yang cukup.

Kebutuhan penelitian untuk mendukung upaya pengelolaan dan konservasi terkendala oleh keterbatasan kapasitas penelitian. Oleh karena itu, diperlukan pengembangan kapasitas penelitian perikanan dan kapasitas kelembagaannya. Terkait dengan hal tersebut, Badan Litbang kelautan dan Perikanan telah meminta dukungan ACIAR dalam penyusunan rancangan rencana strategis jangka panjang pengembangan kapasitas penelitian perikanan dan Kapasitas kelembagaannya. Proyek untuk itu dilaksanakan oleh ACIAR mulai tahun 2012 dengan tujuan untuk menyusun pendekatan perencanaan strategis untuk pengembangan kapasitas dan penelitian perikanan tangkap untuk sepuluh tahun mendatang dalam rangka menyempurnakan pengelolaan perikanan Indonesia. Hal ini akan memberikan kontribusi dalam mempertahankan dan meningkatkan peran perikanan tangkap dalam pertumbuhan ekonomi, ketahanan pangan dan matapencaharian.

Dalam proses penyusunan rencana strategis untuk keikutsertaan Program Perikanan ACIAR dalam pengembangan kapasitas kelembagaan dan penelitian perikanan di Indonesia, ACIAR merencanakan pelaksanaan tersebut dilakukan serangkaian lokakarya yang melibatkan institusi terkait. Tujuan dari lokakarya kali ini adalah untuk: (1) mengidentifikasi factor pendorong kebutuhan penelitian perikanan Indonesia, (2) menetapkan prioritas dari elemen-elemen pengembangan kapasitas untuk pengelolaan perikanan tangkap, yang mencakup penguatan sistem informasi, penguatan kapasitas ilmiah untuk mendukung perencanaan pengelolaan perikanan, dan penguatan kerjasama regional dan internasional, serta (3) menyusun prioritas penelitian dan pengembangan kapasitas dengan mempertimbangkan jenis perikanan, lokasi/wilayah, pendekatan pengelolaan dan penelitian, serta pengintegrasian rekomendasi ilmiah ke dalam perencanaan pengelolaan dan pengambilan keputusan.

Lokakarya tersebut dapat dilaksanakan sesuai dengan rencana. Lokakarya dihadiri oleh wakil dari semua instansi terkait di bawah KKP, yaitu Badan Penelitian dan Pengembangan Kelautan dan Perikanan, Direktorat Jenderal Perikanan Tangkap, dan Direktorat Jenderal Kelautan, Pesisir dan Pulau-pulau Kecil. Instansi tersebut, adalah penanggungjawab penelitian perikanan, pengelolaan perikanan dan konservasi sumberdaya ikan. Pembukaan lokakarya dilakukan oleh pelaksana tugas Kepala Badan Penelitian dan Pengembangan Kelautan dan Perikanan. Materi presentasi yang disampaikan oleh unit kerja terkait pada ke empat instansi tersebut relatif komprehensif dan telah menjadi masukan dan bahan berharga dalam diskusi kelompok. Agar dapat dilaksanakan diskusi lebih mendalam, peserta dibagi dalam dua kelompok diskusi. Para peserta sangat antusias sebagaimana nampak dari dinamika dalam diskusi kelompok dan adanya diskusi tambahan oleh tim kecil di luar jadwal yang direncanakan guna penyempurnaan dan pengintegrasian hasil diskusi kelompok. Rancangan prioritas yang diidentifikasi dalam Lokakarya ini akan dikembangkan lebih lanjut oleh P4KSI untuk finalisasinya pada saat pertemuan yang akan dilaksanakan pada akhir April. Keputusan terakhir mengenai hasil lokakarya tersebut akan menjadi kewenangan pimpinan instansi. Oleh karena itu, hasil lokakarya ini akan dilaporkan oleh Kepala P4KSI kepada Kepala Badan Litbang KP.

## Chair's Summary

As stated in the Indonesian Long-term Development Plan, the National midterm Development during 2015 – 2019 will be undertaken to continue overall development with the main priority to strengthen economic competitive advantages based on available natural resources, qualified human resource and science and technologies. Optimization of the utilization of fisheries resources in the framework of sustainable development needs to be supported by efforts to deal with a number of issues, including overfishing threatening the sustainability of fisheries resources. Therefore, strengthened fisheries management and conservation is required, supported by robust data and scientific information from research activities.

The research needed to support effort in managing and conserving fisheries resources has been constrained by the limited research capacity. Therefore, enhancement of capture fisheries research and associated institutional capacity development are considered very important. With regard to that objective, Agency of Marine and Fisheries Research and Development (AMFRD) sought to develop with ACIAR a strategic, long-term plan for enhancing capture fisheries research and associated institutional capacity development. The project for that was started in 2012, aimed at improving Indonesia's capture fisheries management by providing a strategic and planned approach to capture fisheries research and capacity building for 10 year. This will contribute to maintaining and enhancing the role of capture fisheries in economic growth, food security and livelihoods.

In the process of preparing the Strategic plan for ACIAR Fisheries Programme engagement in capture fisheries research and capacity development in Indonesia, this workshop was conducted. The objectives of current workshop were: (1) to identify priority drivers for capture fisheries research in the Indonesian context, (2) to set the relative priority of the relevant elements of the capacity development framework for capture fisheries management, including strengthening information systems, strengthening regional and national scientific capacity to support fisheries management planning, and strengthening regional and international cooperation, and (3) to identify priority research and capacity building themes in terms of specific fisheries, locations/regions, research and management approaches and the integration of scientific advice into management planning and decision making.

The workshop was conducted as planned. It was attended by representatives from all relevant institutions under the Ministry of Marine Affairs and Fisheries, namely the AMFRD, the Directorate General of Capture Fisheries, and the Directorate General of Marine, Coastal and Small Islands. These are the responsible institutions for fisheries research, fisheries management and fish resource conservation, respectively. The workshop was officially opened by acting Chairman of the AMFRD. Materials presented by relevant units under those four institutions were comprehensive and valuable, and were used in the group discussions. In order to have more in-depth discussion, the participants were divided into two discussion groups. The participants were very enthusiastic, shown from the dynamic of the discussion in each group, and the additional discussion by a small team outside of the scheduled agenda in order to refine and to integrate the result of the two group discussions. The draft priorities identified during the workshop will be further developed by RCFMC for finalisation at a follow-up meeting at the end of April. The final decision regarding the result of the workshop will be provided by the Chairman of the AMFRD. Therefore, the result of the workshop will be reported by the Director of RCFMC to the Chairman.

## Workshop outcomes

### 1. Welcome and introductions by Dr Chris Barlow, Fisheries Programme Manager ACIAR

Dr Barlow welcomed the participants on behalf of ACIAR and thanked them for their time, preparation and engagement in this workshop. He noted that this was an important opportunity to look to the future and identify the priorities for Indonesia, in terms of capture fisheries research and capacity building. He also noted that the ACIAR Fisheries Programme's engagement would be driven by Indonesia's priorities and needs and so the workshop was critical to establishing these. However, he expected the strategic plan to be a document that was regularly reviewed.

### 2. Opening Remarks: Chairman of the Agency for Marine and Fisheries Research and Development (AMAFRAD), Dr. Achmad Poernomo, Acting Chairman

In the opening remarks, Dr. Achmad Poernomo acknowledged the collaborative research that have been undertaken since early 1990s and the benefits gained by Indonesia, including research capacity building, available scientific information and institutional development, for example the establishment of Tuna Research Institute in Benoa, Bali. Then he explained that Indonesia will conduct the third National Mid-term Development Plan (2015-2019) with the objectives to strengthen food security and increase economic competitiveness based on natural resources, human resources and science and technology. Relating to this development objectives Dr. Poernomo mentioned the need to have fisheries management plans (FMP) for each of the 11 fisheries management areas (FMA), and that research capacity building is crucial to support fisheries management. Considering current research capacity, he expected that the collaborative research with Australia will further help Indonesia to increase its research capacity in capture fisheries, including the establishment of a Tuna Research Station in Bitung, and to improve fisheries management, especially research to contribute to the development and implementation of FMPs for the 11 FMAs.

### 3. Workshop objectives, Dr Ilona Stobutzki, Assistant Secretary ABARES,

Dr Stobutzki provided a brief background to the ACIAR FIS/2010/30 project. The Government of Indonesia, through the Agency for Marine Affairs and Fisheries Research and Development (AMAFRAD) had recognised the need to strengthen capture fisheries research and management capacity. AMAFRAD had partnered with ACIAR and Australian institutions since 1995 through a range of projects to address this. AMAFRAD through the Research Center for Fisheries and Marine Conservation (RCFMC), sought to develop with ACIAR a strategic, long-term plan for enhancing capture fisheries research and associated human and institutional capacity development.

The long-term aim of the project is to contribute to strengthening Indonesia's capture fisheries management by providing a strategic and planned approach to capture fisheries research and capacity building. This will contribute to maintaining and enhancing the role of capture fisheries in economic growth, food security and livelihoods.

The project objective was to develop a 10 year strategic plan for ACIAR Fisheries Programme engagement in capture fisheries research and associated institutional capacity development in Indonesia.

The workshop objective was to develop the priorities for the strategic plan, specifically:

- Building on the relevant research aspects of the *Capacity Development Framework for Marine Capture Fisheries Management* in the Indonesian context.
- Confirm key drivers for capture fisheries research in Indonesia.
- Identify priority research and capacity building areas in terms of fisheries, regions/locations and approaches (such as the Ecosystem Approach to Fisheries Management).
- Consider opportunities to progress previous projects along the impact pathway.

#### 4. Presentations

##### **Indonesian Fisheries Master Plan and the role of capture fisheries research**

Professor Hari Eko Irianto, Director of RCFMC, AMFRAD, MMAF

Professor Irianto explained the current Indonesian fisheries issues, including overfishing, overcapacity, illegal, unregulated and unreported (IUU) fishing, conflict among fishers, fisheries complexity, and limited data available for management planning and decision making. The aim was to improve fisheries management and conservation strategies. Data and scientific information are required to develop better management and conservation strategies, especially data and information for fisheries in the archipelagic waters. Unfortunately, research to support fisheries management and conservation was constrained by fisheries research capacity and effective/efficient organisation. Professor Irianto presented the current status of research institutions under RCFMC, covering human resources, facilities and research activities, including international research collaboration and the benefits gained. He noted that fisheries research institutional development was required to continue to build research organisation capacity, researcher capability, research networks and stakeholders participation, and to increase/improve research facilities and infrastructure. Then, Professor Irianto explained research activities and research capacity building needs.

##### **Priorities of the Directorate of Fish Resources and strategic research needs**

Ibu Ernie Wijayanti, Directorate of Fish Resources, DG of Capture Fisheries, MMAF.

Ibu Wijayanti presented the condition of Indonesian capture fisheries, problems and strategic issues, as well as the development policy and strategic action plan for 2015-2019. She explained that issues include an imbalance of the utilization of fish stocks amongst fisheries management areas, conflict amongst fishers in the use of fishery resources, illegal and destructive fishing practices, environment and habitat degradation, conflicts of interest among sectors in the utilization of natural resources in inland waters, and the impact of the fisheries sector in inland waters. The participation of stakeholders in supporting the recovery and enrichment of fish resources was also limited. Support from Local Government relating to fisheries statistic have not always been maximum. She also mentioned the challenge of ensuring stakeholders' compliance with the regional fisheries management organisations" (RFMOs) resolutions and management measures. This was partly due to a limited understanding among stakeholders regarding the rights and obligations as well as the urgency of the compliance with RFMO measures, such as vessel registration.

Ibu Wijayanti also noted that in order to sustain fisheries resources, fisheries management with an ecosystem approach should be strengthened. Strategies that would be implemented during 2015-2019 including: the application of the principles of participation, transparency and accountability in fisheries management, strengthening institutional structures in each FMA in Indonesia, revitalization of fisheries resources management in inland waters,

strengthening fish resources data and fisheries statistics, and strengthening Indonesian involvement in RFMOs. The priority actions for each strategy were also presented. Finally, Ibu Widjajanti, described the expected support from research to strengthen fisheries management, which included understanding the potential fisheries production in every FMA, total allowable catch, catch composition, minimum catch size, fishing capacity, fishing season, assessment models to assist in developing or considering management options.

### **Priorities of the Directorate of Conservation and Marine National Parks and strategic research needs**

Dr Akhsanal Kasasiah, Directorate of Marine and Aquatic Conservation, DG of Marine, Coastal and Small Islands (DGMCSI), MMAF

Dr Kasasiah presented MMAF policies in biodiversity management, relevant laws and regulations, and international initiatives and instruments relating to conservation. She explained that the conservation of fish resources, included ecosystem, species and fish genetics conservation. She informed that the government had a target of establishing 20 million hectares of marine protected areas (MPAs) by 2020. Dr Kasasiah presented the progress towards the target of marine conservation area during 2010-2014, and the strategic plan for 2015-2019 to achieve the target. She explained the justification for the target and the economic value of important habitats. Then, Dr Kasasiah presented annual achievement in the establishment of marine conservation areas during 2003-2013, a roadmap of MPA development toward 2020. She identified the challenges to achieving the policy implementation. Some challenges included: limited stakeholder understanding of conservation, multiple use of MPAs, limited skilled human resources available, open access or common property of the marine ecosystem, the multispecies nature of fish resources, limited scientific information, international obligations and trade related measures, and ensuring the effectiveness of MPA management. Dr Kasasiah also stated the importance of scientific data and information in the formulation of conservation strategies and decision making in the conservation management. Therefore she expected support from research institutions to strengthen fish resource conservation.

### **Current ACIAR capture fisheries projects and lessons from Australian experience in implementing long-term research plans**

Dr Campbell Davies and Mr Craig Proctor, CSIRO

Mr Proctor presented a brief overview of two Australia – Indonesia ACIAR capture fisheries projects: the recent ACIAR project FIS/2006/142 “Developing new assessment and policy frameworks for Indonesia's marine fisheries, including the control and management of Illegal, Unregulated and Unreported (IUU) fishing”, and the current ACIAR project FIS/2009/059 “Developing research capacity for management of Indonesia's pelagic fisheries resources” (2012 – 2016). The IUU project's primary outcomes were recommendations for improved management for three marine fisheries: the Bali Strait sardine fishery; the lobster fishery of south coast East Java; and the shark fishery of East Lombok. To date those recommendations have not seen uptake at Provincial or National level and could be progressed by follow-up ACIAR project(s). Project FIS/2009/059 has two key components: A population structure study for yellowfin and bigeye tunas, examining connectivity of populations across Indonesia and to the Indian and Western Pacific Oceans; and a study of Indonesia's FAD-based tuna fisheries (all gears). This project includes current and planned capacity development for scientists of several of the institutes within AMAFRAD.

The presentation also focused on key ingredients to successful research partnerships, drawn from the experiences of more than 20 years of Australia – Indonesia collaborations in marine fisheries research. Those key ingredients include:

1. Clearly identified shared interests in the research and its outcomes;
2. Strong commitments by the partner agencies to the projects and by the individuals in the projects;
3. Agreed research and capacity building priorities by Indonesian and Australian parties; and
4. Strategic funding arrangements through ACIAR's long-term outlook.

Emphasis was made of the benefits that come from strong, regular, face-to-face presence in the partner country by Australian project staff and from the exchange and development of partner institute(s) staff – a diverse range of participants, their various areas of expertise and the strong collaborative relationships, builds longevity and resilience into the research and maximizes successful outcomes.

### **Strategic plan development process and the Capacity Development Framework for Marine Capture Fisheries Management**

Dr Ilona Stobutzki, ABARES

Dr Stobutzki clarified that the scope of the strategic plan would be the next 5 to 10 years, 2015 – 2025. The plan was not to be a static document but that it would be regularly reviewed. The scope included both marine and freshwater (inland) capture fisheries research and capacity building. Indonesian priorities would drive the strategic plan and it would be aligned with the recently released ACIAR Strategic Plan 2014-18. The priorities should also consider where Indonesia – Australia partnerships would be most effective. Dr Stobutzki described the process of identifying key drivers and challenges and from these the priorities. She reviewed the key drivers, fisheries, regions and technical focus of previous ACIAR capture fisheries research in Indonesia. She also summarised the previous capacity building initiatives, which included on-the-ground research, training workshops, post-graduate scholarships, policy development and institutional capacity building, such as the Benoa research station.

Dr Stobutzki summarised the participatory approach used to develop *Net Returns: Capacity Development Framework for Marine Capture Fisheries Management* (2011) under the *RPOA to Promote Responsible Fishing Practices including Combating Illegal, Unregulated and Unreported (IUU) Fishing in the Region* (2007). She noted that the framework was a tool that could be used to discuss research and capacity building at the national level and apply to both marine and inland fisheries.

## **5. Discussion topics<sup>1</sup>:**

- a) **Key drivers for capture fisheries research in the Indonesian context, building on those identified in the *Capacity Development Framework for Marine Capture Fisheries Management*.**

The workshop discussed the key drivers and challenges for capture fisheries research in Indonesia. This was informed by the presentations, the key drivers identified in the capacity development framework and those identified in the country assessment report undertaken in support of the RPOA. The drivers were grouped into those external to fisheries and areas directly relevant to fisheries, these are summarised below.

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<sup>1</sup> The discussions were conducted in Bahasa Indonesia and then summarized to the workshop in English.

**External drivers**

- I. Poverty
- II. Population growth
- III. Climate change
- IV. Political intervention
- V. Food security

**Drivers/challenges internal to the capture fisheries sector**

- a) *General*
  - I. Making decentralisation more effective for fisheries management
  - II. Limited knowledge and skills of fishery officers including at the province and district levels
  - III. Limited engagement and community involvement
  - IV. The need to manage large numbers of small scale fisheries and fishing capacity (over capacity at many levels)
  - V. Challenge of having effective MCS and law enforcement, including managing IUU fishing
  - VI. In practice, most fisheries operate as an open access fishery
  - VII. Ensuring effective and efficient fisheries governance
  - VIII. Education level of fishers
  - IX. Effective implementation of regulations
  - X. Improvement of engagement and communication with all stakeholders, including government and private sector
  - XI. Need to establish FMA management bodies
  - XII. Need to finalise, establishment and implementation FMPs in 11 fisheries management areas
  - XIII. Implementation of international obligations and trade rules e.g. certification requirements
  - XIV. Meeting changes in demand which can be driven by economic situations and preferences of importing countries
  - XV. Fisheries complexity e.g. multi-species, multi-gear, multiple stakeholders and multiple objectives of development
  - XVI. Many stocks are over exploited
- b) *Habitat and ecosystem*
  - I. Environment and ecosystem degradation, modification and impacts (ecologically related species) noting the role of local government and communities in managing this issue
  - II. Need for improved management and conservation strategies for species of concern, such as Napoleon and Terubuk
  - III. Need to ensure sustainable benefits of MPAs to communities and economy
  - IV. Destructive fishing practices
  - V. Ghost fishing
  - VI. Introduction of alien species, currently inland waters issue
- c) *Resourcing*
  - I. Constraints in research support, such as infrastructure and facilities
  - II. Constraints in funding for research and management
  - III. Need for investment in research capabilities, training, post-graduate studies etc
- d) *Data and assessment*
  - I. Limited availability and reliability of data
  - II. Need for improved assessments of important fisheries
  - III. Innovation on research methodology

**b) The relative priority of the relevant elements of the Capacity Development Framework for Marine<sup>2</sup> Capture Fisheries Management (DAFF 2011):**

- i. Strengthening information systems
- ii. Strengthening the scientific and economic basis for fisheries management
- iii. Strengthening regional and international cooperation.

The workshop identified the relative importance of the relevant components of the capacity development framework in the Indonesian capture fisheries context. This included adding additional activities or deliverables, and modifying the descriptions of these where necessary, so they were more relevant to the Indonesian context. The workshop discussion considered both marine and inland waters explicitly. The priority (low, medium or high) indicates the level of importance placed on research and capacity building activities in the Indonesian capture fisheries context. The discussion also identified whether this research/capacity needed to be initiated, established or improved. The discussion results are presented in Table 1.

**TABLE 1: THE OUTCOMES AND PROPOSED DELIVERABLES OF THE HUMAN CAPACITY DEVELOPMENT FRAMEWORK RELEVANT TO RESEARCH AND CAPACITY BUILDING IN THE INDONESIAN CAPTURE FISHERIES CONTEXT**

<b>Activities</b>	<b>Proposed deliverables</b>	<b>Relative priority (Low, Medium, High)</b>	<b>Status of research capacity (Improve, Establish, Initiate)</b>
<b>Outcome 3: Information systems strengthened</b>			
Activity 3.1: Strengthening fishery independent monitoring systems	1. Reliable sources of fishery independent information designed and implemented for main fisheries – including independent observer programs, VMS, port sampling and enumerators and surveys. Research vessel surveys are needed to provide more information, ideally at the spatial scale of fishing grounds on: <ul style="list-style-type: none"> <li>• stock abundance</li> <li>• catch rate</li> <li>• species composition</li> <li>• size composition</li> <li>• selectivity of gear</li> </ul>	H	I
	2. Information on trends in indices of stock abundance (such as catch rates) and habitat characteristics, from both marine and inland fisheries available to managers. Development of data sharing systems.	H	I
	3. Enumerators, observers and analysts trained	H	I

<sup>2</sup> The framework was regarded as applying to inland/freshwater fisheries as well as marine fisheries.



<b>Activities</b>	<b>Proposed deliverables</b>	<b>Relative priority (Low, Medium, High)</b>	<b>Status of research capacity (Improve, Establish, Initiate)</b>
Activity 3.2: Strengthening information management	1. Integrated information management systems established; capable of collecting, processing, storing and exchanging information; support cross-verification of data and analysis. Including other related data such as oceanography, climate and other environmental data. As a first step, identify other institutes that hold related data and then develop meta data	H	I
	2. Data collection (catch/effort) and compilation systems established at all spatial levels (national and provincial)	H/M – high importance but expected to be high cost. Therefore, medium due to feasibility	I
Activity 3.3: Improving design of information collection systems	1. Management and compliance needs assessed for each main fishery	H	E
	2. Information collection systems designed and implemented to support management plan objectives	H	E
Activity 3.4: Strengthening monitoring of fisheries trade	1. Electronic databases established that link traceability and trade (e.g. supporting the EU, USA, IOTC, CCSBT, MSC and other catch certification system)	H	I - National level E - Province and district level
	2. Trade statistics and market intelligence available to fishery policy makers and planners	H	E
Activity 3.5: Strengthening fishery dependent monitoring systems	1. Robust catch and effort logbook systems in place for the main fisheries	H	E
	2. Robust data on: <ul style="list-style-type: none"> <li>• the value of production</li> <li>• cost of fishing including inputs</li> <li>• vessel and gear characteristics</li> </ul>	H	I
	3. Collaborative data collection with fishers	M	In

Activities	Proposed deliverables	Relative priority ( <u>L</u> ow, <u>M</u> edium, <u>H</u> igh)	Status of research capacity ( <u>I</u> mprove, <u>E</u> stablish, <u>I</u> nitiate)
<b>Outcome 4: Regional and national scientific capacity strengthened to support fisheries management planning</b>			
Activity 4.1: Strengthening scientific analytical capability and capacity to gather information	1. Analytical capacity sufficient to undertake robust assessments of main stocks/ fisheries (particularly tropical multi-species, multi gear fisheries) including highly migratory fish stocks and ecologically related species (ERS).	H	I
	2. Capacity for stock assessment/risk assessment in data poor environments strengthened	H	I
	3. Analytical capacity to study ecosystem dynamics and impacts, including pollution impacts (such as oil spill, marine debris, etc.)	H	In
Activity 4.2: Integrating scientific advice into management planning, including the identification of endangered species and important habitats	1. Institutional structures established to ensure integration of scientific outputs/ advice into management planning	H	E
	2. Management planning performance indicators (for example limit and target reference points) monitored regularly	H	E
	3. Dissemination to ensure the adoption of research output to stakeholders	H	E
	4. Strengthen community and stakeholder engagement skills, including at province and district level	H	In
	5. Improve dissemination of economic and environmental importance of fisheries to higher level decision makers to strengthen support for the sector	H	I
	6. Strengthen management planning for species conservation, important habitats and ecosystems	H	I
	7. Promoting, maintaining, sustaining and strengthening existing local and traditional knowledge particularly for data poor fisheries	H	I

<b>Activities</b>	<b>Proposed deliverables</b>	<b>Relative priority (Low, Medium, High)</b>	<b>Status of research capacity (Improve, Establish, Initiate)</b>
	8. Capacity to design and assess the function of MPA, fisheries reserves, and fisheries refugia (e.g. nursery habitat)	H	In
Activity 4.3: Strengthening economic impact analysis capacity	1. Capacity to assess social and economic impacts of alternative policy options strengthened	H	I
	2. Economic advice integrated into management performance evaluation	H/M – will take longer to implement	E
Activity 4.4: Strengthening capacity for assessment of climate change adaptation/mitigation in fisheries, inc. fishing vessel emissions	Strengthened capacity to assess national fisheries implications arising from climate change and implement adaptation strategies	M- long process	E
Activity 4.5: Research management (including planning, implementation, monitoring and evaluation)	1. Fishery specific research plans in place for each of the main fisheries, with research tied to explicit management planning/policy objectives	H	I
	2. Capacity to formulate research plans tied to the management/policy objective	H	I
	3. Capacity to implement research activities effectively and efficiently	H	I
	4. Capacity to monitor and evaluate research activity including to undertake impact assessment	H	In
<b>Outcome 7: Regional and international cooperation strengthened</b>			
Activity 7.1: Strengthening capacity for complementary management of transboundary stocks	1. Increasing regional coordination and support for collective transboundary management decisions and other regional strategic commitments	M	I
	2. Formal institutional structures established to ensure complementarity of	L – need improvements	E

Activities	Proposed deliverables	Relative priority (Low, Medium, High)	Status of research capacity (Improve, Establish, Initiate)
	management for shared stocks (for example bilateral, multi-lateral)	in data and systems first	
Activity 7.2: Strengthening capacity for joint (and common) stock assessment (RPOA stock assessment platform; defining stock structure)	1. Regional initiatives in place that harmonise arrangements for data collection terminology, formats and exchange mechanisms	H	I
	2. Regional stock assessment platform for joint and common stocks established	L – need improvements in data and systems first	E
Activity 7.5: Strengthen capacity for International engagement	Strengthened engagement in international fisheries management arrangements	M - already engaged in international fisheries management arrangements	I
	International obligations in fisheries management are met	H	I

**c) Priority research and capacity building themes in terms of:**

- i. Fisheries (domestic and transboundary)
- ii. Regions/locations
- iii. Research and management approaches (such as ecosystem approach to fisheries management; risk assessment; integrated social, economic and biological assessments)
- iv. Integrating scientific advice into management and planning decision making

The workshop discussed priority research and capacity building in terms of fisheries, regions/locations, research and management approaches, and integrating scientific advice into management and decision making. The workshop also considered previous ACIAR research projects and areas.

Priority research and capacity building themes in terms of:

- i. **Fisheries (domestic and transboundary)**
  - Marine transboundary – tuna including neritic tuna, shark, HMS
  - Inland - multispecies fisheries including Catfish, Bilih, etc
  - Marine/domestic - shrimp, small pelagic, demersal finfish
  - Conservation – MPA, fishery reserves, fishery refugia
  
- ii. **Regions and research areas**

Research activities to support fisheries management plans, other management initiatives and relevant conservation actions.

#### *Tuna*

- Bitung, North Sulawesi (E), pacific and archipelagic including FMA (713-717 WCPFC)
- Bali (I), servicing the CCSBT and IOTC areas. SBT monitoring and science. Aim to develop RITF IOTC scientific training centre. Increase research capacity in reproductive biology, diet analysis and aging. Increase stock assessment and analytical capacity.

#### *Shrimp*

- Arafura (FMA 718)

#### *Small pelagic finfish*

- CTI regions (Banda, Flores, Makassar Strait and Sulawesi; E). Research relating to fisheries refugia in South China Sea and Java Sea (link to SEAFDEC).
- Lemuru in Bali Strait – climate change, environmental variation impacts on stock
- Terubuk in Bengkalis – over fishing and environmental degradation
- Flying fish in Eastern Indonesia – over fishing (L).

#### *Demersal finfish*

- Arafura (FMA 718)
- Sunda Shelf

*MPA* – evaluation of the effectiveness of the established MPAs. Design for new MPAs which are linked to CTI. To be discussed further

*Habitat* – Arafura, to be discussed further

#### *Inland fisheries*

- Scaling up from Jatiluhur to Citarum river and Jaliluhur reservoir
- Flood plain in South Sumatera
- Application of EAFM
- Users oriented – early warning systems for eutrophication of reservoirs

*Research and management approaches* (such as Ecosystem Based Fisheries Management; risk assessment; integrated social, economic and biological assessments) – to be discussed further in relation to priorities.

*Integrating scientific advice into management and planning decision making* – this was seen as an important priority (high) and a cross-cutting issue for all research projects.

## 6. Summary and review of agreed priorities and identification of potential project areas.

The workshop started drafting the priorities (Table 2) based on the discussion topics above. The workshop draft was further elaborated by RCFMC (provided 21 April 2014) in preparation for the follow-up meeting in early May 2014.

**TABLE 2: DRAFT SUMMARY OF THE PRIORITY RESEARCH AND CAPACITY BUILDING THEMES**

<b>Fisheries</b>	<b>Region</b>	<b>Research issues/approach</b>	<b>Agency/Policy</b>	<b>Priority (<u>Low</u>, <u>Medium</u>, <u>High</u>)</b>
<b>1. Tuna</b>				
Tuna (transboundary)	Pacific (716, 717)	<ul style="list-style-type: none"> <li>• Bitung, North Sulawesi (E)</li> <li>• Capacity building and Research activities (2015)</li> <li>• Oceanography linkage analysis to tuna research (Tuna Fishing Ground)</li> <li>• Social and economic analysis</li> </ul>	<ul style="list-style-type: none"> <li>• AMAFRAD</li> <li>• DGCF</li> <li>• WCPFC</li> <li>• Provincial and District</li> </ul>	H
Tuna (transboundary)	Indian ocean (572, 573)	<ul style="list-style-type: none"> <li>• Bali (I)</li> <li>• RITF as IOTC Training centre</li> <li>• Improve research equipment</li> <li>• Diet, reproductive and aging (Population dynamics), Genetic</li> </ul>	<ul style="list-style-type: none"> <li>• RCFMC</li> <li>• CCSBT</li> <li>• IOTC</li> </ul>	H
Neritic tuna (domestic)	Archipelagic (572, 573)	<ul style="list-style-type: none"> <li>• Stock assessment</li> <li>• Harvest Strategy (Harvest Control Rule and Management Measures)</li> <li>• Risk assessment</li> <li>• Social and economic</li> <li>• EBFM</li> </ul>	<ul style="list-style-type: none"> <li>• IOTC</li> <li>• RCMFC</li> <li>• NSAC (National Stock Assesment Commission)</li> </ul>	H
Ecologically related species including sharks and rays (Related to tuna fishery)	Pacific (716, 717), Indian ocean (572, 573)	<ul style="list-style-type: none"> <li>• Stock assessment</li> <li>• Risk assessment</li> <li>• Social and economic</li> <li>• EBFM</li> </ul>	<ul style="list-style-type: none"> <li>• RCMFC</li> <li>• DGCF</li> <li>• CCSBT</li> <li>• IOTC</li> <li>• WCPFC</li> </ul>	H

Fisheries	Region	Research issues/approach	Agency/Policy	Priority ( <u>Low</u> , <u>Medium</u> , <u>High</u> )
<b>2. Shrimp</b>				
Shrimp	Arafura	<ul style="list-style-type: none"> <li>• Stock assessment</li> <li>• Harvest Strategy (Harvest Control Rule and Management Measures)</li> <li>• EBFM</li> </ul>	<ul style="list-style-type: none"> <li>• RCMFC</li> <li>• DGCF</li> <li>• NSAC</li> </ul>	L
<b>3. Small pelagic finfish</b>				
Small pelagic finfish	CTI (713,714,715, 716,717)	<ul style="list-style-type: none"> <li>• Fisheries refugia</li> <li>• Improve research equipment</li> <li>• Diet, reproductive and aging otolith (Population dynamics), Genetic</li> <li>• EBFM</li> </ul>	<ul style="list-style-type: none"> <li>• RCMFC</li> <li>• DGMCSI</li> </ul>	M
<b>4. Demersal</b>				
Demersal	Arafura sea Sunda Shelf	<ul style="list-style-type: none"> <li>• Stock assessment</li> </ul>	<ul style="list-style-type: none"> <li>• RCFMC</li> <li>• DGCF</li> </ul>	L
<b>5. Inland waters</b>				
Inland waters	<ul style="list-style-type: none"> <li>- Citarum ( project number) FIS/2002/111 (Saguling, Cirata, Jatiluhur)</li> <li>- Floodplain in South Sumatra</li> <li>- Reserved Area in West Borneo (Sentarum)</li> </ul>	<ul style="list-style-type: none"> <li>• EAFM/EBFM</li> <li>• Social and economic</li> <li>• Habitat Rehabilitation and Modification</li> <li>• Water Pollution incld Algae blooms, eutrophication</li> <li>• Fisheries and Water Quality Regular Monitoring</li> </ul>	<ul style="list-style-type: none"> <li>• RCFMC</li> <li>• DGCF</li> <li>• Province: national</li> </ul>	H

Fisheries	Region	Research issues/approach	Agency/Policy	Priority (Low, Medium, High)
<b>6. Conservation</b>				
MPA	- CTI (Raja Ampat, Sawu, Taka Bone Rate) - Anambas	<ul style="list-style-type: none"> <li>• EAFM/EBFM</li> <li>• Risk Assessment</li> <li>• Effectiveness and Connectivity</li> <li>• Zonation</li> <li>• Fisheries Refugia</li> <li>• Management Measures</li> <li>• Social and economic</li> </ul>	RCFMC DGMCSI CTI	H
Habitat degradation	- Inland Waters -Marine Waters (Coastal, Mangrove, Sea Grass and Coral Reef)	<ul style="list-style-type: none"> <li>• Sedimentation rate and impact assesment</li> <li>• Pollution type and Mitigation</li> <li>• Habitat Rehabilitation and Enhancement</li> <li>• Enviromental Engineering</li> <li>• Social and economic</li> </ul>	RCFMC DGCF DGMCSI DGA District Province: national	H
Endangered, Vulnerable, Rare Species	Terubuk Flying Fish Marine Turtle Sea Horse Bambu laut (Isis Hippuris)- Gorgonacea Kima (giant clams) Lola (Trochus niloticus )	<ul style="list-style-type: none"> <li>• Genetic</li> <li>• Risk Assessment</li> <li>• Bio – Geography</li> <li>• Biology</li> <li>• Stock Status</li> <li>• Rebuilding stock</li> </ul>	RCFMC DGCF DGMCSI District offices	M
<b>7. Capacity Building to formulate research plans tied to the management/policy objective</b>				
Research Management and Leadership	Australia	<ul style="list-style-type: none"> <li>• Research Management</li> <li>• Research Dissemination</li> <li>• Internship Program</li> <li>• Post Graduate Scholarship (John Allwright and John Dillon Fellowship)</li> </ul>	RCFMC	H



## **8. Next steps to finalise the strategic plan**

A follow-up meeting between RCFMC, ACIAR, ABARES and CSIRO was proposed for early May 2014.

It was agreed that RCFMC would further develop the draft Table 2 prior to the follow-up meeting, and this was provided on 21 April 2014, for finalisation at the May meeting.

It was noted that ABARES would seek comments from Australian research partners and agencies for consideration at the April meeting.

**The workshop closed at 12:30pm, 12 March 2014**

**Attachment A: Agenda**

**Attachment B: Participants list**

**Attachment C: List of background papers provided for the workshop**

## Attachment A: Agenda

*Priority identification workshop for the strategic plan for ACIAR's Fisheries Program engagement in capture fisheries research and associated institutional capacity development in Indonesia.*

*11<sup>th</sup> & 12<sup>th</sup> March 2014, Hotel Santika, Bogor Indonesia*

### AGENDA

#### Workshop commences: 9 am, 11<sup>th</sup> March 2014

1. Welcome and introductions by Dr Chris Barlow, ACIAR
2. Opening speech by Dr. Achmad Poernomo, AMFRAD
3. Workshop objectives (Dr Ilona Stobutzki, ABARES)
4. Presentations (15 minutes for the presentation, 5 minutes for questions)
  - Indonesian Fisheries Master Plan and the role of capture fisheries research  
Prof. Dr. Hari Eko Irianto, AMAFRAD
  - Priorities of the Directorate of Fish Resources and strategic research needs  
Ibu Ernie Wijayanti, Directorate of Fish Resources
  - Priorities of the Directorate of Conservation and Marine National Parks and strategic research needs  
Dr Akhsanal Kasasiah, Directorate of Conservation and Marine National Parks
  - Current ACIAR capture fisheries projects and lessons from Australian experience in implementing long-term research plans  
Mr Craig Proctor, CSIRO
  - Strategic plan development process and the *Capacity Development Framework for Marine Capture Fisheries Management*  
Dr Ilona Stobutzki, ABARES
5. Discussion topics:
  - a) Key drivers for capture fisheries research in the Indonesian context, building on those identified in the *Capacity Development Framework for Marine Capture Fisheries Management*.
  - b) The relative priority of the relevant elements of the *Capacity Development Framework for Marine Capture Fisheries Management*:
    - i. Strengthening information systems
    - ii. Strengthening the scientific and economic basis for fisheries management
    - iii. Strengthening regional and international cooperation.
  - c) Priority research and capacity building themes in terms of:
    - i. Fisheries (domestic and transboundary)
    - ii. Regions/locations
    - iii. Research and management approaches (such as Ecosystem Based Fisheries Management; risk assessment; integrated social, economic and biological assessments)
    - iv. Integrating scientific advice into management and planning decision making

6. Summary and review of agreed priorities and identification of potential project areas.
7. Next steps to finalise the strategic plan

**Workshop close: 12:30pm 12 March 2014**

## Attachment B: Participants list

### Indonesia

Name	Agency
Dr. Ir. Achmad Poernomo Acting Chairman	Agency for Marine and Fisheries Research and Development AMAFRAD ( <i>Badan Litbang Kelautan dan Perikanan</i> )
Prof. Dr. Hari Eko Irianto Director	Research Centre for Fisheries Management and Conservation-RCFMC ( <i>Pusat Penelitian Pengelolaan Perikanan dan Konservasi Sumberdaya Ikan</i> )
Mrs Ernie Wijayanti	Directorate of Fish Resources ( <i>Direktorat Sumberdaya Ikan</i> ), Directorate General of Capture Fisheries (DITJEN <i>Perikanan Tangkap</i> )
Dr Akhsanah Kasasiah	Conservation and National Park, Directorate General of Marine, Coasts and Small Islands Affairs (DITJEN <i>Kelautan, Pesisir dan Pulau-Pulau Kecil- KP3K</i> )
Mr. Kusno Susanto Head	Research and Operational Division, RCFMC
Prof. Dr. Ali Suman Head	Research Institute for Marine Fisheries (RIMF), RCFMC
Dr. Fayakun Satria Head	Research Institute for Fisheries Enhancement and Conservation (RIFEC), RCFMC
Prof. Dr. Wudianto Senior Scientist	RCFMC
Mr. Duto Nugroho Senior Scientist	RCFMC
Dr. Sonny Koeshendrajana Senior Socio-economist	Research Centre for Marine and Fisheries Socio-Economics (RCMFSE)
Mrs Shanti Dewi Hafsanita	Cooperation and Information Division, Secretariat of AMAFRAD
Mr. M. Natsir Scientist	RCFMC
Ms Ririk Kartikas Sulistyaningsih Scientist	Research Institute for Tuna Fisheries (RITF), RCFMC
Yudi Priatno Kaelan	RCFMC
Mahardika A Nugraha	AMAFRAD
Teguh Satria	MMAF

### Australia

Name	Agency
Dr Chris Barlow Programme Leader	Fisheries Programme ACIAR
Dr Ilona Stobutzki Assistant Secretary	Australian Bureau of Agricultural and Resource Economics and Sciences Department of Agriculture
Mrs Mary Stephan Economist	Australian Bureau of Agricultural and Resource Economics and Sciences Department of Agriculture
Mr Craig Proctor Senior Scientist	CSIRO Marine and Atmospheric Research

### ACIAR Country Office Staff

Mrs Mirah Nuryati, Mrs Maria Ludwina, Mr Nugroho Dyaksono

## **Attachment C: List of background papers provided for the workshop**

1. Summary of *Net Returns: a human capacity development framework for marine capture fisheries management in South East Asia* (ABARES 2014)
2. Context: Australian – Indonesian partnerships on capture fisheries research (Draft (ABARES 2014)
3. Country Assessment Report, Indonesia for the RPOA Framework for marine capture fisheries capacity building (DAFF 2011)
4. Context: Overview of Indonesia's capture fisheries (ABARES 2014)
5. *Net Returns: a human capacity development framework for marine capture fisheries management in South East Asia* (DAFF 2011)

*Priority identification workshop for the  
Strategic plan for ACIAR's Fisheries Program engagement  
in capture fisheries research and associated institutional  
capacity development in Indonesia (FIS/2011/030)*

**Follow-up Meeting**

*2<sup>nd</sup> May 2014  
RCFMC, Jakarta, Indonesia*

## 1. Agreed priorities and identification of potential project areas.

The priority setting workshop ( March 2014) started drafting the priorities and potential project areas, these were elaborated on by RCFMC in April and at the follow-up meeting at RCFMC, 2<sup>nd</sup> May 2014.

**TABLE 1: SUMMARY OF THE PRIORITY RESEARCH AND CAPACITY BUILDING THEMES**

Fisheries & Region (Fisheries management area)	Research drivers Research and capacity building issues/approach	Agency	Priority
<b>1. Tuna</b>			
a) Pacific tunas, transboundary (716, 717)	<p><i>Drivers:</i></p> <ul style="list-style-type: none"> <li>• Support for the National tuna management plans, related policy, management and decision making at the national, province and district levels.</li> <li>• Support for WCPFC engagement and bilateral discussions.</li> </ul> <hr/> <ul style="list-style-type: none"> <li>• Bitung research station capacity (Initiate): research and capacity building activities to contribute to building a similar institutional capacity to the Research Institute for Tuna Fisheries (RITF), Bena, Bali. This should continue to include broader collaboration, such as with the WCPFC and GEF. Research and capacity building would include:               <ul style="list-style-type: none"> <li>○ catch and effort data collection (enumerators/port sampling)</li> <li>○ biological and population dynamics research (aging, reproduction studies)</li> <li>○ data management and analysis and stock assessment</li> <li>○ fishery status reporting</li> <li>○ establishment of a scientific observer program</li> </ul> </li> </ul> <hr/> <ul style="list-style-type: none"> <li>• Characterisation of the tunas' pelagic habitat use to understand the location of main fishing grounds, feeding and spawning areas. Research into the oceanographic and environmental variables in relation to tuna distribution, abundance and behaviour. This information would support bilateral discussions and potential spatial management approaches (such as areas for protection).</li> </ul>	<ul style="list-style-type: none"> <li>• AMAFRAD</li> <li>• DGCF</li> <li>• WCPFC</li> <li>• Provincial and District</li> <li>• RCMFSE</li> </ul>	High

Fisheries & Region (Fisheries management area)	Research drivers Research and capacity building issues/approach	Agency	Priority
	<ul style="list-style-type: none"> <li>• Social and economic characterisation and analyses of the fisheries to inform management decisions, at national, province and district levels. The current ACIAR project FIS/2009/059 will provide some information on the social and economic characteristics of four ports in the region with a focus on the fish aggregating devices (FAD) associated fisheries. However, more information will be required to assist in evaluating the social and economic implications of different management options. This should consider all the fisheries involved (industrial and small-scale) and information on where catches are used (domestic consumption or exported). In Bitung a 'special economic development zone' has been established which will enable exports/imports directly from Bitung. This may change the structure of the industry, with implications for the social and economic characterisation of the industry. RCMFSE is currently doing research in this area.</li> <li>• Climate changes impacts on tunas and the associated fisheries.</li> </ul>		
b) Indian Ocean tunas, transboundary (572, 573)	<p><i>Drivers:</i></p> <ul style="list-style-type: none"> <li>• Support for the National tuna management plans, related policy, management and decision making.</li> <li>• Support for IOTC and CCSBT engagement and bilateral discussions.</li> <li>• Building on the investments and achievements to date in tuna-related research and capacity development.</li> </ul> <ul style="list-style-type: none"> <li>• Research Institute for Tuna Fisheries (RITF) in Benoa, Bali (I): research and capacity development activities to continue to build and extend the capacity for tuna fishery related research. This may include opportunities to continue to improve research equipment and facilities. The current ACIAR project (FIS/2009/059) includes training in otolith microchemistry and stock structure genetics. Research and capacity building would include: <ul style="list-style-type: none"> <li>○ species' diet</li> <li>○ population dynamics (including reproduction and aging)</li> <li>○ stock structure and genetics (engagement in close-kin genetics)</li> <li>○ data analysis and stock assessment</li> <li>○ fishery status reporting.</li> </ul> </li> <li>• Opportunities to develop the RITF as an IOTC Training centre.</li> </ul>	<ul style="list-style-type: none"> <li>• AMAFRAD</li> <li>• CCSBT</li> <li>• IOTC</li> </ul>	High



Fisheries & Region (Fisheries management area)	Research drivers Research and capacity building issues/approach	Agency	Priority
	<ul style="list-style-type: none"> <li>Continued strengthening of fishery data collection (catch and effort data) and management. The current ACIAR project (FIS/2009/059) includes the development and implementation of an improved port-based monitoring program and fisheries statistics system for FAD-based fisheries.</li> </ul>		
c) Neritic tunas, archipelagic (572,573)	<p><i>Drivers:</i></p> <ul style="list-style-type: none"> <li>Support for the National tuna management plans, related policy, management and decision making at the national, province and district levels.</li> <li>Potential input to IOTC neritic tuna work and bilateral discussions.</li> <li>Support for implementation of the ecosystem approach to fisheries management (EAFM) and linking this to the fisheries management plans. Indonesia, through MMAF is implementing a roadmap towards EAFM. This is led by DGCF and supported by key stakeholders including District and Provincial Fisheries agencies, NGOs, universities and the Coral Triangle Initiative (CTI). The implementation of EAFM is taking into account the data poor situation and a suite of indicators has been developed and used to conduct a preliminary assessment in the Fisheries Management Areas.</li> <li>Research and capacity building to extend the work on transboundary tuna species to neritic tuna species. This would include: <ul style="list-style-type: none"> <li>Data collection, including catch and effort data by species, fishery/gear and region</li> <li>Stock structure</li> <li>Locations of spawning grounds</li> <li>Population dynamics research (ageing and reproduction studies).</li> </ul> </li> <li>Data poor approaches to risk assessment, stock assessment and harvest strategies.</li> <li>Social and economic characterisation and analyses of the fisheries to inform management decisions, at national, provincial and district levels.</li> <li>Research and capacity building in support of the implementation of EAFM.</li> <li>Climate changes impacts on tunas and the associated fisheries.</li> </ul>	<ul style="list-style-type: none"> <li>IOTC</li> <li>RCMFC</li> <li>RCMFSE</li> <li>NSAC</li> </ul>	High

Fisheries & Region (Fisheries management area)	Research drivers Research and capacity building issues/approach	Agency	Priority
d) Ecologically related species (including sharks and rays) in the Pacific and Indian Ocean tuna fisheries (Pacific - 716, 717; Indian Ocean - 572, 573)	<i>Drivers:</i> <ul style="list-style-type: none"> <li>Support for the Fisheries Management Plans, the draft NPOA – Sharks, policy, management and decision making with respect to ecologically related species. This extends across national, provincial and district levels.</li> <li>Support for RFMO engagement (WCPFC, IOTC and CCSBT) and implementation of agreed conservation and management measures relating to ecologically related species</li> </ul>	<ul style="list-style-type: none"> <li>RCMFC</li> <li>RCMFSE</li> <li>DGCF</li> <li>CCSBT</li> <li>IOTC</li> <li>WCPFC</li> </ul>	High
	<ul style="list-style-type: none"> <li>Data collection, including catch and effort data by species, gear/fishery and region. This is likely to require port sampling/enumerators and scientific observer programs where appropriate.</li> </ul>		
	<ul style="list-style-type: none"> <li>Data poor approaches to risk assessment, stock assessment and management/harvest strategies.</li> </ul>		
	<ul style="list-style-type: none"> <li>Social and economic characterisation and analyses of the fisheries and the role of ecologically related species in these fisheries, to inform management decisions, at national, provincial and district levels.</li> </ul>		
	<ul style="list-style-type: none"> <li>Fishing technology to enable bycatch mitigation</li> </ul>		
	<ul style="list-style-type: none"> <li>Research and capacity building in support of the implementation of EAFM.</li> </ul>		
<b>2. Shrimp</b>			
Shrimp (Arafura)	<i>Drivers:</i> <ul style="list-style-type: none"> <li>Support for the Fisheries Management Plans, measuring performance of FMP 718, related policy, management and decision making.</li> </ul>	<ul style="list-style-type: none"> <li>RCMFC</li> <li>DGCF</li> <li>NSAC</li> </ul>	Low
	<ul style="list-style-type: none"> <li>Stock assessment</li> </ul>		
	<ul style="list-style-type: none"> <li>Harvest Strategy development (Harvest Control Rules and Management Measures)</li> </ul>		
	<ul style="list-style-type: none"> <li>Research and capacity building in support of the implementation of EAFM.</li> </ul>		

Fisheries & Region (Fisheries management area)	Research drivers Research and capacity building issues/approach	Agency	Priority
<b>3. Small pelagic finfish</b>			
Small pelagic finfish (CTI area, 713,714,715, 716,717)	<p><i>Drivers</i></p> <ul style="list-style-type: none"> <li>• Support for the Fisheries Management Plans and related policy, management and decision making. This extends across national, provincial and district levels.</li> </ul> <hr/> <ul style="list-style-type: none"> <li>• Data collection by fisheries/gear and region.</li> </ul> <hr/> <ul style="list-style-type: none"> <li>• Fisheries refugia – identification of areas that are important for small pelagic species, to underpin advice on potential design and establishment of fisheries refugia (DGMCSI).</li> </ul> <hr/> <ul style="list-style-type: none"> <li>• Characterisation and understanding of fisheries interactions. Small pelagic species are caught by a range of gear but there is limited data to inform discussions of these interactions across fisheries.</li> </ul> <hr/> <ul style="list-style-type: none"> <li>• Improved research equipment</li> </ul> <hr/> <ul style="list-style-type: none"> <li>• Biological and population dynamics research, including: diet, reproduction, aging and stock structure</li> </ul> <hr/> <ul style="list-style-type: none"> <li>• Research and capacity building in support of the implementation of EAFM.</li> </ul>	<ul style="list-style-type: none"> <li>• RCMFC</li> <li>• DGMCSI</li> </ul>	Medium
<b>4. Demersal</b>			
Demersal fish (Arafura sea, Sunda Shelf)	<p><i>Drivers</i></p> <ul style="list-style-type: none"> <li>• Support for the Fisheries Management Plans, measuring performance of FMP 718, related policy, management and decision making. This extends across national, provincial and district levels.</li> </ul> <hr/> <ul style="list-style-type: none"> <li>• Data collection by fisheries/gear and region</li> </ul> <hr/> <ul style="list-style-type: none"> <li>• Stock assessment</li> </ul> <hr/> <ul style="list-style-type: none"> <li>• Fishing technology to enable bycatch reduction/mitigation (e.g. Bycatch Reduction Devices)</li> </ul> <hr/> <ul style="list-style-type: none"> <li>• Harvest Strategy (Harvest Control Rules and Management Measures)</li> </ul>	<ul style="list-style-type: none"> <li>• RCFMC</li> <li>• DGCF</li> </ul>	Low

Fisheries & Region (Fisheries management area)	Research drivers Research and capacity building issues/approach	Agency	Priority
	<ul style="list-style-type: none"> <li>Research and capacity building in support of the implementation of EAFM.</li> </ul>		
<b>5. Inland waters</b>			
Inland waters - Citarum region - Floodplains in South Sumatra - Reservation Area in West Borneo (Sentarum)	<p><i>Drivers</i></p> <ul style="list-style-type: none"> <li>Support for floodplains, reservoirs and river capture fisheries management, policy and decision making.</li> <li>Building on research and capacity development from ACIAR project (FIS/2002/111) that focused in the Citarum region, on the Saguling, Cirtarum and Jatiluhur reservoirs. This would be aimed at extending the understanding of interactions between capture fisheries and other activities, including freshwater cage culture, to inform local management decisions.</li> <li>The development of water quality monitoring systems and early warning systems (such as in Jatiluhur) to enable farmers and fishers to respond and reduce/prevent losses.</li> </ul> <hr/> <ul style="list-style-type: none"> <li>Research and capacity building activities that continue the development and extension of the approach developed in ACIAR project (FIS/2002/111) for capture fisheries in reservoirs and co-management approaches. Initiatives to assist in moving from the specific research project into ongoing implementation, which is at the local government level.</li> </ul> <hr/> <ul style="list-style-type: none"> <li>Extension of the work in Citarum reservoirs (FIS/2002/111) to the associated rivers and floodplains.</li> </ul> <hr/> <ul style="list-style-type: none"> <li>A Centre of Inland Fisheries Research (SEAFDEC) will be established in 2014. This provides an opportunity for collaboration and capacity building.</li> <li>Capture fisheries data collection by fisheries/gear, data management and analysis.</li> </ul> <hr/> <ul style="list-style-type: none"> <li>Social and economic characterisation and analyses of the capture fisheries (including food safety and food security) and interactions with other activities, including freshwater cage culture. This would be aimed at informing local management decisions. This work should include research to improve the understanding of the role of women in the capture fisheries and increase their engagement in management.</li> </ul>	<ul style="list-style-type: none"> <li>RCFMC</li> <li>DGCF</li> <li>Province &amp; national</li> <li>RCMFSE</li> </ul>	High

Fisheries & Region (Fisheries management area)	Research drivers Research and capacity building issues/approach	Agency	Priority
	<ul style="list-style-type: none"> <li>• Freshwater habitat modification (including sedimentation) and rehabilitation, particularly in relation to capacity for floating aquaculture cages.</li> <li>• Water quality monitoring and management, including understanding the impacts of eutrophication and water quality on aquaculture floating cages and capture fisheries, related communities and the local economy. The development of water quality monitoring systems and early warning systems (such as in Jatiluhur) to enable farmers and fishers to respond and reduce/prevent losses. Potentially wide application across inland waters.</li> <li>• Monitoring and control of invasive alien species.</li> <li>• Research and capacity building in support of the implementation of EAFM in inland waters.</li> </ul>		
<b>6. Conservation</b>			
a) Marine Protected Areas (MPAs) - CTI (Raja Ampat, Sawu, Taka Bone Rate) - Anambas	<i>Drivers:</i> <ul style="list-style-type: none"> <li>• Support for the MPA policy, management and decision making, particularly in terms of biodiversity conservation and the potential role in fisheries management.</li> <li>• Support for the scientific basis for the design of MPAs, monitoring their effectiveness and understanding connection to other areas.</li> <li>• Data and information collection, analyses, research and capacity building to underpin advice on MPAs and conservation issues, including:               <ul style="list-style-type: none"> <li>○ Measuring and monitoring MPA effectiveness and connectivity among areas.</li> <li>○ advice on zonation (for different uses/levels of protection) within MPAs</li> </ul> </li> <li>• Fisheries Refugia – research to identify important habitats/areas for specific species. This would contribute to advice on the design and establishment of fisheries refugia (DGMCSI)</li> <li>• Management Measures - such as open and closed seasons (contributions of the MPA’s to higher Management Measures)</li> <li>• Research on how MPAs contribute to social and economic aspects in associated communities, including food security, economic evaluation. This should gender specific research, to understand the role of women and potential impacts/benefits on their role.</li> </ul>	RCFMC DGMCSI RCMFSE CTI	High

Fisheries & Region (Fisheries management area)	Research drivers Research and capacity building issues/approach	Agency	Priority
	<ul style="list-style-type: none"> <li>Research and capacity building in support of MPA in the context of the implementation of EAFM.</li> </ul>		
b) Habitat degradation - Inland Waters - Marine Waters (Coastal, Mangrove, Sea Grass and Coral Reef)	<p><i>Drivers:</i></p> <ul style="list-style-type: none"> <li>Support for the policy, management and decision making in relation to habitat issues, including: mitigating habitat degradation, habitat rehabilitation and enhancement. This support is required at the national, province and district levels.</li> </ul> <hr/> <ul style="list-style-type: none"> <li>Research on inland waters habitat changes, including:               <ul style="list-style-type: none"> <li>sedimentation rates and impact assesment</li> <li>wetlands improvements to reduce sedimentation</li> <li>pollution types and mitigation</li> <li>habitat rehabilitation</li> </ul> </li> </ul> <hr/> <ul style="list-style-type: none"> <li>Research in marine waters, including:               <ul style="list-style-type: none"> <li>Coastal, mangrove, sea grass and coral reef habitat status monitoring</li> <li>Environmental engineering – artificial reefs (Rumah ikan), data, information and analyses to advise on design and the evaluate and monitoring the impact of artificial reefs to assist DGCF decision-making.</li> </ul> </li> </ul> <hr/> <ul style="list-style-type: none"> <li>Social and economic data collection, analyses and advice to assist decision-making.</li> </ul>	RCFMC DGCF DGMCSI DGA RCMFSE District Province	High
c) Endangered, Vulnerable, Rare Species and those listed under CITES.	<p><i>Drivers:</i></p> <ul style="list-style-type: none"> <li>Support for the policy, management and decision making in relation to these species, including responding to the international commitments.</li> <li>Support for providing species status reports as required.</li> <li>Species could include: Terubuk, flying fish, marine turtle, seahorses, Bambu laut (<i>Isis Hippuris</i>)-Gorgonacea, Kima (giant clams), Lola (<i>Trochus niloticus</i>) and CITES listed sharks.</li> </ul>	RCFMC DGCF DGMCSI District offices	Medium

Fisheries & Region (Fisheries management area)	Research drivers Research and capacity building issues/approach	Agency	Priority
	<ul style="list-style-type: none"> <li>• Research and capacity building that will contribute to providing species status reports, including:               <ul style="list-style-type: none"> <li>○ Data collection, population levels, catch and depletion</li> <li>○ Stock structure and bio-geography</li> <li>○ Risk assesment</li> <li>○ Biological research, including population dynamics</li> <li>○ Stock Status and population trajectories</li> <li>○ Strategies to rebuilding species/stock</li> </ul> </li> <li>• CITES Appendix II listings (e.g. hammerhead sharks), data collection, status reporting and implications for national management.</li> </ul>		
<b>7. Capacity Building to formulate research plans tied to the management/policy objective</b>			
Research Management and Leadership	<i>Drivers:</i> <ul style="list-style-type: none"> <li>• To contribute to evidence-based policy, management and decision making, through research management and planning that is strongly integrated with policy and management objectives.</li> <li>• To ensure effective communication and dissemination of research results to decision-makers and stakeholders.</li> <li>• To contribute to long-term institutional capacity building.</li> </ul>	RCFMC RCMFSE	High

Fisheries & Region (Fisheries management area)	Research drivers Research and capacity building issues/approach	Agency	Priority
	<ul style="list-style-type: none"> <li>• Research management and planning to ensure effective links to and consideration by policy, management and decision makers.</li> <li>• Strategic planning and engagement in the RFMO science processes, including increased understanding of national objectives, goals and paper preparation</li> <li>• Establishment of processes and relationships that increase effective research dissemination to key stakeholders (including policy makers). This would include improved:               <ul style="list-style-type: none"> <li>○ Fishery status reporting</li> <li>○ Contributions to harvest strategy development</li> <li>○ Effective communication with policy, management and decision-makers</li> </ul> </li> <li>• Internship Programs</li> <li>• Post Graduate Scholarship (John Allwright and John Dillon Fellowship)</li> </ul>		
<b>8. The role of women in fisheries: Gender related research</b>			
Role of woman in fisheries	<p><i>Drivers:</i></p> <ul style="list-style-type: none"> <li>• There are limited data and information on the role of women in fisheries (particularly small-scale), for example the role of women is not considered by the Indonesian Bureau of Statistics and women often have limited participation in management. However, women can have important roles in fishing, processing and marketing and are important stakeholders in local fisheries management. Lack of engagement of women in management efforts can result in lost opportunities to improve conservation practices and ensure secure, viable livelihoods.</li> <li>• Support for improved policy, management and decision making at national, provincial and district levels.</li> <li>• Support for implementation of the Millennium Development Goals.</li> </ul>	RCFMC RCMFSE Kementerian Pemberdayaan Perempuan dan Perlindungan Anak (Ministry of Women Empowerment and Child	Medium to High



Fisheries & Region (Fisheries management area)	Research drivers Research and capacity building issues/approach	Agency	Priority
	<ul style="list-style-type: none"> <li>• Initial research and capacity building should include developing a better understanding of women's participation in pre-production, fishing and post-harvest activities, providing data and increased understanding of the role of women in fisheries. Activities would include:               <ul style="list-style-type: none"> <li>○ Data and information collection to understand women's participation</li> <li>○ Incorporation of gender specific research into social and economic research activities, considering livelihoods and food security</li> <li>○ Capacity building to improve engagement with women in fisheries</li> </ul> </li> </ul>	Protection)	

## 2. Next steps to finalise the strategic plan

Meetings would be held at RCMFC to finalise the priorities and discuss them and receive any further comments from DGCF and DGMSI. These priorities would then be included in the draft strategic plan for consideration by ACIAR and AMAFRAD.

**Attachment A: Participants list**

**Attachment B: Background paper provided for the workshop**

## Attachment A: Participants list

### Indonesia

Name	Agency
Prof. Dr. Hari Eko Irianto Director	Research Centre for Fisheries Management and Conservation-RCFMC ( <i>Pusat Penelitian Pengelolaan Perikanan dan Konservasi Sumberdaya Ikan</i> )
Mr. Kusno Susanto Head	Research and Operational Division, RCFMC
Prof. Dr. Ali Suman Head	Research Institute for Marine Fisheries (RIMF), RCFMC
Dr. Fayakun Satria Head	Research Institute for Fisheries Enhancement and Conservation (RIFEC), RCFMC
Prof. Dr. Wudianto Senior Scientist	RCFMC
Mr. Duto Nugroho Senior Scientist	RCFMC
Dr. Sonny Koeshendrajana Senior Socio-economist	Research Centre for Marine and Fisheries Socio-Economics (RCMFSE)
Mr. M. Natsir Head	Research Program Sub Division, RCFMC
Mrs Ririk Kartikas Scientist	Research Institute for Tuna Fisheries (RITF), RCFMC
Mrs Lilis	RCFMC

### Australia

Name	Agency
Dr Ilona Stobutzki Assistant Secretary	Australian Bureau of Agricultural and Resource Economics and Sciences Department of Agriculture
Dr Campbell Davies Principal Scientist	CSIRO Marine and Atmospheric Research
Mr Craig Proctor Senior Scientist	CSIRO Marine and Atmospheric Research

## Attachment B: Background document for RCFMC Meeting, 2 May 2014

### *Priority identification for the Strategic plan for ACIAR's Fisheries Program engagement in capture fisheries research and associated institutional capacity development in Indonesia (FIS/2011/030)*

#### Introduction

The priority identification workshop (March 2014) noted that ABARES would seek comments and suggestions from key Australian researchers. These suggestions would be provided to the follow-up meeting (RCFMC, 2 May 2014) for consideration. The strategic plan priorities are intended to reflect those of the Indonesian agencies within the ACIAR mandate. These suggestions are solely provided to inform discussions.

ABARES provided key Australian researchers who had been engaged in previous capture fisheries research in Indonesia, primarily through ACIAR projects, with the draft workshop report. The following is a summary of the suggestions received.

#### Suggestions for consideration

These suggestions are provided in addition to the research and capacity building priorities identified in the draft workshop report, or to assist in elaborating Indonesia's priorities. The RCFMC and MMAF may wish to consider the relevance or priority of research and capacity building in:

1. **Translation of research into effective management outcomes.** Research, capacity building and communication tools and strategies that improve the translation of research outputs and advice into effective management outcomes. This has been a challenge in previous research projects and was identified as a priority at the workshop. Initiatives could include specific capacity building focused on strengthening processes (for joint planning and prioritisation) and communication strategies. One approach could be through training/workshops, possibly linked to the development of the Fisheries Management Plans for each Fisheries Management Area. Another approach may be to continue to strengthen this component within proposed research projects. If training courses were developed perhaps they could be broadened to include development of general skill sets in sustainable management of natural resources that could also be applied in other areas like forestry management.
2. **Fishery status reporting.** There is an opportunity to build on MMAF's processes for stock status reporting (National Stock Assessment Committee and national reports to RFMOs) and develop broader national fishery status reporting systems. This could provide a communication tool targeted at policy and decision makers, stakeholders or markets. Status reporting can facilitate reporting to international organisations, as well as aligning with third party certification where appropriate. Fishery status reporting can be incrementally expanded over time to cover the aspects of an ecosystem approach to fisheries management (such as livelihoods, economic contributions and sustainability aspects).
3. **Economic contribution of fisheries.** There may be opportunity for strengthened reporting on the economic contribution of fisheries at a range of scales, using approaches suitable to Indonesian fisheries. This could contribute to informing policy development, management approaches and research investment. This could include regular reporting on a range of measures of economic performance of fisheries, including contributions to livelihoods, employment and trade. This could also be extended to look at the impact of different economic tools (e.g. subsidies) on fisheries management outcomes.

- 4. Provincial and local level capacity.** The decentralised nature of Indonesian fisheries management results in substantial responsibility at the provincial and local level. Ensuring there is sufficient understanding and capacity to implement effective management, including RFMO obligations is a challenge in this decentralised environment.
- 5. The role of women in small-scale fisheries, including the contribution to household food security and income.** The role of women in fisheries is generally not considered by the Indonesian Bureau of Statistics (e.g. Fitriana and Stacey 2012) and women often have limited participation in management. However, they can have important roles in fishing, processing and marketing and are important stakeholders in local fisheries management. Lack of engagement of women in management efforts can result in lost opportunities to improve conservation practices and ensure secure, viable livelihoods. Initial steps may include developing a better understanding of women's participation in pre-production, fishing and post-harvest activities, providing data and increased understanding of the role of women in fisheries.
- 6. Identification of locally important fisheries for food security, nutrition and household incomes.** The contribution of these small-scale fisheries is unlikely to be captured effectively in production statistics or broad economic statistics. This can result in a limited management and resourcing. There may be value in understanding these contributions in local areas and how these could be best managed through locally appropriate fisheries management or co-management approaches.
- 7. Role of fishers in small-scale fisheries data collection and integration of these data sources with others sources of data into local fisheries management.** There may be value in a pilot project on how to involve local fishers in data collection and monitoring for fisheries management.
- 8. The structure of Fisheries Management Areas (FMAs).** The process to develop fisheries management plans for each FMA requires an understanding of the stock structure of the fish species. If stocks are shared across FMAs, or there are multiple stocks within a single FMA, will require different management approaches.
- 9. Continuing to strengthen fisheries management data collection.** The workshop identified this as a priority and consideration of opportunities to build on previous initiatives and ensure long-term fishery dependent and fishery independent data are collected, stored and readily available to MMAF.
- 10. Review of the implementation of previous ACIAR projects' recommendations** for management or capacity building. This could be informative in understanding what is required for uptake of recommendations and contribute to planning future work.
- 11. Strategy to communicate research in relevant ways to each stakeholder.** This may be something that could be addressed within specific projects, or as an overarching initiative.
- 12. Climate change adaptation and fisheries.** Fisheries, coastal and fishing communities are likely to be among the most highly impacted by climate change. Research could assist in identifying potential impacts and working with governments and communities to consider adaptation options. (see <http://coastalclimateblueprint.org.au/>).

# Australian-Indonesian partnerships on capture fisheries research

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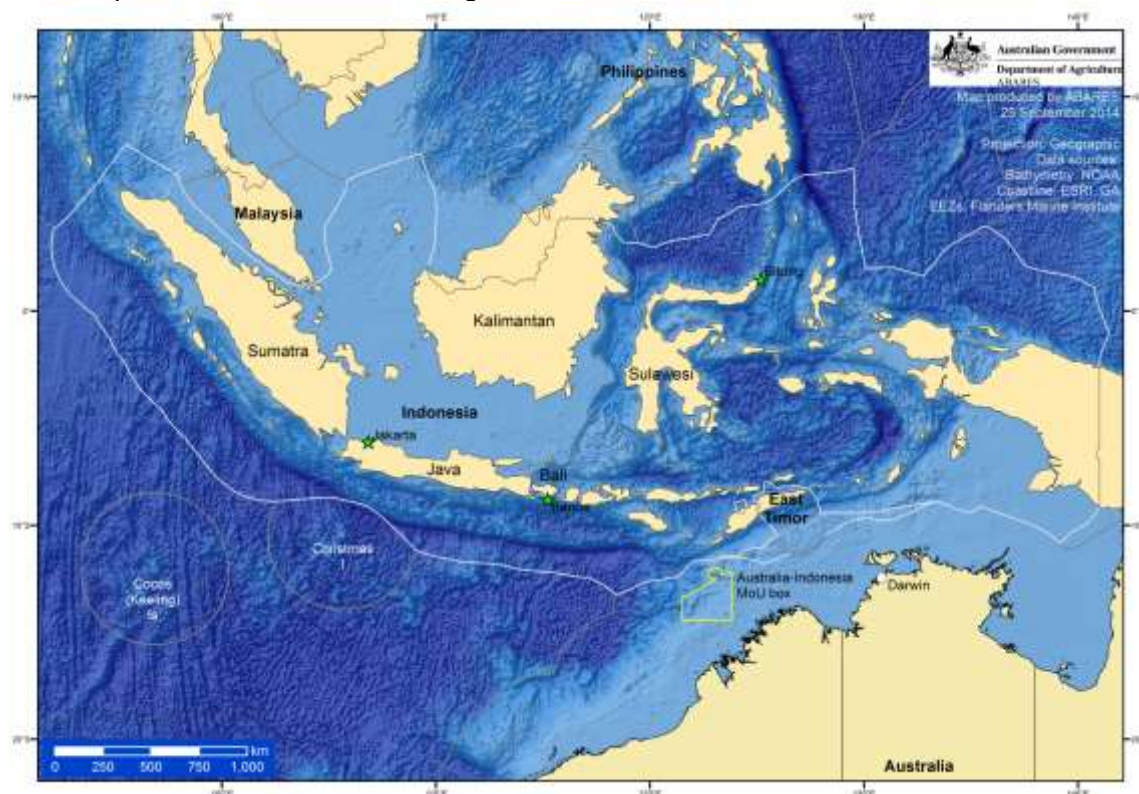
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## **Acknowledgements**

This background document benefited from the review and input from colleagues from RCFMC, CSIRO Marine and Atmospheric Research, Murdoch University, the University of Wollongong and Charles Darwin University.

## Introduction

This background paper was prepared to provide context for the development of the draft Strategic Plan for ACIAR's engagement in Capture Fisheries Research and Capacity Development in Indonesia. A draft was provided as background to the priority identification workshop, 11 & 12 March 2014, Bogor, Indonesia.



**Figure 1 Indonesia and associated maritime boundaries.**

Australia and Indonesia are near neighbours and share a long, common maritime boundary (Figure 1). Due to this proximity there are historic cultural and trade links between the countries. The shared maritime boundary also means that some fish stocks straddle the exclusive economic zones (EEZs) of both countries. These straddling fish stocks may be fished by both Australian and Indonesian fishers in their associated EEZs. Both countries also participate in regional fisheries management organisations (RFMOs, Table 1) for highly migratory fish stocks, such as tuna and billfish, which straddle their maritime boundaries and are also fished on the high seas. One of the most valuable fish stocks shared by Australia and Indonesia is southern bluefin tuna, with the only known spawning ground for this stock occurring in the waters off Indonesia and northern Australia (Farley & Davis, 1998).

The *Agreement between the Government of Australia and the Government of the Republic of Indonesia Relating to Cooperation in Fisheries* (1992 Fisheries Cooperation Agreement<sup>1</sup>) provides the framework for fisheries and marine cooperation between Australia and Indonesia. This agreement provides for information exchange on research, management and technological developments, complementary management of shared stocks, training and technical exchanges and cooperation to deter illegal fishing. Currently, the cooperation under the Agreement is overseen by the Working Group on Marine Affairs and Fisheries (established in 2001) that meets annually. The Department of Agriculture takes the lead for Australia at the Working Group and the Ministry of Marine Affairs and Fisheries for

<sup>1</sup> <http://www.agriculture.gov.au/fisheries/international/cooperation/indonesia>

Indonesia.

There is also a Memorandum of Understanding (MoU) 1974<sup>2</sup> between the Governments of Australia and Indonesia that covers an area of Australian waters in the Timor Sea (the MoU Box, Figure 1) where Indonesian traditional fisheries, using traditional fishing methods only, are permitted to operate<sup>1</sup>. This access was granted in recognition of the long history of traditional Indonesian fishing in the area. The MoU provides Australia with a tool to manage access to its waters while for Indonesia, it enables traditional fishers to continue their customary practices<sup>1</sup>.

The Australian-Indonesian relationship with respect to fish and fishing activities is potentially, one of the most important in Southeast Asia for Australia. This relationship has had substantial attention because it encompasses four key international connections over fish: illegal fishing; managing shared fish stocks; tuna stocks and fish trade (Williams 2007).

The relative importance of capture fisheries differs between the two countries, in terms of the volume of production and economic scale, number of people engaged and the role in livelihoods, the national economy and poverty alleviation. Indonesia's marine capture fisheries are among the largest and most productive worldwide. Indonesian fisheries production is at least 20 times that of Australia production (FAO 2015) but there are significant capacity constraints in Indonesia's ability to investigate and control these fisheries, particularly with decentralised governance (Dudley & Ghofar 2006; Williams 2007; Syarif 2009). Australia, while having much lower levels of fisheries production has a history of innovative fisheries and marine research, including research focused on tropical, multispecies fisheries and environments. Australia also has examples of effective, evidence-based fisheries management systems and policy development (Mora et al. 2009; Pitcher et al. 2009). Australia's capabilities in fisheries and marine research, as well multidisciplinary and policy-related research can contribute to effective partnerships with Indonesian researchers and agencies. Continued partnerships between Australian and Indonesian researchers developed through collaborative science and capacity building initiatives have, and can continue to contribute to improved management and policy development for capture fisheries.

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<sup>2</sup> Australia-Indonesia Memorandum of Understanding regarding the Operations of Indonesian Traditional Fishermen in Areas of the Australian Fishing Zone and Continental Shelf – 1974



## ACIAR Fisheries Programme's engagement in Indonesian capture fisheries research and capacity building

### ACIAR Strategic Plan (2014-18)

Australia's total aid program to Indonesia is one of Australia's largest, worth \$542.5 million in 2014-15 (DFAT 2015). It is one of the largest bilateral aid programs in the world and is focused on helping Indonesia implement its own reform programs to reduce poverty (Asian century white paper). The *Australia Indonesia Partnership 2008-14*<sup>3</sup> (AusAid 2008) provides a comprehensive plan of Australia's support to Indonesia that focuses on poverty alleviation. Australia and Indonesia are currently developing an updated strategy which is expected to come into effect in 2015 (DFAT 2015). The *Australia Indonesia Partnership* emphasises that 'support for applied research will be increasingly important in informing debate and policy settings in Indonesia, including in regional areas'. ACIAR's Indonesian program (ACIAR 2014a) supports the *Australia Indonesia Partnership*, focused on improved economic opportunities for rural people through increases in productivity, access to markets and better infrastructure and growth of small- to medium-size enterprises in target provinces.

ACIAR is guided by an overarching mission:

*To achieve more-productive and sustainable agricultural systems, for the benefit of developing countries and Australia, through international agricultural research partnerships (ACIAR 2014b).*

Indonesia is ACIAR's largest partner-country program, due to both its proximity and strategic importance to Australia, and to the imperative of reducing the large proportion of its population living in poverty (49% of the population are estimated to live on less than US\$2 per day, ACIAR 2014a). The agricultural sector in Indonesia accounts for 40% of employment but only 14% of the national gross value of production (ACIAR 2014a). Similar to other developing countries, extreme poverty is largely a rural phenomenon and tends to be most pervasive among populations dependent on agriculture, livestock, fisheries and forests for their livelihoods. ACIAR's partner-country program in Indonesia covers agriculture, forestry, fisheries and aquaculture and works across science, economic and policy research and capacity building.

ACIAR has worked with Indonesian and Australian partners on capture fisheries research and capacity building since 1995.

ACIAR's Strategic Plan 2014-18 (ACIAR 2014b) aims to deliver:

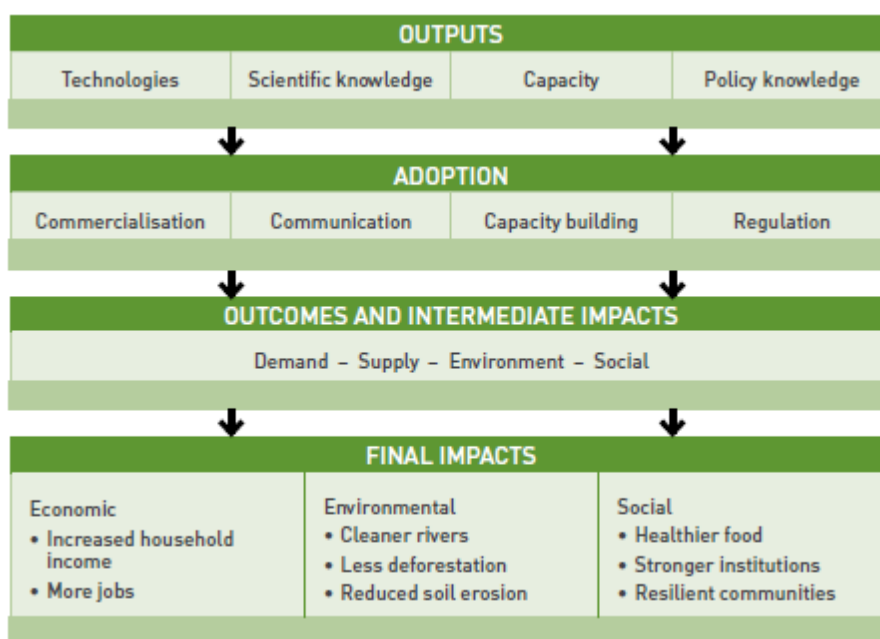
- **New agricultural technologies**, creating and supporting the commercialisation and use in developing countries
- Generating and delivering **new scientific knowledge** with and for developing countries
- **Building capability** in partner countries to do and use research
- Support for **better decision making** through policy analysis that leads to improved policies and better regulation; and by strengthening the evidence base on which policy is formulated.

There will continue to be a focus on impact pathways (Figure 2), particularly the role of women, through partnerships with next and end users.

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<sup>3</sup> The Australian and Indonesian governments agreed to extend the current country strategy until end 2014. This will allow the next strategy to align with Indonesia's Medium Term Development Plan.

**Figure 2. Summary of the pathways to impact for ACIAR projects (ACIAR 2014b).**



ACIAR's focus during the Strategic Plan 2014-18 will continue to be in four thematic areas: crops, livestock and fisheries, natural resources and forestry, and socioeconomic and policy. ACIAR is also increasingly looking to implement cross-disciplinary, interdisciplinary and market-oriented research approaches across these focus areas. The creation and sustaining of partnerships among research providers, the private sector, public and non-government extension systems and development organisations will remain the core modality. ACIAR's research programmes will tackle gender inequality, in the design, delivery and impacts of projects.

## ACIAR Capture Fisheries Projects

The ACIAR capture fisheries research projects in Indonesia and their inter-relationships are shown in Figure 2, modified from Martin (2008). The project details are listed in Appendix A, including links to the project summaries for further information on specific projects.

### Research Drivers

ACIAR's programme of capture fisheries research and capacity building in Indonesia has responded to a range of drivers, including:

- *Species or fisheries of local or provincial importance* and the ability to transfer knowledge from other studies, such as projects on Terubuk (Toli shad, a herring species) (ACIAR Project number FIS/1996/082; FIS 2001/128), fish species used for bait in tuna fisheries (FIS/1994/024). This has also included research into capture fisheries in freshwater reservoirs and the interactions with reservoir aquaculture (FIS/2002/111). ACIAR fisheries projects were part of the international response to the 2009 tsunami, by contributing to rebuilding strategies, primarily the Aceh province (FIS/2005/025).
- *Stocks that may be shared across national boundaries* and important to fisheries in both northern Australia and Indonesia, such as the tropical snappers (FIS/1997/165), sharks and rays projects (FIS/2000/062; FIS/2003/037). A significant driver is the need for a shared and improved understanding of the fisheries and stocks as a basis for improved and complementary management.
- *Highly migratory stocks of regional and national importance*, in particular tunas, some sharks and other pelagic species. Indonesia is the single largest tuna fishing country, in terms of catch, however most tuna is consumed domestically. Some of Australia's most valuable fisheries are based on tuna species and Australia has been involved in negotiations of several of the regional treaties and agreements (Georgeson et al. 2014). The effectiveness of the relevant RFMOs and national arrangements is reliant on robust data and science to underpin the decisions. Effective engagement and the ability to meet RFMO membership obligations are important to maintaining access to these highly migratory fish resources. ACIAR's program has included assisting to address gaps in Indonesia's national fisheries policy and regulatory frameworks against international or regional requirements (FIS/2001/079; FIS/2002/074; FIS/2009/059)
- *Shared management and policy challenges*, such as the management of illegal, unreported and unregulated (IUU) fishing. The shared nature of some fish stocks and common participation in regional and international fisheries forums, results in shared management and policy challenges. One area of focus has been increasing Indonesia's capacity to manage illegal, unreported and unregulated (IUU) fishing (FIS/2000/163; FIS/2002/019; FIS/2006/142). In March 2001, the United Nations Fisheries and Agriculture Organisation (FAO) introduced *the International Plan of Action to Prevent, Deter and Eliminate IUU Fishing* (FAO 2001). Both Indonesia and Australia are signatories to the *Regional Plan of Action to promote responsible fishing practices including combating IUU fishing in the region* (RPOA 2007). This RPOA was developed as a joint initiative of the Indonesian and Australian Governments. ACIAR projects have contributed to the development of a draft *National Plan of Action to Prevent, Deter and Eliminate IUU* (NPOA IUU) for Indonesia (FIS/2002/019).

The ACIAR projects have generally been multidisciplinary reflecting the need to provide the fundamental data and science around the fisheries and stocks, as well as understand the social and economic characteristics of the fishers and communities, in order to inform

management and policy. There has been a strong focus on strengthening the evidence-base for management, policy and decision-making and considering pathways to impact.

The projects have also been aligned with other research and capacity building activities where there are opportunities for synergies. The shark and ray projects (FIS/2000/062; FIS/2003/037) built on several projects in northern Australia, supported by the Fisheries Research and Development Corporation and the then-Environment Australia. The ACIAR tuna and pelagic species projects (FIS/2001/079; FIS/2002/074; FIS/2009/059) have complemented other work supported by CSIRO, the then-AusAID and the Global Environment Fund (GEF) in collaboration with the Western and Central Pacific Fisheries Commission (WCPFC) and the Indian Ocean Tuna Commission (IOTC).

### Disciplinary focus

From a technical perspective, ACIAR projects have covered many aspects of the information required to inform ecosystem based fisheries management (EBFM), including focus on:

- *Fisheries data collection and monitoring.* This reflects key data and knowledge gaps and with the challenge of moving from an historic focus on the collection of production data, towards the collection of catch and effort data that can underpin robust stock assessments.
- *The trial and development of port-based enumerator and on-board observer programs.* The trial of an observer program for the tuna longline fleet based in Benoa was critical to demonstrating the feasibility, building capacity and data collection and reporting.
- *Innovative research techniques,* including risk assessment approaches for multi-species fisheries, rapid market assessments, and links to the close-kin genetics study for southern bluefin tuna.
- *Biological studies* that generate key parameters for stock assessment and management guidance. This has included taxonomy (particularly of sharks and rays), reproductive biology, age and growth patterns, habitat use and population stock structure. The latter has been central to determining the extent of shared stocks between Indonesia and Australia, and therefore where complementary management should focus.
- *Characterisation of the fisheries and fleet components,* critical examination of the capacity and catch of different sectors.
- *Social and economic characteristics of the fishers and associated communities.* This includes research into the financial supporting arrangements, supply chains and level of dependence on fisheries resources. This research assists in understanding the reliance of different communities or fishers on particular fisheries, the potential impacts of any proposed management changes and the resilience of the communities. This information is critical to ecosystem based fisheries management.
- *Joint stock assessments and risk assessment.* These contribute to the shared understanding of the status of stocks and consideration of management approaches.
- *Policy and governance research* to identify potential gaps in current national fisheries policy and regulatory frameworks against international or regional requirements. An example of this was the policy and regulatory review against the IPOA IUU.

Several projects have included engagement with communities and industry, as well as district and local governments. This engagement has included the communication of project results, direct involvement in sampling or research and the development and discussion of potential management approaches. The terubuk and tuna baitfish projects included cooperation from industry for sampling and community engagement, with workshops that discussed the key project recommendations. The tuna projects have engaged with tuna

fishing companies and organisations to discuss the results and future monitoring and observer program options.

### Capacity building

Capacity building remains a central part of ACIAR's mandate and a critical outcome for projects. In brief, the capacity building components of the Indonesian capture fisheries projects have included:

- *Direct research training*, as Indonesia partners work with Australian researchers, undertaking joint sampling, analysis and publication of the research. At times this is complemented with specific training workshops held in Indonesia. This has covered the range of technical areas listed above, as well as research planning, data-base development and management.
- *Study trips* by Indonesian partners to work and train in Australia, this has included laboratory based techniques such as genetics, histology and ageing, as well as stock assessment and data analysis.
- *On-the-ground capacity development through the enumerator and observer programs* and training in regional areas, such as Aceh.
- *Post-graduate research*, several Indonesian scientists have undertaken post-graduate research, associated with the research projects and supported by the ACIAR fellowships
- *Policy development*, ACIAR projects have supported the development of the Indonesian draft *National Plan of Action for the Conservation and Management of Sharks* (NPOA Sharks; FIS/2003/037), draft NPOA IUU (FIS/2002/019) and a framework for bilateral cooperation (Indonesia – Philippines) to address IUU fishing in the Sulawesi Sea (FIS/2002/019).
- *Institutional capacity building*, such as the Research Institute for Tuna Fisheries Bali. The ACIAR tuna projects, along with other initiatives, have contributed to the formalisation of this monitoring capacity and the research station. Other examples include the provision of equipments to enable aging studies, and assistance to IOTC in development of a centralised database for tuna catch and effort (WinTuna). The ACIAR projects have also increased the capacity of Indonesian agencies to meet national reporting and data submissions requirements of relevant RFMOs.

The contribution of the ACIAR projects to the elements of the *Net Returns: a Human Capacity Development Framework for Marine Capture Fisheries Management in South East Asia* (DAFF 2011) are shown in Table 1.

### ACIAR Indonesian Fisheries Projects Impact Assessment

In 2008 ACIAR undertook a review and impact assessment of Indonesian fisheries projects, both aquaculture and wild-capture fisheries (Martin 2008). The review of all the projects, identified that they succeeded in:

- *Developing a partnership between Australian and Indonesian researchers and agencies*
- *Achieving the research goals especially in terms of improving data collection and analysis, and improving the understanding of the fisheries and the requirements for sustainable aquaculture production*
- *Delivering proposed management plans for major fisheries, especially those crossing national borders*

- *Enhancing the capacity of researchers and research agencies to undertake research and operational support for both research and other activities of government such as fisheries management and land capability assessment*
- *Delivering research outputs that have the potential to deliver significant economic, social and environmental benefits.*

The impact assessment focused in detail on the capture fisheries projects aimed at the capacity development to monitor, analyse and report on Indonesian tuna fisheries (FIS/2001/079 and FIS/2002/074). Martin (2008) concluded that the two ACIAR projects demonstrated that a structured observer program on board fishing vessels could deliver the quality of data required. Further, the research led to improved modelling of the fishery as well as capacity building in Indonesia for future data collection and modelling.

In April 2008, Indonesia became a member of the CCSBT and the impact assessment concluded that the ACIAR projects contributed a significant part in achieving this outcome. Martin (2008) concluded that the benefit to cost ratio of the ACIAR investment in these projects was 179:1, based on the assessed importance of better catch data leading to Indonesian membership and commitment to the CCSBT. The impact assessment also noted that the ACIAR projects contributed significantly to better understanding of, and improved data collection in the yellowfin and bigeye tuna fisheries.

The impact assessment also identified that fisheries research and development has relatively long lead times, especially for research related to improved data collection and analysis for wild capture fisheries. Nonetheless, the potential economic gains could be substantial. Substantial capacity building within Indonesia to undertake fisheries-related research was regarded as a major achievement of the ACIAR projects.

**Figure 2. ACIAR capture fisheries projects in Indonesia** (extended from Martin (2008), project details are in Appendix A).

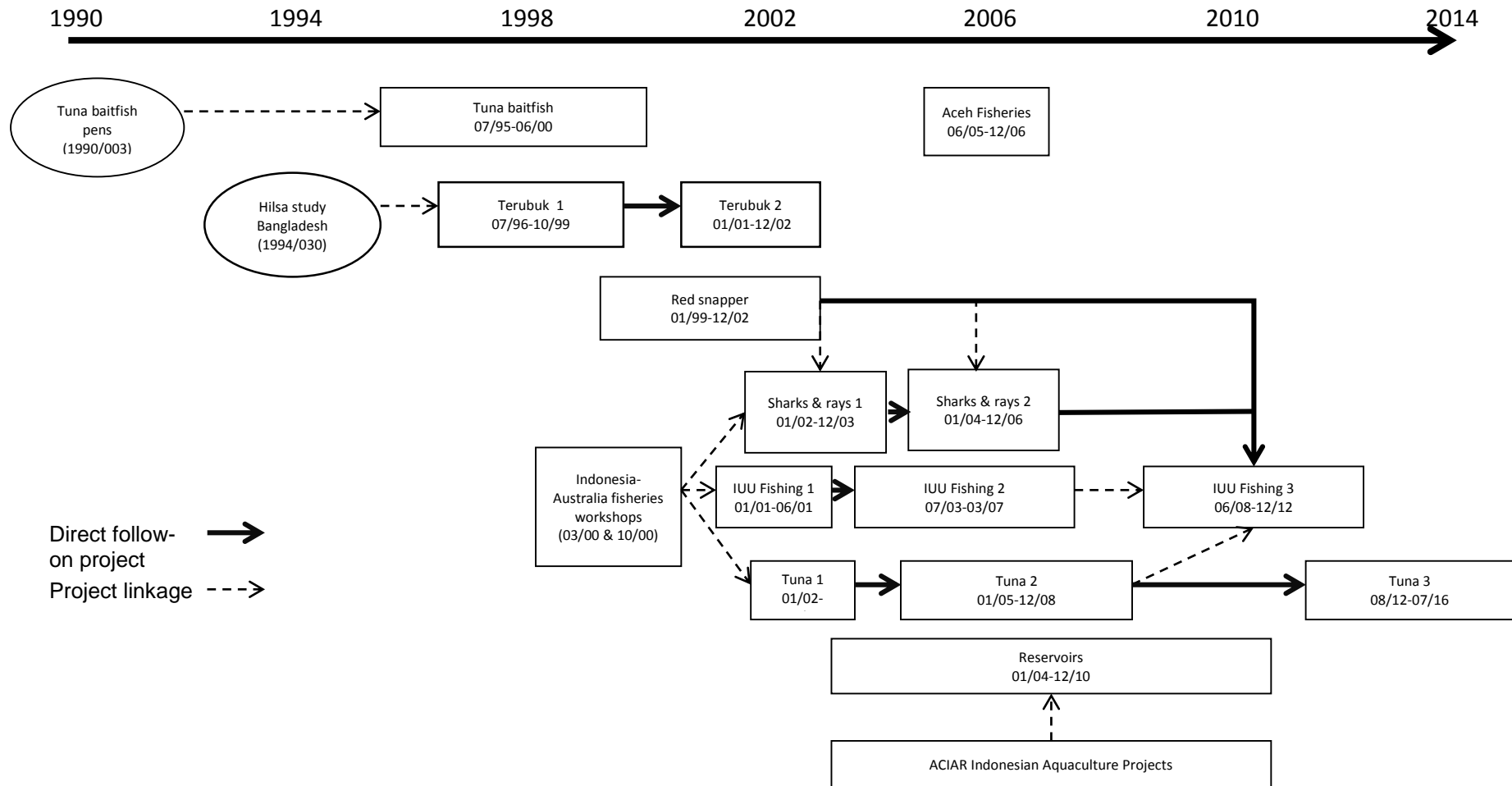


Table 1: A summary of ACIAR Indonesian capture fisheries projects and the main outcomes and activities of the capacity development framework (DAFF 2011) that the project contributed to, indicated by shaded boxes. Stakeholder engagement was not specified in the capacity development framework but has been shown as it has been a key activity in research projects. Project details are provided in Appendices A and B.

Project	Outcomes and activities of the Capacity Development Framework													
	Outcome 3: Information systems strengthened					Outcome 4: Regional and national scientific capacity strengthened to support fisheries management planning				Outcome 7: Regional and international cooperation strengthened			Stakeholder engagement	
	3.1 Strengthening fishery independent monitoring systems	3.2 Strengthening information management	3.3 Improving design of information collection systems	3.4 Strengthening monitoring of fisheries trade	3.5 Strengthening fishery dependent monitoring	4.1 Strengthening scientific analytical capability and capacity to gather information	4.2 Integrating scientific advice into management planning	4.3 Strengthening economic impact analysis capacity	4.4 Strengthening capacity for assessment of climate change adaptation /mitigation in fisheries. Fishing vessel	4.5 Research planning	7.1 Strengthening capacity for complementary management of transboundary stocks	7.2 Strengthening capacity for joint (and common) stock assessment		7.4 Strengthen capacity for International engagement
Terubuk 1 (FIS/1996/082)														
Terubuk 2 (FIS/2001/128)														
Tropical snappers (FIS/1997/165)														
Sharks and rays 1 (FIS/2000/062)														
Sharks and rays 2 (FIS/2003/037)														
IUU 1 (FIS/2000/163)														



Project	Outcomes and activities of the Capacity Development Framework													
	Outcome 3: Information systems strengthened					Outcome 4: Regional and national scientific capacity strengthened to support fisheries management planning					Outcome 7: Regional and international cooperation strengthened			Stakeholder engagement
	3.1 Strengthening fishery independent monitoring systems	3.2 Strengthening information management	3.3 Improving design of information collection systems	3.4 Strengthening monitoring of fisheries trade	3.5 Strengthening fishery dependent monitoring	4.1 Strengthening scientific analytical capability and capacity to gather information	4.2 Integrating scientific advice into management planning	4.3 Strengthening economic impact analysis capacity	4.4 Strengthening capacity for assessment of climate change adaptation /mitigation in fisheries. Fishing vessel	4.5 Research planning	7.1 Strengthening capacity for complementary management of transboundary stocks	7.2 Strengthening capacity for joint (and common) stock assessment	7.4 Strengthen capacity for International engagement	
IUU 2 (FIS/2002/019)														
IUU 3 (FIS/2006/142)														
Aceh fisheries (FIS/2005/025)														
Reservoirs (FIS/2002/111)														
Tuna baitfish (FIS/1994/024)														
Tuna 1 (FIS/2001/079)														
Tuna 2 (FIS/2002/074)														
Tuna 3 (FIS/2009/059)														

## Other Indonesian capture fisheries research and capacity building initiatives

There are numerous initiatives that have been, and are currently, underway in Indonesia that contribute to strengthening capture fisheries and marine research and management. This section highlights several key initiatives that may link to potential ACIAR priorities.

### Australian Government

As mentioned previously, the *Australia Indonesia Partnership 2008-14* provides a comprehensive plan of Australia's support to Indonesia that focuses on poverty alleviation. The implementation of this plan is lead by the Department of Foreign Affairs and Trade (including the former AusAID). Along with the ACIAR programs, the Australian Government has supported a range of capacity building and development initiatives which are summarised below.

#### Regional Plan of Action to promote responsible fishing practices including combating IUU fishing in the region (RPOA IUU 2007).

The RPOA IUU (2007) aims to strengthen fisheries management and governance, sustain fisheries resources and the marine environment, promote responsible fishing practices and combat Illegal, unreported and unregulated fishing. The RPOA IUU was a joint initiative of the Indonesian and Australian governments that 11 South East Asian countries signed in 2007. A priority of the RPOA countries was to develop a regional capacity development framework, *Net Returns: a Human Capacity Development Framework for Marine Capture Fisheries Management in South East Asia* (DAFF 2011). This framework was developed through a participatory approach involving the RPOA members. The overall goal of the framework is to increase the capacity of people and institutions involved in marine capture fisheries within RPOA participating countries to develop their abilities, to ensure the sustainable development of the region's marine capture fisheries.

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

The CTI-CFF is a multilateral partnership of six countries (Indonesia, Malaysia, Papua New Guinea, Philippines, Solomon Islands and Timor-Leste) formed in 2007 (<http://www.coraltriangleinitiative.org>). The objective is for the countries to work together to sustain the marine and coastal resources of the area by addressing crucial issues such as food security, climate change and marine biodiversity. At the 2009 Leader's Summit a 10-year CTI-CFF Regional Plan of Action (CTI-CFF RPOA) was adopted, with five goals:

- strengthening the management of seascapes
- promoting an ecosystem approach to fisheries management
- establishing and improving effective management of marine protected areas
- improving coastal community resilience to climate change
- protecting threatened species.

The Indonesia CTI-CFF National Coordinating Committee (NCC) was formed in 2009 to lead the in-country implementation of CTI-CFF RPOA and the Indonesia CTI-CFF National Plan of Action (NPOA) (<http://www.coraltriangleinitiative.org/country/indonesia>). The NCC comprises representatives from multi-sectoral ministries, non-government organizations,

development partners and academic experts. It has seven working groups, five of which cover technical areas such as seascapes, fisheries, marine protected areas, climate change, threatened species protection and two cover cross-cutting themes such as monitoring and evaluation and capacity building. The working groups are led by representatives from the Ministry of Marine Affairs and Fisheries, the Ministry of Forestry and the Ministry of Environment.

When the CTI was established, a group of stakeholders - including the Australian Government - were invited to become Partners to the CTI. The Australian Government has committed to a phased multi-year program of support to the CTI (<http://www.environment.gov.au/topics/marine/international-activities/coral-triangle-initiative>). The first stage of support, implemented from 2010, focused on building foundations and momentum for the CTI, and for subsequent phases of Australian Government support. The other Partners are: the Asian Development Bank, Conservation International, The Nature Conservancy (TNC), the United States Government (USAid), and the World Wildlife Fund (WWF).

### **Coral Reef Rehabilitation and Management Program (COREMAP)**

Launched in 1998, COREMAP is a fifteen year program financed by multiple donors and implemented over three phases to cover priority locations in ten provinces in Indonesia. The Australian Government contributes to COREMAP, which has the long term goal of the protection, rehabilitation and sustainable use of Indonesian coral reefs and associated ecosystems. (see <http://documents.worldbank.org/curated/en/2005/03/5707045/indonesia-coral-reef-rehabilitation-management-project>).

### **Arafura and Timor Seas Ecosystem Action Program (ATSEA)**

The Arafura and Timor Sea Expert Forum (ATSEF) was established to assist stakeholders who depend on the resources of the Arafura and Timor seas in achieving the goals of sustainable development to support their livelihoods (<http://www.atsea-program.org>). The forum is committed to achieving sustainable management of the seas resources and conducting scientific research necessary through cooperation between coastal states of the Arafura and Timor seas. There are five priority areas to which the ATSEF directs research:

- Preventing deterring and eliminating illegal, unreported and unregulated fishing
- Sustaining and preserving fish stocks, sea habitats and coastal marine biodiversity
- Providing sustainable or alternative livelihoods using aquaculture for coastal and Indigenous communities
- Understanding of the systems of dynamic ocean, coastal and fishing areas
- Improving information capacity on ocean data, management and exchange.

In 2010, through additional funding provided by GEF, the ATSEA program commenced which focuses on addressing and understanding existing problems associated with the Arafura and Timor seas and their associated industries. The priority issues have been described in the Strategic Action Programme for the Arafura and Timor Seas (<http://www.atsea-program.org/publications>). The five medium-term environmental quality objectives of the action programme are:

- Recovering and sustaining fisheries. This includes the implementation of the ecosystem approach to fisheries management and the reduction in IUU fishing.

- Restoring degraded habitats for sustainable provision of ecosystem services, including enhanced management and protection of 20 per cent of marine and coastal habitats.
- Reducing land-based and marine sources of pollution; through the reduction of the ecologically harmful impacts of nutrients in coastal waters and the reduction in the incidence and impacts of marine-based pollution
- Protecting key marine species, including enhanced protection of 10-20 per cent of important habitats for threatened species
- Adaptation to the impacts of climate change, including increased understanding of climate change impacts and incorporation of that knowledge into management plans.

### West Pacific East Asia Oceanic Fisheries Management Project

Indonesia entered full membership of the Western and Central Pacific Fishery Commission (WCPFC) in 2010. Current advice on the status of regional tuna stocks identifies the importance of fishing activities in Indonesia and the Philippines on bigeye and yellowfin tuna stocks. To assist this, the West Pacific East Asia Oceanic Fisheries Management Project (WPEA OFM) has been developed, focused on Indonesia and the Philippines. The project aims to strengthen national capacities and international cooperation on priority trans-boundary concerns relating to the conservation and management of highly migratory fish stocks in the west Pacific Ocean and East Asia. Port sampling activities have been continuing since 2010. In total there are 20 enumerators that are assigned to conduct port sampling (WCPFC 2013).

Other tuna fisheries related initiatives underway in Indonesia include:

- *The BestTuna project: Benefiting from Innovations in Sustainable and Equitable Management of Fisheries on Trans-boundary Tuna's in the Coral Triangle and Western Pacific* (University of Wageningen, the Netherlands; 2012-2017): explores whether and how to provide adequate incentives to adopt sustainable fishing practices and that reduce pressure on tuna stocks (<http://www.besttuna.org/>). The research programme will focus on:
  - the ecology and fisheries of the three tuna species in their interaction with Fish Aggregating Devices,
  - the composition, behaviour and interests of different fishing fleets,
  - the incentive structure and economic and social relations of related market actors and
  - the response of state and intergovernmental fisheries management arrangements to new market-based mechanisms.
- *ANOVA Seafood's Fishing and Living program*; started in 2008 and is now under the NGO Masyarakat Dan Perikanan Indonesia (<http://mdpi.or.id/>). It focuses on small-scale fisheries that organize the catch of yellowfin tuna in a sustainable way. The program strives to achieve two goals:
  - Promoting sustainable fisheries through improved fishing practices; and
  - Providing enhanced living conditions for the communities engaged in the industry.
- *International Pole and Line Foundation*; has an overarching aim to develop socially and environmentally responsible pole and line fisheries, and demonstrate their value for coastal communities (<http://ipnlf.org/>). The foundation works with the seafood

sector, scientists and government. Current initiatives include: supporting progress towards MSC, supporting sustainable bait fish management and conducting an assessment of supply and demand for pole and line tuna.

- *Sustainable Fisheries Partnerships*: current projects include promoting traceability to ensure that the origins and status of tuna products purchased are well-known and all coming from legal fisheries (<http://www.sustainablefish.org/>). The initiative also aims to improve the availability of accurate data on catches and bycatch and improve the management and policy to support sustainable management of the tuna fisheries.

## USAID

The USAID assistance supports institutional strengthening of the Ministry of Marine Affairs and Fisheries (MMAF) aimed at increasing the effectiveness of management practices which reduce the rate of destruction of fisheries and high biodiversity coastal ecosystems (<http://www.usaid.gov/indonesia>).

## US CTI Program

The US Government through the US CTI Program is supporting the implementation of EAFM through the regional, national and site-level scale activities across the Coral Triangle area ([http://pdf.usaid.gov/pdf\\_docs/PDACM755.pdf](http://pdf.usaid.gov/pdf_docs/PDACM755.pdf)). The Program's aims are in summary:

### *Regional*

- Strengthen fisheries governance through EAFM by providing technical assistance to the Coral Triangle countries in the establishment of a regional framework and a 10-year roadmap to implement EAFM across the region.

### *National*

- Provide technical assistance to fisheries agencies in each Coral Triangle country to enable them to develop their own national EAFM operational guidelines that will form national legislative frameworks and policies
- Support the review and analysis of existing national laws on EAFM and legal framework for IUU.

### *Site level*

- Implement EAFM in all 13 priority sites and work with local governments and stakeholders to integrate MPA's and climate change adaptation actions to support EAFM
- Collaborate with local governments and stakeholders to catalyse public-private partnerships in fisheries industries.

The National Oceanic and Atmospheric Administration (NOAA) is providing training in key areas to support Indonesia's participation in the Coral Triangle Initiative (CTI). Training focuses on developing a sustainable approach to fisheries management and strengthening management of marine protected areas. Capacity building aims to contribute to comprehensive and coordinated fisheries management through enforcement, science, and effective resource management. This will contribute to Indonesia's efforts to control IUU fishing

([http://indonesia.usaid.gov/en/USAID/Activity/273/National\\_Oceanic\\_and\\_Atmospheric\\_Administration\\_NOAA\\_Training\\_Program](http://indonesia.usaid.gov/en/USAID/Activity/273/National_Oceanic_and_Atmospheric_Administration_NOAA_Training_Program)).

### **Indonesia Marine and Climate Support Project**

The *Indonesia Marine and Climate Support* (IMACS) is a four year project supported by the US Government that aims to improve marine resource management in Indonesia ([http://indonesia.usaid.gov/en/USAID/Activity/271/Indonesia Marine and Climate Support IMACS Project](http://indonesia.usaid.gov/en/USAID/Activity/271/Indonesia_Marine_and_Climate_Support_IMACS_Project)). IMACS aims to strengthen the management capacity of MMAF and local government, enhance local communities and the private sector engagement through open and transparent governance, and provide technical support for key activities that support marine resources management and communities' empowerment. The IMACS has four major program areas, including:

- Institutional development of the MMAF
- Sustainable fisheries management
- Coastal community resilience and climate change adaptation
- Program integration, coordination and administrative support.

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### Appendix A: ACIAR Indonesian capture fisheries projects 1995 to 2014.

General Area	Title (Project number)	Indonesian collaborators	Commissioned organisation and Australian collaborators	Link
Terubuk 1	Management and conservation of the Terubuk ( <i>Tenualosa macrura</i> ) fishery in Riau Province, Sumatra, Indonesia (FIS/1996/082)	Research Institute for Marine Fisheries, Central Research Institute for Fisheries, Riau University, Dinas Perikanan, Agency for Agricultural Research and Development	CSIRO Marine Research	<a href="http://aciar.gov.au/project/FIS/1996/082">http://aciar.gov.au/project/FIS/1996/082</a>
Terubuk 2	Community-based management of the Terubuk fishery in Riau, Indonesia (FIS/2001/128)	Directorate General of Fisheries	CSIRO Marine Research	<a href="http://aciar.gov.au/project/FIS/2000/128">http://aciar.gov.au/project/FIS/2000/128</a>
Tropical snappers	Biology, fishery assessment and management of shared snapper fisheries in northern Australia and eastern Indonesia (FIS/1997/165)	Centre for Agro-Socio Economic Research and Development, Research Institute for Marine Fisheries, Central Research Institute for Fisheries, Directorate General of Fisheries	CSIRO Marine Research, AFFA, International Relations Section Northern Territory Department of Primary Industry and Fisheries, Queensland Department of Primary Industries and Energy	<a href="http://aciar.gov.au/project/FIS/1997/165">http://aciar.gov.au/project/FIS/1997/165</a>



<b>General Area</b>	<b>Title (Project number)</b>	<b>Indonesian collaborators</b>	<b>Commissioned organisation and Australian collaborators</b>	<b>Link</b>
Sharks and rays 1	Artisanal shark and ray fisheries in Eastern Indonesia: their socio-economic and fisheries characteristics and relationship to Australian resources (FIS/2000/062)	Indonesian Institute of Sciences, Central Research Institute for Fisheries, Centre for Agro-Socio Economic Research and Development, Research Institute for Marine Fisheries	CSIRO Marine Research, Murdoch University	<a href="http://aciarc.gov.au/project/FIS/2000/062">http://aciarc.gov.au/project/FIS/2000/062</a>
Sharks and rays 2	Artisanal shark and ray fisheries in Eastern Indonesia and their relationships with Australian resources (FIS/2003/037)	Research Centre for Capture Fisheries, Directorate General of Fisheries, Research Institute for Marine Fisheries	CSIRO Marine Research, Queensland Department of Primary Industries and Fisheries, Murdoch University	<a href="http://aciarc.gov.au/project/FIS/2003/037">http://aciarc.gov.au/project/FIS/2003/037</a>
IUU 1	The identification of researchable options for the development of policy and management frameworks to combat Illegal, Unreported and Unregulated (IUU) fishing activities in Indonesian and Philippine waters (FIS/2001/163)	Department of Ocean Affairs and Fisheries, Harmonisation of Research and Development	University of Wollongong	<a href="http://aciarc.gov.au/project/FIS/2000/163">http://aciarc.gov.au/project/FIS/2000/163</a>
IUU 2	Management and policy frameworks for illegal, unreported and unregulated (IUU) Fishing in Indonesian and Philippine waters (FIS/2002/019)	Agency for Marine and Fisheries Research, Research Centre for Capture Fisheries	University of Wollongong	<a href="http://aciarc.gov.au/project/FIS/2002/019">http://aciarc.gov.au/project/FIS/2002/019</a>
IUU 3	Developing new assessment and policy frameworks for Indonesia's marine fisheries, including the control and management of Illegal,	Research Centre for Capture Fisheries, Directorate Fisheries Resources Management,	University of Wollongong, CSIRO Marine	<a href="http://aciarc.gov.au/project/FIS/2006/142">http://aciarc.gov.au/project/FIS/2006/142</a>

<b>General Area</b>	<b>Title (Project number)</b>	<b>Indonesian collaborators</b>	<b>Commissioned organisation and Australian collaborators</b>	<b>Link</b>
	Unregulated and Unreported (IUU) fishing (FIS/2006/142)	Centre of Fisheries Extension Development	and Atmospheric Research	
Aceh fisheries	Fisheries rehabilitation in tsunami-affected Indonesia: Community needs assessment and resource status (FIS/2005/025)	Ministry for Marine Affairs and Fisheries; Universitas Syiah Kuala (UNSYIAH);	The WorldFish Center	<a href="http://aciarc.gov.au/project/FIS/2005/025">http://aciarc.gov.au/project/FIS/2005/025</a>
Reservoirs	Culture, capture conflicts: sustaining fish production and livelihoods in Indonesian reservoirs (FIS/2002/111)	Directorate General Aquaculture	Deakin University, Network of Aquaculture Centres Asia-Pacific	<a href="http://aciarc.gov.au/project/fis/2002/111">http://aciarc.gov.au/project/fis/2002/111</a>
Tuna baitfish	Studies on live baitfish for the tuna industry in eastern Indonesian waters (FIS/1994/024)	Research Institute for Marine Fisheries, Indonesia; Balai Pengkajian Teknologi Pertanian, Indonesia	CSIRO Marine Research	<a href="http://aciarc.gov.au/project/fis/1994/024">http://aciarc.gov.au/project/fis/1994/024</a>
Tuna 1	A review of Indonesia's Indian Ocean tuna fisheries and extension of catch monitoring at the key off-loading ports (FIS/2001/079)	Research Centre for Capture Fisheries, Bogor Agricultural University	CSIRO Marine Research	<a href="http://aciarc.gov.au/project/FIS/2001/079">http://aciarc.gov.au/project/FIS/2001/079</a>
Tuna 2	Capacity development to monitor, analyse and report on Indonesian tuna fisheries (FIS/2002/074)	Agency for Marine and Fisheries Research, Directorate General of Capture Fisheries	CSIRO Marine Research	<a href="http://aciarc.gov.au/project/FIS/2002/074">http://aciarc.gov.au/project/FIS/2002/074</a>
Tuna 3	Developing research capacity for management of Indonesia's pelagic fisheries resources (FIS/2009/059)	Research Centre for Fisheries Management and Conservation, Research Institute for Marine Fisheries	CSIRO Marine Research, University of Queensland	<a href="http://aciarc.gov.au/project/fis/2009/059">http://aciarc.gov.au/project/fis/2009/059</a>

**Appendix B: A summary of ACIAR Indonesian capture fisheries projects and their main contribution to the outcomes and activities of the human capacity development framework (DAFF 2011). The project details are provided in Appendix A.**

Capacity Development Framework	Terubuk 1 (FIS/1996/082)	Terubuk 2 (FIS/2001/128)	Tropical snappers (FIS/1997/165)	Sharks and rays 1 (FIS/2000/062)	Sharks and rays 2 (FIS/2003/037)
	07/1996 - 10/1999	01/2001 - 12/2002	01/1999 - 12/2002	01/2002 - 12/2003	01/2004 - 12/2006
<b>Outcome 3: Information systems strengthened</b>					
<b>3.1 Strengthening fishery independent monitoring systems</b>	Development of a terubuk fisheries data collection system, including historic data and monitoring the current situation		Trained enumerators and implemented an improved system of data collection during the project. This enabled the catch by small-scale, bottom longline and fish trawl boats to be better estimated. This provided information on catch and effort for the stock assessment.	Prior to the project knowledge of Indonesian sharks and rays and the fisheries that caught them was poor. Trained researchers in data collection for sharks and rays at landing sites and markets. Focused on the artisanal fishery in south-eastern Indonesia to provide species composition of catches.	Developed a bilingual field identification guide for Indonesian sharks and rays (137 species) to assist in catch identification. A taxonomic reference collection was also established at the Museum Zoologicum Bogoriense (Cibinong). Continued market sampling to provide data on species composition of catches.
<b>3.2 Strengthening information management</b>	Training in data management		Research found that Indonesian data collection was not producing reliable estimates of catches and identified significant challenges in		

<b>Capacity Development Framework</b>	<b>Terubuk 1 (FIS/1996/082)</b>	<b>Terubuk 2 (FIS/2001/128)</b>	<b>Tropical snappers (FIS/1997/165)</b>	<b>Sharks and rays 1 (FIS/2000/062)</b>	<b>Sharks and rays 2 (FIS/2003/037)</b>
			quantifying catches and fishing effort.		
<b>3.3 Improving design of information collection systems</b>			Identified the need for improved licensing system for vessels >30 tonnes. Changes introduced during the course of the project have led to an improved licensing system.		All DGCF landings data were compiled and analysed, highlighting that while the landings were a relatively small proportion of the overall fish landings, this does not reflect the monetary value or regional importance (e.g. Lombok). Provincial data were higher than estimates from the project market surveys, suggesting that under-reporting of catches was not a concern. Challenges were identified in the collection of DGCF landings data where there is no central auction site. The project established a list of indicator species to assist managers in understanding those

<b>Capacity Development Framework</b>	<b>Terubuk 1 (FIS/1996/082)</b>	<b>Terubuk 2 (FIS/2001/128)</b>	<b>Tropical snappers (FIS/1997/165)</b>	<b>Sharks and rays 1 (FIS/2000/062)</b>	<b>Sharks and rays 2 (FIS/2003/037)</b>
					species needing to be monitored long-term.
<b>3.4 Strengthening monitoring of fisheries trade</b>			Improved understanding of fisheries supply chain relating to large fish trawl vessels.		
<b>3.5 Strengthening fishery dependent monitoring</b>					
<b>Outcome 4: Regional and national scientific capacity strengthened to support fisheries management planning</b>					
<b>4.1 Strengthening scientific analytical capability and capacity to gather information</b>	Training in age determination and biological research	Sampling program (plankton survey) conducted to determine the distribution and abundance of terubuk larvae and better define the spawning areas. Training in gut content analysis which identified the water quality issue relating to the high volumes of sawdust in the water and terubuk guts. Research established	Research into the population structure demonstrated the extent to which stocks were shared and the need for coordinated management to ensure fisheries in both countries were sustainable. Research was also conducted into reproductive patterns, age and growth rates and habitat use, that contributed to the	Research identified a higher level of diversity of sharks and rays in Indonesia than known previously and provided data on the catch composition. Genetics research identified some shared stocks and collected biological parameters for some species (e.g. size at maturity). An initial assessment of the status of shark and	The field guide increases the capacity to correctly identify catches. Technical training was provided in taxonomy, biological research (reproduction, age and growth) and stock assessment. Genetic analysis of stock structure identified five shared stocks and two species with separate populations. The information on the

<b>Capacity Development Framework</b>	<b>Terubuk 1 (FIS/1996/082)</b>	<b>Terubuk 2 (FIS/2001/128)</b>	<b>Tropical snappers (FIS/1997/165)</b>	<b>Sharks and rays 1 (FIS/2000/062)</b>	<b>Sharks and rays 2 (FIS/2003/037)</b>
		that the stocks were severely depleted, with overfishing and low water quality identified as the key contributing factors. Overfishing was especially severe because fishers concentrated on spawning grounds to capture gravid females.	stock assessment. A joint stock assessment for red snapper undertaken with information from both Australian and Indonesian fisheries.	ray fisheries was conducted.	biological parameters (reproduction, age and growth studies) for some species provides an input to stock assessments and an understanding of the productivity of species. Stock assessment approaches were applied and identified the need for further information gathering and analyses, given the low levels of optimum harvest for many species and the declining catch rates in research vessel surveys. Potential indicator species were identified.
<b>4.2 Integrating scientific advice into management planning</b>		Development of community-based management was the project aim and coastal community stakeholders participated in workshop to discuss	The project identified that the fish trawl sector was having a considerable impact on the stocks due to the scale of catches and the fact a large number of small fish were		Developed a draft <i>National Plan of Action for the Conservation and Management of Sharks</i> , in line with FAO IPOA sharks and RFMO measures. Information provided information

<b>Capacity Development Framework</b>	<b>Terubuk 1 (FIS/1996/082)</b>	<b>Terubuk 2 (FIS/2001/128)</b>	<b>Tropical snappers (FIS/1997/165)</b>	<b>Sharks and rays 1 (FIS/2000/062)</b>	<b>Sharks and rays 2 (FIS/2003/037)</b>
		management recommendations. Recommendations were agreed.	caught. The joint stock assessment identified that the current levels of catch of red snapper were unsustainable. The project brought together Australian and Indonesian fisheries managers, policy and decision makers (Snapper Management Policy Advisory Committee), providing them an awareness of the research outcomes. Contributed to the establishment of a shared stocks committee at the Indonesian-Australian WGMAF meetings.		to inform complementary management of shared stocks, particularly the understanding of which stocks were shared and the results from the stock assessments. Contributed to the establishment of a shared stocks committee at the Indonesian-Australian WGMAF meetings. Economic research found the importance of sharks and rays to small-scale fishers varied, in some areas they are the main source of income, in others relatively insignificant, suggesting management measures need to be instituted at regional and local levels. A management options matrix was

<b>Capacity Development Framework</b>	<b>Terubuk 1 (FIS/1996/082)</b>	<b>Terubuk 2 (FIS/2001/128)</b>	<b>Tropical snappers (FIS/1997/165)</b>	<b>Sharks and rays 1 (FIS/2000/062)</b>	<b>Sharks and rays 2 (FIS/2003/037)</b>
					developed for the different fisheries.
<b>4.3 Strengthening economic impact analysis capacity</b>		Socioeconomic research to enable an understanding of the dependence on terubuk and alternative income sources, as well as how proposed management measures may impact on local communities and other stakeholders.	Research was conducted into the social and financial structures of the Indonesian fisheries that might be affected by management strategies. It was identified that Indonesia derived very little economic benefit from catches taken by the net fishery and fuel subsidies were being provided to fish net boats from Thailand.	Research improved the understanding of the socio-economic characteristics of the artisanal fisheries, in particular the level of economic dependence of fishers on sharks and rays. It was thought that many artisanal fishers relied heavily on sharks and rays and this needed to be understood if management was to be developed.	Research into the socio-economic characteristics of the small-scale fisheries continued and identified the relative importance of sharks and rays to fisheries in different areas.
<b>4.4 Strengthening capacity for assessment of climate change adaptation/mitigation in fisheries, inc. Fishing vessel emissions</b>					
<b>4.5 Research planning</b>			Provided a catalyst for further collaborative research on sharks and rays and IUU fishing.		



Capacity Development Framework	Terubuk 1 (FIS/1996/082)	Terubuk 2 (FIS/2001/128)	Tropical snappers (FIS/1997/165)	Sharks and rays 1 (FIS/2000/062)	Sharks and rays 2 (FIS/2003/037)
<b>Outcome 7: Regional and international cooperation strengthened</b>					
<b>7.1 Strengthening capacity for complementary management of transboundary stocks</b>			The project brought together Australian and Indonesian fisheries managers, policy and decision makers (Snapper Management Policy Advisory Committee), providing them an awareness of the research outcomes. Contributed to the establishment of a shared stocks committee at the Indonesian-Australian WGMAF meetings.		Contributed to the establishment of a shared stocks committee at the Indonesian-Australian WGMAF meetings.
<b>7.2 Strengthening capacity for joint (and common) stock assessment</b>			A joint stock assessment for red snapper undertaken with information from both Australian and Indonesian fisheries.		Provided information to inform complementary management of shared stocks, particularly the understanding of which stocks were shared and the results from the stock assessments.
<b>7.4 Strengthen capacity for</b>					Developed a draft <i>National Plan of Action for the Conservation</i>

<b>Capacity Development Framework</b>	<b>Terubuk 1 (FIS/1996/082)</b>	<b>Terubuk 2 (FIS/2001/128)</b>	<b>Tropical snappers (FIS/1997/165)</b>	<b>Sharks and rays 1 (FIS/2000/062)</b>	<b>Sharks and rays 2 (FIS/2003/037)</b>
<b>International engagement</b>					<i>and Management of Sharks</i> , in line with the FAO IPOA-Sharks guidelines and RFMO measures.
<b>Stakeholder engagement</b>		Coastal community participation seen as important for managing the terubuk fishery resources and project included substantial consultative process.	The project had significant involvement from policy and decision makers and fisheries managers. This contributed to the development of recommendations for future management, in response to the research outcomes.		

<b>Capacity Development Framework</b>	<b>IUU 1 ( FIS/2000/163)</b>	<b>IUU 2 (FIS/2002/019)</b>	<b>IUU 3 (FIS/2006/142)</b>	<b>Aceh fisheries (FIS/2005/025)</b>	<b>Reservoirs (FIS/2002/111)</b>
	<b>01/2001 - 06/2001</b>	<b>07/2003 - 03/2007</b>	<b>01/06/2008-01/07/2012</b>	<b>06/2005-12/2006</b>	<b>01/2004 - 12/2010</b>
<b>Outcome 3: Information systems strengthened</b>					
<b>3.1 Strengthening fishery independent monitoring systems</b>			Rapid market assessments were conducted at seven fishing ports and guided the choice of fisheries for more detailed assessment. The project developed and implemented further monitoring programs for the improved monitoring of the Bali Strait Lemuru Fishery and the South Java Lobster Fishery. Fisheries enumerators were trained and a book on market fish developed.	Training was conducted on participatory appraisal for community needs assessment and resource status. The project conducted an assessment of the fishery and natural resources based on available information.	Surveys were conducted of cage culture and wild fisheries in targeted reservoirs. Enumerators were trained for the capture fisheries component.
<b>3.2 Strengthening information management</b>					

<b>Capacity Development Framework</b>	<b>IUU 1 ( FIS/2000/163)</b>	<b>IUU 2 (FIS/2002/019)</b>	<b>IUU 3 (FIS/2006/142)</b>	<b>Aceh fisheries (FIS/2005/025)</b>	<b>Reservoirs (FIS/2002/111)</b>
<b>3.3 Improving design of information collection systems</b>					
<b>3.4 Strengthening monitoring of fisheries trade</b>					
<b>3.5 Strengthening fishery dependent monitoring</b>					
<b>Outcome 4: Regional and national scientific capacity strengthened to support fisheries management planning</b>					
<b>4.1 Strengthening scientific analytical capability and capacity to gather information</b>	The project contributed to a commitment by Indonesia and the Philippines to collaborate on joint research projects to address IUU fishing in their waters. The project resulted in agreement on future research needs, including a profile of fishing activities to facilitate information		Refinement and implementation of rapid market assessment methods. The project aimed to development of new, fishery-specific stock assessment processes for the selected fisheries. The project reviewed the red snapper fisheries in terms of re-assessment and management practices and	Capacity building in participatory appraisal for community needs assessment and resource status.	Analyses of historical data on cage production and wild catch from reservoirs, as well as interactions was undertaken. The project developed predictive models of yield for the capture fisheries in the three reservoirs.

Capacity Development Framework	IUU 1 ( FIS/2000/163)	IUU 2 (FIS/2002/019)	IUU 3 (FIS/2006/142)	Aceh fisheries (FIS/2005/025)	Reservoirs (FIS/2002/111)
	exchange and a review of regulatory controls.		contributed to the development of an improved scientific framework for sustainable management of red snapper stocks. Capacity building workshop was conducted including fishing capacity and risk assessment approaches.		
<b>4.2 Integrating scientific advice into management planning</b>	A general cooperation agreement was signed between Indonesia and the Philippines aimed at furthering joint management of IUU fishing.	Reviews of the national fisheries legislation and the ratification of international obligations and fishing vessel registration and authorization identified gaps in current national fisheries policy and regulatory frameworks against the requirements of the IPOA IUU. The project contributed to increased national	The project aimed to develop new, innovative fisheries policy and management frameworks, particularly for dealing with IUU fishing and red snapper stocks.	Research activities supported the Indonesian Strategy for Rehabilitation and Reconstruction of the fishing sector in Aceh and Nias post the earthquake and tsunami disaster.	The models developed can be utilized to inform management. The historical data and socio-economic surveys contributed to the development of cage farming management strategies for the three reservoirs.

<b>Capacity Development Framework</b>	<b>IUU 1 ( FIS/2000/163)</b>	<b>IUU 2 (FIS/2002/019)</b>	<b>IUU 3 (FIS/2006/142)</b>	<b>Aceh fisheries (FIS/2005/025)</b>	<b>Reservoirs (FIS/2002/111)</b>
		awareness on IUU fishing and established a national committee to draft the NPOA IUU and serve as a focal point for policy discussion and recommendations. A NPOA IUU was drafted for Indonesia.			
<b>4.3 Strengthening economic impact analysis capacity</b>			The capacity building workshop included bioeconomics, fishing capacity assessment. Research included the investigation and review of IUU fishing.	The project contributed to understanding the social and economic issues that constrain fisher incomes. The participatory appraisals included fishing community needs, livelihood strategies and perceptions regarding the status of fisheries, other natural resources and future management. Training in participatory appraisal, which includes socio-	Socio-economic surveys were conducted on the cage culture in three reservoirs.

<b>Capacity Development Framework</b>	<b>IUU 1 ( FIS/2000/163)</b>	<b>IUU 2 (FIS/2002/019)</b>	<b>IUU 3 (FIS/2006/142)</b>	<b>Aceh fisheries (FIS/2005/025)</b>	<b>Reservoirs (FIS/2002/111)</b>
				economic aspects for community needs assessment.	
<b>4.4 Strengthening capacity for assessment of climate change adaptation/mitigation in fisheries, inc. Fishing vessel emissions</b>					
<b>4.5 Research planning</b>	Agreement on future research needs, including a profile of fishing activities to facilitate information exchange and commitment to collaborate on joint research projects.				
<b>Outcome 7: Regional and international cooperation strengthened</b>					
<b>7.1 Strengthening capacity for complementary management of transboundary stocks</b>	The project assisted in address the impasse over management of fisheries in the Sulawesi Sea, contributing to a	The project contributed to increased awareness of IUU and strengthened bilateral cooperation between Indonesia and			

Capacity Development Framework	IUU 1 ( FIS/2000/163)	IUU 2 (FIS/2002/019)	IUU 3 (FIS/2006/142)	Aceh fisheries (FIS/2005/025)	Reservoirs (FIS/2002/111)
	<p>commitment by Indonesia and the Philippines to collaborate on joint research projects. The future research needs included a review of regulatory controls and a coordinated approach to monitoring and surveillance, involving joint exploration of technology options.</p>	<p>the Philippines. Draft <i>National Plans of Action for IUU fishing</i> were prepared for both countries. An agreed framework for bilateral cooperation to address IUU fishing in the Sulawesi Sea was developed. The framework includes measures to address the general management of fisheries resources, including the formulation of common and compatible management objectives for the Sulawesi Sea, MCS-related measures and cooperation and coordination of measures to address IUU fishing. Identified gaps in current national fisheries policy and</p>			



<b>Capacity Development Framework</b>	<b>IUU 1 ( FIS/2000/163)</b>	<b>IUU 2 (FIS/2002/019)</b>	<b>IUU 3 (FIS/2006/142)</b>	<b>Aceh fisheries (FIS/2005/025)</b>	<b>Reservoirs (FIS/2002/111)</b>
		regulatory frameworks against the IPOA and measures needed to address IUU.			
<b>7.2 Strengthening capacity for joint (and common) stock assessment</b>	The commitment to joint research is a step towards strengthened capacity for joint stock assessment.	The agreed framework for bilateral cooperation includes data sharing, sustainable utilisation of shared resources.			
<b>7.4 Strengthen capacity for International engagement</b>	The commitments strengthen capacity for bilateral and regional engagement.	The project identified gaps in the current national fisheries policy and regulatory frameworks in comparison to the IPOA IUU. The development of the NPOA IUU contributes to Indonesia fulfilling their commitments under the IPOA IUU and has facilitated policy and legislative reforms.			

<b>Capacity Development Framework</b>	<b>IUU 1 ( FIS/2000/163)</b>	<b>IUU 2 (FIS/2002/019)</b>	<b>IUU 3 (FIS/2006/142)</b>	<b>Aceh fisheries (FIS/2005/025)</b>	<b>Reservoirs (FIS/2002/111)</b>
<b>Stakeholder engagement</b>	Workshops were held to highlight the issues of IUU fishing	The project had significant involvement from policy and decision makers and National Committees on IUU fishing were established.			The District Fishery Authorities were engaged in the project and capacity building.

<b>Capacity Development Framework</b>	<b>Tuna baitfish (FIS/1994/024)</b>	<b>Tuna 1 (FIS/2001/079)</b>	<b>Tuna 2 (FIS/2002/074)</b>	<b>Tuna 3 (FIS/2009/059)</b>
	<b>07/1995 - 06/2000</b>	<b>01/2002 - 12/2003</b>	<b>01/2005 - 12/2008</b>	<b>01/08/2012-31/07/2016</b>
<b>Outcome 3: Information systems strengthened</b>				
<b>3.1 Strengthening fishery independent monitoring systems</b>	Development and trial of a baitfish catch recording system (Bacan)	Research highlighted that the current fisheries data collection and reporting was designed primarily to provide national production statistics. Identified deficiencies in the fishery data/statistics that limit their usefulness for stock assessment, such as the grouping of species in statistics and duplication in catch and fleet operations data collected and reported at different levels of government with inadequate validation. Established a monitoring program at the three major ports where tunas and billfishes are landed by the industrial longline fishery. Trained enumerators to sample at landing or processing points and implemented a vessel activity logging program with	Development and trial of a scientific observer program based at Benoa, to create a basis for long-term monitoring of catches and landings. Trained 12 observers (6 Indonesian and 6 from Timor Leste) and contributed to the establishment of the Benoa Tuna Research and Monitoring Station. Establishment of a port-based monitoring program for eastern Indonesia in collaboration with WCPFC. This included a trial of newly developed sampling protocols for monitoring in eastern Indonesian fisheries (multi-gear, multi-species). This was linked to the establishment of the Bitung station in North Sulawesi. Also monitoring in Kendari (South-eastern Sulawesi). The monitoring	Development and implementation of an improved monitoring program and fisheries statistics system for FAD-based fisheries. The project aims to assess the number, type and distribution of tuna fishery FADs; Characterise the catch on FADs by gear, species and size of fish; Establish, through trial programs, improved port-based monitoring procedures for long-term data on FAD fishery operations;

<b>Capacity Development Framework</b>	<b>Tuna baitfish (FIS/1994/024)</b>	<b>Tuna 1 (FIS/2001/079)</b>	<b>Tuna 2 (FIS/2002/074)</b>	<b>Tuna 3 (FIS/2009/059)</b>
		a unified database enabling centralisation.	recommendations contributed to the DGCF/RCCF proposal to establish a monitoring program in Eastern Indonesia.	
<b>3.2 Strengthening information management</b>		Data collection was supported by a unified database - WinTuna, to enable centralisation of all the information collected. Contributed to a broader-based capacity within MMAF to manage fisheries data.	Observer database system established to provide trip reports and integrate with other databases.	

<b>Capacity Development Framework</b>	<b>Tuna baitfish (FIS/1994/024)</b>	<b>Tuna 1 (FIS/2001/079)</b>	<b>Tuna 2 (FIS/2002/074)</b>	<b>Tuna 3 (FIS/2009/059)</b>
<b>3.3 Improving design of information collection systems</b>	Capacity building in relation to monitoring baitfish fisheries and information required to assess production constraints. Demonstrated the potential for under-reporting due to the levying of taxes on fish production, suggesting much higher annual production (Bitung region but wider implications for government statistics).	Identified the need to implement data collection and reporting systems that would support science-based, species level stock assessments. Provided recommendations on ways to improve data collection and validation and ensure consistency in type and quality at different levels of government. The monitoring program established met the CCSBT and IOTC reporting requirements for species and size composition. Noted improvements in registration of vessels but recommended there were inconsistencies in the recording of vessel activity and registration that needed to be addressed.	Contributed to improving the reliability and quality of catch information required for tuna stock assessments and fisheries management. Improving Indonesia's capacity to independently monitor and assess its tuna and billfish fisheries. Developed a strategy to transition the trial observer program to a formal national program.	Expected to contribute more broadly to improved monitoring programs for FAD-based fisheries.
<b>3.4 Strengthening monitoring of fisheries trade</b>				
<b>3.5 Strengthening fishery dependent monitoring</b>			The project contributed to meetings to discuss the progress of implementing a	

Capacity Development Framework	Tuna baitfish (FIS/1994/024)	Tuna 1 (FIS/2001/079)	Tuna 2 (FIS/2002/074)	Tuna 3 (FIS/2009/059)
			formal logbook/logsheets system.	
<b>Outcome 4: Regional and national scientific capacity strengthened to support fisheries management planning</b>				
<b>4.1 Strengthening scientific analytical capability and capacity to gather information</b>	Status of bait fisheries assessed and reported (Sorong and Bacan). Shortage of bait for the tuna fishery was related to operational inefficiency and seasonal variation not depression of the size of the resource due to overexploitation of the fishery. Examined baitfish use in North Sulawesi and undertook stock assessment in an enclosed bay (Bima Bay, Sumbawa).	In the production of a Country Status Report, research examined the extent and accuracy of Indonesia's tuna fishery data for the Indian Ocean, and the existing systems for data collection and reporting at district, provincial and national levels and for industrial and to a lesser degree artisanal fisheries. Provided capacity building in terms of the ability of MMAF staff to provide Country Status Reports to relevant RFMOs.	A review of Indonesian tuna fisheries operating in the eastern region, including the Banda Sea and the Western Pacific Ocean. Research and capacity development in analysis and interpretation of fisheries data for stock assessment to enable independent reporting on fisheries in line with international requirements. Capacity development and training in ageing and reproductive biology.	Research will include studies of the population structure of yellowfin tuna and bigeye tuna in Indonesian archipelagic waters and populations in adjacent oceans and the implications for assessment and management of fisheries harvesting these stocks. Research will include preliminary assessments of the fishing capacity and risk aspects of the fisheries for each major gear type. Capacity building and training in dissection and identification of parasites in juvenile tuna and genetic and otolith chemistry analyses.

<b>Capacity Development Framework</b>	<b>Tuna baitfish (FIS/1994/024)</b>	<b>Tuna 1 (FIS/2001/079)</b>	<b>Tuna 2 (FIS/2002/074)</b>	<b>Tuna 3 (FIS/2009/059)</b>
<b>4.2 Integrating scientific advice into management planning</b>	Estimates of the scale of bait fisheries and related optimum size of the pole-and-line fleet in Bacan. Policy recommendations for conservation of baitfish developed and discussed with industry and government stakeholders (agreed by workshop participants). Cooperation from fishing company in catch monitoring.	Produced a Country Status Report and in doing so, identified key information gaps for management.	Produced a review of eastern Indonesian tuna fisheries. Key project meetings involved industry participation and discussion around the development of a formal observer program and logbook/logsheets program. Strengthened Indonesia's participation in the overall management of Western Pacific Ocean pelagic fisheries. Provided the first catch estimates for key tuna species caught by the Indian Ocean longline fishery to submit to IOTC and CCSBT, independent of assistance from external agencies.	The project will provide a review of FAD-based fisheries in Indonesia that can be considered by key stakeholders. This is expected to contribute to the development of management plans for the FAD-based fisheries.
<b>4.3 Strengthening economic impact analysis capacity</b>				Research will include preliminary assessments of the bioeconomic, socioeconomic aspects of the FAD-based fisheries.
<b>4.4 Strengthening capacity for assessment of climate change</b>				

<b>Capacity Development Framework</b>	<b>Tuna baitfish (FIS/1994/024)</b>	<b>Tuna 1 (FIS/2001/079)</b>	<b>Tuna 2 (FIS/2002/074)</b>	<b>Tuna 3 (FIS/2009/059)</b>
<b>adaptation/mitigation in fisheries, inc. Fishing vessel emissions</b>				
<b>4.5 Research planning</b>				
<b>Outcome 7: Regional and international cooperation strengthened</b>				
<b>7.1 Strengthening capacity for complementary management of transboundary stocks</b>			Strengthened Indonesia's participation in the overall management of Western Pacific Ocean pelagic fisheries.	Research will contribute to strengthening Indonesia's capacity for management of FAD-based fisheries on pelagic stocks and their participation in WCPFC.
<b>7.2 Strengthening capacity for joint (and common) stock assessment</b>		Establishment of the monitoring program at three major ports which meets the requirements of CCSBT and IOTC reporting. Identified key data gaps required for joint stock assessments in RFMOs.	Continued strengthening of monitoring program and implementation in eastern Indonesia, in line with meeting RFMO requirements. Provided the first catch estimates for key tuna species caught by the Indian Ocean longline fishery to submit to the IOTC and CCSBT, independent of external assistance. Strengthened capacity to analyse and	Research will strengthen the capacity for joint stock assessments, through consideration of the implications of the population structure and improved data and information FAD-based fisheries. There will be strengthened capacity to analyse and interpret fisheries data for stock assessments and contribute to WCPFC scientific meetings.



<b>Capacity Development Framework</b>	<b>Tuna baitfish (FIS/1994/024)</b>	<b>Tuna 1 (FIS/2001/079)</b>	<b>Tuna 2 (FIS/2002/074)</b>	<b>Tuna 3 (FIS/2009/059)</b>
			interpret fisheries data for stock assessments and therefore contribute to RFMO scientific meetings.	
<b>7.4 Strengthen capacity for International engagement</b>		Developed a Country Status Report and increased the capacity for Indonesia to independently report on tuna fisheries and participate in stock assessments in line with international requirements and RFMO measures.	Indonesia achieved full member status of both IOTC and the CCSBT and co-operating non-member status of the WCPFC during this project, substantial steps towards higher level of international engagement in these RFMOs.	The project will assist in meeting the requirements of RFMO engagement in science, assessment and management. Indonesia is a full member of WCPFC.
<b>Stakeholder engagement</b>	Research outcomes and policy recommendations were developed and discussed with industry and government stakeholders. Fishing company cooperated in the catch-monitoring component.	Workshops were held with a broad range of stakeholders including fishery managers, scientists and peak industry bodies.	Workshops were held with a broad range of stakeholders including fishery managers, scientists and peak industry bodies. A Steering Committee for Monitoring and Assessment was established to develop the strategy for the transition of the project's trial observer program into a more formal observer program and progress the implementation of a formal logbook/logsheets system.	

# Overview of Indonesia's Capture Fisheries, 2013

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## Introduction

This background paper was prepared to provide context for the development of the draft Strategic Plan for ACIAR's engagement in Capture Fisheries Research and Capacity Development in Indonesia. A draft was provided as background to the priority identification workshop, 11 & 12 March 2014, Bogor, Indonesia.

Indonesia has some of the most diverse aquatic and fisheries resources, including those shared with neighbouring countries and the high seas areas. It is the world's largest archipelago, with more than 17,500 islands (FAO 2013a) and over 81 000 km of coastline, stretching between the Pacific and the Indian Oceans. Indonesia's fishing area covers 5.8 million km<sup>2</sup> of marine waters, comprising 2.7 million km<sup>2</sup> of territorial waters and 3.1 million km<sup>2</sup> of the Exclusive Economic Zone (EEZ) which is the fifth largest in the world (FAO 2013a). In terms of freshwater resources, Indonesia has over 5,500 rivers, although they tend to be short, and an estimated total dam capacity of 22.49 km<sup>3</sup> (FAO 2013b).

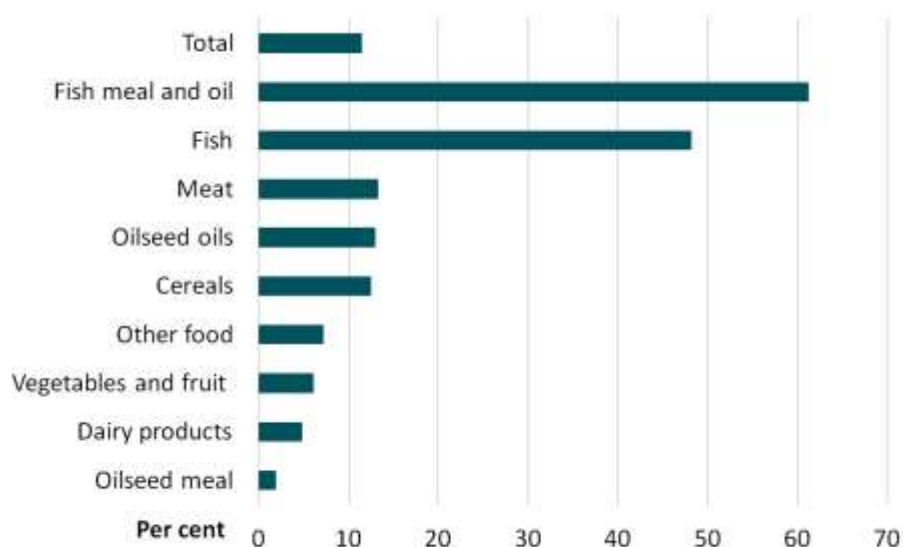
These diverse aquatic resources enable seafood, wild-capture fisheries and aquaculture to play important roles in trade, livelihoods, food security and culture.

## Global trends

Globally, capture fisheries and aquaculture supplied 128 million tonnes of fish in 2010, which was utilised as food for people. The world fish food supply has grown by an average of 3.2 percent per year between 1961 and 2009, outpacing the increase of 1.7 percent per year in the world's population. This was mainly driven by sustained growth in fish production and improved distribution channels (FAO 2012). Worldwide, people are eating more seafood - over the past 3 decades global seafood consumption has increased by 50 percent, accounting for 16% of all animal protein consumed worldwide (FAO 2012).

Long-term projections in global food demand, production and price have been examined by the Food and Agriculture Organization of the United Nations (FAO), the International Food Policy Research Institute (IFPRI) and ABARES (Linehan et al. 2012a; Linehan et al. 2013). Consistently, the world demand for agrifood products is projected to increase significantly by 2050, because of a larger global population and growth in per person incomes, especially in developing countries. ABARES projected the real value of world agrifood demand to be 77 per cent higher in 2050 than in 2007 (Linehan et al. 2012a). Demand is projected to increase most strongly in Asia, doubling between 2007 and 2050. China is driving this demand, accounting for 43 per cent of the global agrifood increase, while India accounts for 13 per cent (Linehan et al. 2012a). Associated with the increasing demand, is a projected rise in food production, mostly in Asia where the real value of agrifood production is projected to be 84 per cent higher in 2050 than in 2007.

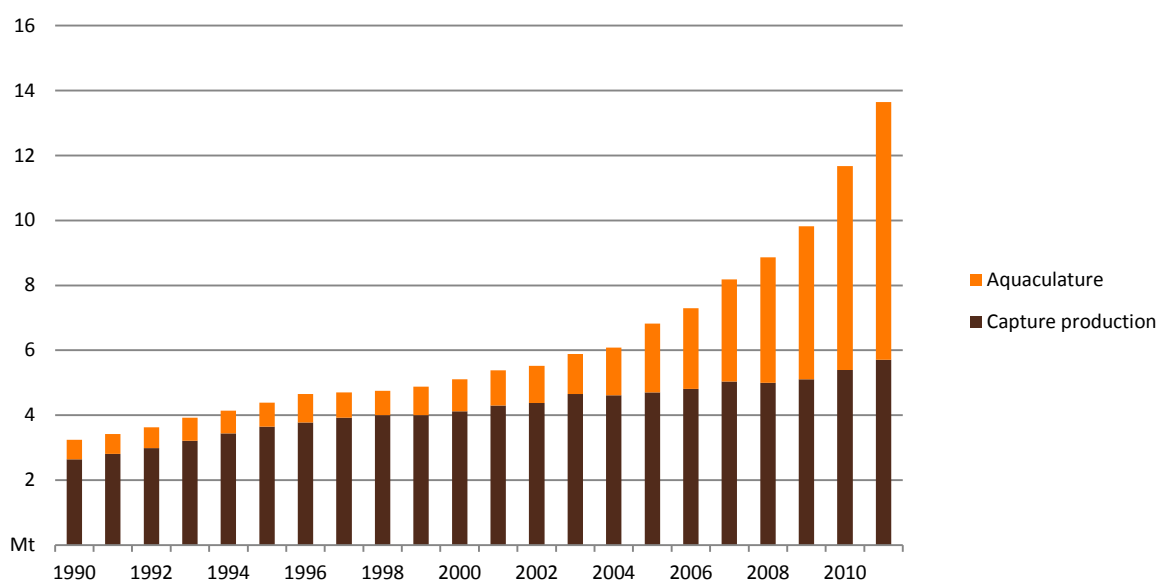
The average price of world agrifood products in 2050 is projected to be 11.5 per cent higher than in 2007 (Linehan et al. 2013). The fish meal and oil, fish, meat, oilseed oils, and cereals commodity groups experience the largest price rise over the projection period (Figure 1). The rise in the price of the fish group (which includes high-value and low-value capture fish and seafood, and aquaculture fish and seafood) reflects the potential effect of fixed quotas on capture fisheries. The projections assume the growth in fish production is from aquaculture, which is also dependent on fish meal and oil from the capture fishery as its feed input. With no growth projected for the capture fishery, feed inputs for aquaculture are constrained and hence growth in aquaculture is limited.

**Figure 1 Projected world agrifood price change, 2007 to 2050** (Linehan et al. 2013)

## Fisheries Production

Indonesia is a significant global producer of fisheries products from both wild-capture fisheries and aquaculture. In 2011, Indonesia produced 13.7 million tonnes of fisheries products (including 5.2 million tonnes of aquatic plants) and accounted for 7 per cent of the world's production (FAO 2013c). Since 1990, Indonesia's fisheries production has increased by an average of 7 per cent annually (Figure 2). In terms of national agricultural GDP, fisheries production in Indonesia contributes over 10 per cent of agricultural GDP (Stobutzki et al. 2006).

Aquaculture production has been the main driver of the increase in fisheries production. Indonesia's aquaculture production has grown from 3.8 million tonnes in 2008 to 6.3 million tonnes in 2010. In 2011 total production increased further to approximately 7.9 million tonnes (60 per cent of Indonesia's total fisheries production) (FAO 2013c). Increased aquatic plant production, from 0.1 million tonnes in 1990 to 5.2 million tonnes, has been a major contributor to the increase in aquaculture production in 2011. Indonesia's 2011 aquaculture production represented 9 per cent of the global aquaculture production by volume (FAO 2012). The value of Indonesia's aquaculture production was \$US7.5 billion which contributed 17 per cent of the world aquaculture production value. Indonesia is the world's second largest producer of aquatic plants and fourth largest aquaculture producer of fish.

**Figure 2 Indonesia's aquaculture and wild-capture fisheries production, 1990–2011**

Source: FAO 2013a

## Capture fisheries

Indonesia's capture fisheries production has increased to 5.7 million tonnes in 2011. In 2011, Indonesia was the second largest producer of capture fisheries products, second to China. The global share of Indonesia's capture fisheries production increased from 3 per cent in 1990 to 6 per cent in 2011. Most capture fisheries production comes from marine fisheries (94 per cent; FAO 2010). These catches are attributed to a number of main fishing areas – Sumatra (28 per cent of catch), Maluku (20 per cent), Sulawesi (19 per cent), Java (19 per cent), Kalimantan (7 per cent), Bali and Nusa TenTT (6 per cent; DAFF 2011). About 50 per cent of the total catch landed is sold as fresh product while the rest is processed or preserved through salting, drying, boiling, smoking and freezing (Tull 2009).

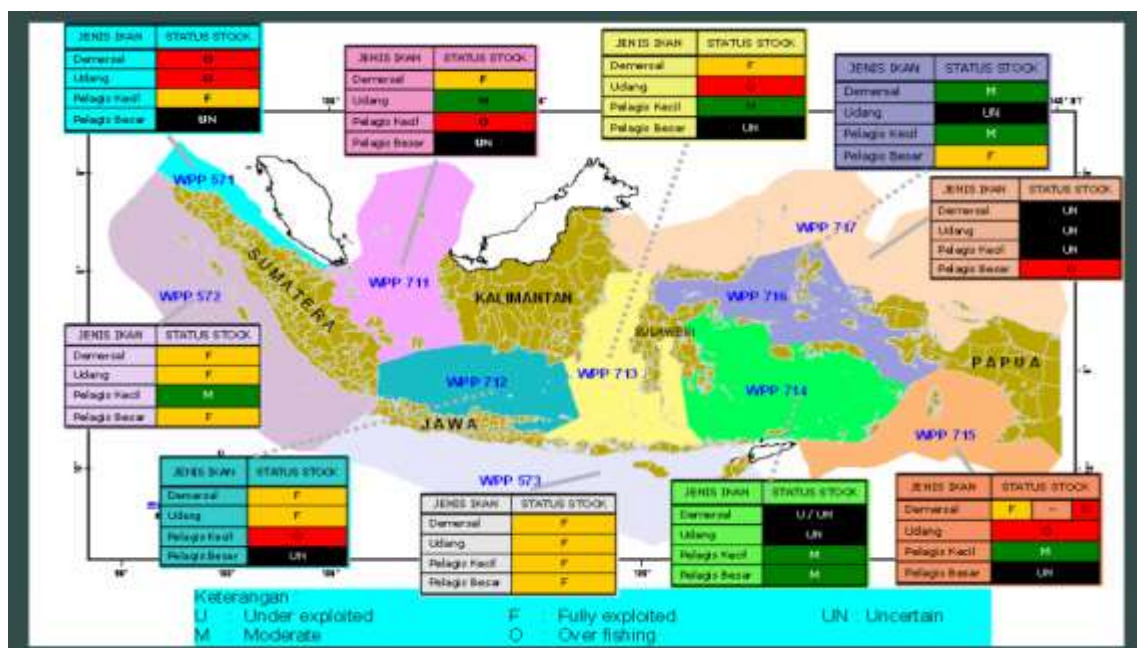
In terms of the composition of Indonesia's capture fisheries production, tuna account for the largest proportion by weight, contributing 20 per cent of production, followed by shrimp (FAO 2012). Tuna species caught include bigeye, yellowfin, albacore, southern bluefin, skipjack and tongol.

Since 1990, Indonesia's share of global tuna production has almost doubled (FAO 2013a) and since 2004, Indonesia has been the highest tuna producing country (Sunoko & Hsiang-Wen 2013).

## Status of stocks

Most Indonesian fisheries are defined as fully exploited or over exploited (Figure 3). The number of fishing vessels continues to expand with clear signs of declining CPUE's in many fisheries. These include the tunas, small pelagics (scad, sardinella and anconvies), Arafura shrimp and coastal reef fish.

**Figure 3. An example of Indonesia Fishery Status Reporting by fishery management area (Duto Nugroho 2009)**



Note: Jenis ikan = Types of fish; Udang = prawns; Pelagis Kecil = small pelagics; Pelagis Besar= large pelagics

## Fishing fleet

Indonesia's marine capture fleet numbers approximately 560 to 590 thousand vessels, representing a 28 per cent increase since 2002 (DAFF 2011). The fleet is dominated by small coastal vessels (< 5 GRT) operating within 4 nautical miles of the coast and managed at the district level. These small coastal vessels (approximately 500 000) account for between 35–40 per cent of landings. A further ~ 50 000 vessels (between 20 and 30 GRT) operate in territorial waters (4 to 12 nautical miles), managed by provinces, making up a further 25–35 per cent of the catch. The remaining ~10 000 vessels operate in archipelagic or EEZ waters and account for 20–30 per cent of the national catch. The larger vessels (>30 GRT) are licensed by the central government. Most of this offshore fleet target tunas in the Western Pacific and Indian Oceans using long lines, purse seine and, pole and line methods. The modern industrial sector that accounts for about 10 per cent of total production is often owned by licensed foreigners or by joint ventures, capturing high value species such as prawns, tuna and other deeper off-shore fish resources, mainly for export markets (Tull 2009).

The total number of fishing boats in the inland water fishery is estimated at 198,534 (FAO 2006). About 41 per cent and 80 per cent of the boats in the marine fisheries and the inland water fishery respectively were non-powered boats. Between 2007 and 2009, the number of motorised vessels increased by 16 per cent (FAO 2012).

The number of fishing vessels continues to expand with clear signs of declining catch rates in many fisheries (DAFF 2011). The main areas of fleet expansion are found in district and provincial zones, where management continue to support effectively open access fisheries (DAFF 2011).

Sunoko & Hsiang-Wen (2013) also highlight the issues of inadequate infrastructure which inhibits domestic fisheries development. Infrastructure is particularly limited in the eastern areas of Indonesia. This condition has significant influence on operating costs and the quality of product produced.

## Livelihoods

Indonesia's capture fisheries have an important role in providing employment. In 2010, nearly 6 million people were directly engaged in fishing of which 2.6 million are employed in capture production mostly in marine fisheries and 3.4 million are employed in fish farming (FAO 2012). Twice as many employed people are indirectly employed in this fishing industry (Koeshendrajana and Hartono 2006). The number of people employed in capture fisheries has increased by 84 per cent since 2000, while employment in fish farming has increased by 156 per cent (FAO 2012). In poor rural and coastal areas, fisheries can provide part-time and seasonal employment that supplements agricultural or other employment. Indonesia also has some communities that are highly dependent on fisheries and nomadic, such as the Bajau.

## Seafood demand

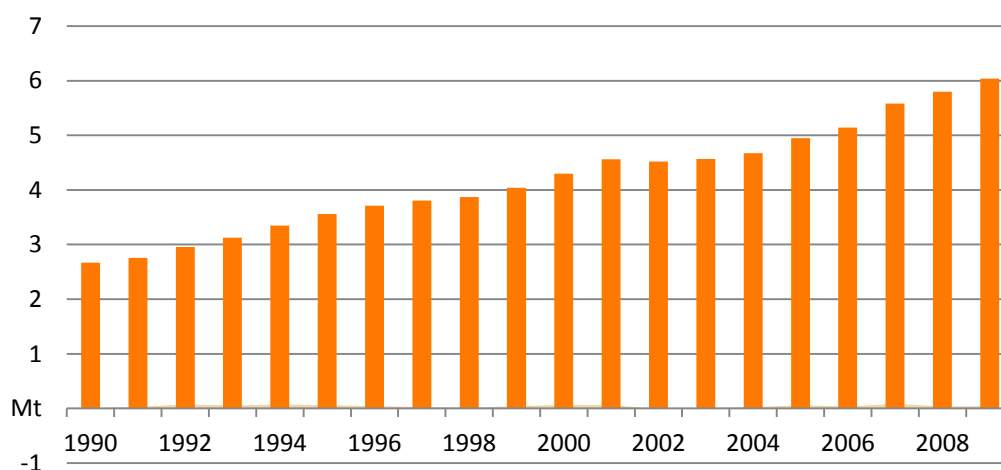
Indonesia is the fourth most populous country, with over 237 million people, of which 56 per cent live in rural areas (FAO 2013a) and 60 per cent of the live in coastal areas (Purwaka and Sunoto 2002). Indonesia's Gross Domestic Product has grown by 5–6 per cent each year from 2005 to 2012 (World DataBank 2014).

## Seafood consumption and nutrition

Seafood contributes an estimated 54 per cent of animal protein in Indonesia, 15 per cent of protein consumption (FAO 2012). Indonesia has one of the world's highest rates of seafood consumption. Total seafood consumption has grown significantly, between 1990 and 2009 the total seafood consumption increased by an average of 4 per cent annually, from 2.7 million tonnes in 1990 to 6 million tonnes in 2009 (Figure 4). Due to its large population, Indonesia is also the largest consumer of fisheries products in the ASEAN region. If Indonesia's population grows at 2–3 per cent per year, consumption will double within the next 25 years. Assuming constant consumption levels, demand for fish for national consumption is estimated to be as much as 8 million tonnes per year (FAO 2000).

The annual per person consumption of fish and seafood in Indonesia increased from 14.5 kg in 1990 to 25.4 kg in 2009 (FAO 2012). Over 50 per cent of fish sold on the domestic market is consumed fresh. Due to limited storage and infrastructure only 16 per cent of production is frozen. The rest of the production is mainly dried, salted, smoked or fermented (OECD 2012). Fisheries consumption is met mostly from domestic production, an estimated 80 per cent of Indonesia's marine capture fisheries production is consumed domestically.

**Figure 4 Total estimated consumption of fisheries products, 1990—2009**



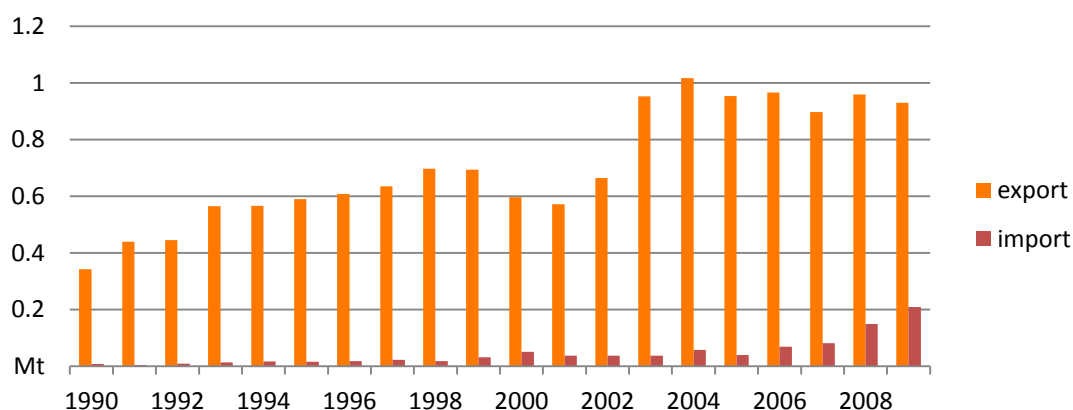
Source: FAO 2013a

In Indonesia, the per person annual fish consumption increases with income, however the lower income households spend a greater proportion of their income on food (Dey et al. 2007). The share of fish expenditure as a percentage of total household expenditure decreases as income increases. As such, the poorer households in Indonesia tend to spend a greater proportion of their food expenditure on fish. Processed fish is an important component of fish expenditure (averaging 10 per cent) among Indonesia households where expenditure shares reach 22 per cent (Dey et al. 2007).

## Fisheries Trade

Indonesia is one of the world's leading exporting countries of fisheries products. In 2011, the value of Indonesia's edible fisheries exports reached US \$3.2 million, contributing 2.5 per cent of the total value of global fisheries exports (FAO 2013b). Following a significant increase in fisheries production Indonesia's exports have increased during the past decades. Exports of edible fisheries products have increased from 0.34 million tonnes to 0.93 million tonnes over 1990 and 2009 period rising on average at 6 per cent annually (Figure 5).

**Figure 5 Indonesia's total fisheries products (both wild-capture and aquaculture) exports and imports, 1990–2009**



Source: FAO 2013a

Indonesia exports fisheries products to more than 210 countries (USDA-FAS 2010). The main importing countries were Japan, Hong Kong, the United States, France, South Korea, Australia, Germany, the United Kingdom, and the Netherlands. In 2009, the largest export markets in volume terms were the United States (120,150 tonnes), Japan (106,502 tonnes) and the European Union (56,189 tonnes) and other countries (422,703 tonnes) including China and Hong Kong (Figure 6, USDA-FAS 2010).

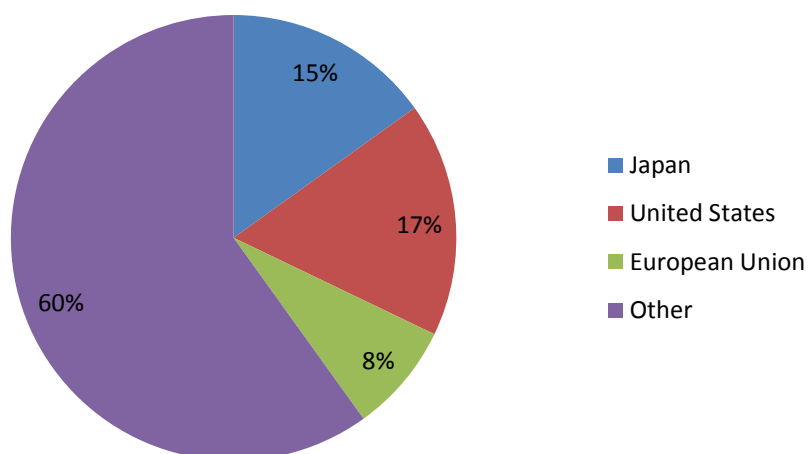
The main commodities exported were shrimps, tunas and crabs (JECA 2008). The main products exported to the United States, Japan and Thailand in 2007 were shrimps and tuna, with sea weeds being the main products exported to Hong Kong and China. In 2007, the United States and Japan imported 38 per cent and 25 per cent respectively of the total volume of Indonesia's shrimp export and 18 per cent and 25 per cent of tuna export.

Indonesia imports substantially less fisheries products than it exports (Figure 5). Imports represent about 1.5 per cent of Indonesia's estimated total fisheries product consumption (FAO 2013a).



However, due to increases in total fisheries consumption the volume of fisheries imports has also increased, from 0.01 million tonnes in 1990 to 0.21 million tonnes in 2011 (Figure 5).

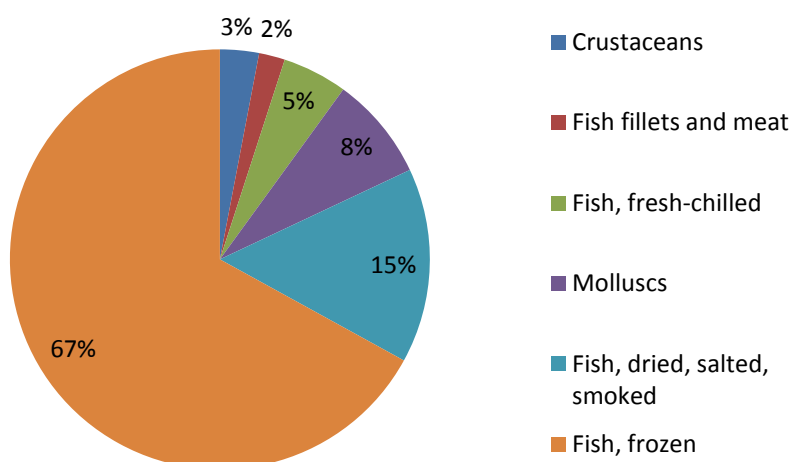
**Figure 6 The destinations of Indonesia's fisheries products export (tonnes) by major destination in 2009**



Source: USDA-FAS 2010

The main imported fish commodities are fish meal, fresh and frozen tuna and fresh and frozen fish. Most imported fisheries products are processed. For example, about 67 per cent of fish is imported in a frozen form, 15 per cent as dried, salted and smoked and only 5 per cent of as fresh and chilled (Figure 7). The main suppliers of Indonesia's fisheries import products in value terms were Malaysia, Peru, China, Thailand and South Korea (JICA 2008). About 40 per cent of fish meal import came from Peru, about 70 per cent of fresh and frozen fish came from Malaysia, China and Pakistan (JICA 2008).

**Figure 7 Indonesia's imports of fish and seafood (tonnes) by species group in 2008**



Source: JICA 2008

## Interaction with aquaculture

Aquaculture is undertaken in fresh, brackish and marine waters using a variety of production methods and facilities. The systems used range from extensive to intensive depending on the stocking density of the aquatic organism, input level and management (FAO 2014). Between 2005 and 2009 aquaculture production grew at 22 per cent per annum (Rimmer et al. 2013)

The Ministry of Marine Affairs and Fisheries strategic plan for 2010-2014 set a fish production target of 22.39 million tonnes in 2014. Estimates show that the share of aquaculture in the total catch will grow to more than 16.8 million tonnes by 2014. Indonesian aquaculture products are mostly consumed on the domestic market. However, most of the shrimp production is exported to USA, Japan, and the European Union. Seaweed is exported to China, Republic of Korea, Viet Nam, Philippines, and Hong Kong SAR, tilapia to USA and the EU, and grouper to Hong Kong and China, Singapore and Malaysia (Miao 2013).

There are a range of ways in which aquaculture and capture fisheries interact. There may physical interactions, where coastal or freshwater aquaculture overlaps with coastal habitats that were fished or on which capture-fisheries species rely. Indonesian capture fisheries may also directly contribute to aquaculture feeds, such as the reliance on the use of 'trash' fish for feeding marine finfish, Kongkeo et al (2010). Some aquaculture production, such as grouper aquaculture, is dependent on wild-caught fingerlings or sub-adults. These interactions between the sectors, illustrate the importance of considering both aquaculture and capture fisheries together, within the policy context.

## Capture Fisheries Governance

The fisheries management arrangements in Indonesia operate on a decentralised scheme consisting of three levels: the Ministry for Marine Affairs and Fisheries (MMAF, Federal); Dinas Perikanan Provinsi (DKP, State in 33 Provinces) and the DKD (250 district administrators). Management rights for resources that occur within 12 nautical miles of the coast are delegated to the provincial government while management rights for resources that are found up to 4 nautical miles from the coast are delegated to the district/municipal government (Adriato & Hirtato 2009).

Fisheries policies at country level are set out through the Directorate General for Capture Fisheries, MMAF. However, the policies go through various processes of adoption if they require implementation at the provincial and district levels. The Ministry, in the devolution of authority to the provinces and districts, assumes a facilitation and coordination role to guide these authorities in the management of their respective jurisdictions, consistent with national laws.

Indonesia's domestic and international fisheries policy objectives are set by the *Fisheries Master Plan*, produced every 5 years by the Ministry. The current version is due to expire in 2014. The Master Plan outlines a goal for marine capture fisheries production to increase by 0.5 per cent per year. Hence, the plan would increase production from 5.38 million tonnes in 2010 to 5.5 million tonnes in 2014 (Sunoko & Hsiang-Wen 2013). This objective has been achieved with 5.7 million tonnes of catch in 2011. The plan also emphasises the promotion of growth in aquaculture and exports.

The key objectives for fisheries management as contained in the *Fisheries Master Plan* include:

- To strengthen an integrated marine and fisheries' human resources and institutions
- To sustainably manage marine and fisheries resources
- To increase scientific based productivity and competitiveness

- To extend the access of the domestic and international market

The Ministry has approximately 3 000 staff, of which 1 500 in capture fisheries, 1 000 in aquaculture, 150 in small islands, 140 in process and marketing and 150 in research.

### International agreements

Indonesia ratified the *United Nations Convention on the Law of the Sea* in 1986 and the Agreement relating to the implementation of Part XI of the Convention in 2000 (UNCLOS 1982). Indonesia ratified the *UN Fish Stocks Agreement* (UNFSA) in 2010 and was one of the first countries to sign up to the *Port State Measures Agreement* (2009).

Indonesia is a member of the following regional fisheries management organisations/agreements, including:

- Commission for the Conservation of Southern Bluefin Tuna (CCSBT)
- Indian Ocean Tuna Commission (IOTC)
- Western and Central Pacific Fisheries Commission (WCPFC)
- Brunei, Indonesia, Malaysia, Philippines – East Asia Growth Area (BIMP-EAGA)
- Indian Ocean Marine Affairs Cooperation (IOMAC)
- Coral Triangle Initiative on Coral Reefs, Fisheries and Food Security (CTI)
- Arafura and Timor Sea EA (ATSEA).

### Capture fisheries research capacity

Indonesia's main federal fisheries scientific organisation is the Marine and Fisheries Research Institute (BRKP). BRKP is responsible for the coordination of a number of sub-institutes including the Marine, Open Waters, Conservation and stock enhancement (BRPL), Fisheries Technology and Research Centre for Social Economics. BRPL has approximately 70 staff and an annual budget of US\$8.5 million, and is currently in the process of building a new research vessel.

The BRKP implements research programmes based on a 5 year research cycle in the 11 fisheries management areas. An annual stock assessment report is prepared for the National Committee on Stock assessment. This committee discusses validations on data and submits recommendations on stock status to the Minister.

BRPL is currently cooperating with IOTC and WCPFC in two donor supported programmes linked to observer deployment and data collection. Ten observers deployed on tuna long line vessels in Bali, funded by ACIAR/CSIRO in support of the IOTC observer programme and GEF funding is supporting a WCPFC data collection programme at Bitung, Kendari and Sorong.

With regard to economics, the main fisheries economics organisation in Indonesia is the Research Centre for Social Economics, under BRKP. The organisations primary focus is in modelling and assessment of trade related issues. Some costs and earnings data is collected, but on a sporadic basis, and is not coordinated or integrated with the stock assessment survey. The Research Centre has 20 researchers with annual funding around US\$ 200 000.

### Ecosystem approach to fisheries management (EAFM) in Indonesia

In 2003, the United Nations Food and Agriculture Organisation (FAO) defined EAFM as —*An approach to fisheries management and development that strives to balance diverse societal objectives, by taking into account the knowledge and uncertainties about biotic, abiotic, and human*

*components of ecosystems and their interactions and applying an integrated approach to fisheries within ecologically meaningful boundaries* (FAO 2005). The increased understanding of the interactions among different components of marine ecosystems such as fish, people, habitats, and climate has led to a growing recognition of the need to manage fisheries in the context of their supporting ecosystems (CTI 2011). The EAFM recognises the importance of the human dimensions to fisheries management and views coastal communities and fishers as critical parts of the ecosystem with food security, livelihood, and economic development interests linked to effective fisheries management.

The EAFM approach, particularly to fisheries management in Indonesia, is called for through Law No. 31/2004 on Fisheries; Law No. 27/2007 on Coastal Management; and Government Regulation No. 60/2007 on Fish Resources Conservation. While policy and regulatory frameworks are in place, the implementation of such frameworks is partial (CTI-CFF 2009a). The legislative framework can be used to support the EAFM (CTI 2011). In some cases, EAFM may require that existing laws and policies, and the practices of other sectors that interact with fisheries, need to be reconsidered and adjustments made where necessary. EAFM is, therefore, likely to require more complex sets of rules or regulations that recognise the impacts of fisheries on other sectors and the impact of those sectors on fisheries. Williams (2007) highlights the importance of increasing the capacity of Indonesian fisheries personnel to become more active beyond the fisheries domain in integrated management where many of the fisheries problems such as habitat destruction, coastal pollution, and trade may be addressed.

Following the formation of the Coral Triangle Initiative (CTI) on coral reefs, fisheries and food security the Indonesian Government became a member of the CTI Regional Plan of Action (RPOA). The second goal of the CTI RPOA is the 'application of an ecosystem approach to fisheries management with strong legislative, policy and regulatory frameworks in place for achieving EAFM' (CTI-CFF 2009b). Indonesia's National Plan of Actions for the CTI aligns with this, with one of the five goals being 'Ecosystem approach to management of fisheries (EAFM) and other marine resources fully applied'.

The use of ecosystem-based management approaches to fisheries management in Indonesia has been investigated for some Indonesian fisheries. A study on the Bali Straits Sardine Fishery showed fisheries ecosystem sustainability modelling as useful in comparing possible effects of different management strategies (Buchary et al. 2002). In addition, Pitcher et al. (2009) evaluation of the implementation of ecosystem-based management of fisheries in 33 developed and developing countries highlights case studies in Indonesia (specifically the Raja Ampat & Papua regions) as performing better with regards to ecosystem-based fisheries management than many other developed countries.

To monitor and evaluate progress of EAFM in Indonesia, a suite of indicators was established in consultation with key stakeholders in fisheries management. Indicators spanned six fisheries domains: habitat, fish resource, fishery, social, economic and institutional. These have been used to conduct preliminary assessment of EAFM implementation in Indonesian fisheries management areas. Later, assessments were expanded to examine marine protected areas and species-based fisheries.

The establishment of indicators has enabled fishery managers to evaluate both spatial (MPA's) and species-based (shark) fishery management performance. Results show that more reliable data is required to assist EAFM application in Indonesia. This will require collaborative approaches between management agencies with other fisheries stakeholders (researchers, ENGO's etc.) in order to maximise data resources and cost efficiency.

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# Extracts from *Net Returns: a Human Capacity Development Framework for Marine Capture Fisheries Management in South East Asia* (DAFF 2011)

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## Introduction

This document provides key extracts from *Net Returns: a Human Capacity Development Framework for Marine Capture Fisheries Management in South East Asia* (DAFF 2011) to assist workshop discussions. The full document is available at [http://www.daff.gov.au/\\_\\_data/assets/pdf\\_file/0011/2005787/net-returns.pdf](http://www.daff.gov.au/__data/assets/pdf_file/0011/2005787/net-returns.pdf)

The framework was developed under the *Regional Plan of Action to Promote Responsible Fishing Practices including Combating Illegal, Unregulated and Unreported (IUU) Fishing in the Region* (RPOA 2007). The RPOA was a joint initiative of the Indonesian and Australian governments that 11 South East Asian countries signed in 2007. A priority of the RPOA participating countries was to prepare a capacity development framework for marine capture fisheries management (DAFF 2011). A participatory, bottom-up approach was taken to identify the needs at the national level and regional priorities were then formulated at a workshop held in Da Nang, Vietnam, November 2010, of participating country representatives.

The overall goal of the human capacity development framework is to increase the capacity of people and institutions involved in marine capture fisheries within RPOA participating countries to develop their abilities, individually and collectively, to ensure the sustainable development of the region's marine capture fisheries, based on current and emerging trends, challenges and needs.



## **Relevant extracts from *Net Returns: a Human Capacity Development Framework for Marine Capture Fisheries Management in South East Asia***

### **The main internal and external drivers**

Drivers internal to the fisheries sector:

- Poverty of fishers and the need for food security.
- Increasing global and local demand for seafood.
- Historical focus on production.
- Limited fisheries management resources
- Increasing emphasis on market-based solutions.
- Inter-connectedness of the region's fisheries.

Drivers external to the fisheries sector:

- Population growth and the demand on coastal fisheries.
- Decentralisation.
- International obligations.
- Climate change.

### **Main challenges**

- Excess fishing capacity.
- Depleted marine capture fisheries.
- Weak management of ecosystems effects.
- Intra-sectoral conflict.
- Weak information collection and analysis systems.
- Low catches/incomes and dissipated resource rents.
- IUU fishing, weaknesses in law enforcement and control of fishing intensity.
- Misalignment of political and management objectives.
- Making decentralisation work.

## Framework components

**Table 1: The components of the capacity development framework (DAFF 2011)**

FISHERIES MANAGEMENT PLANNING	Developing fishery specific management plans, incorporating the ecosystem approach to fisheries and participation
FISHING CAPACITY MANAGEMENT	Vessel licensing and/or registration
	Rights based fisheries management
	Developing alternative livelihoods
	Commercial capacity reduction schemes
STRENGTHENING INFORMATION SYSTEMS	Strengthening fishery independent monitoring systems
	Strengthening Information management
	Design of information collection systems
	Strengthening monitoring of fisheries trade
	Strengthening fishery dependent monitoring systems
STRENGTHENING THE SCIENTIFIC AND ECONOMIC BASIS FOR FISHERIES MANAGEMENT	Strengthening scientific analytical capability and the capacity to gather information
	Integrating scientific advice into management planning
	Economic impact analysis
	Strengthening capacity for assessment of climate change adaptation/mitigation
	Research planning
EFFECTIVE DECENTRALISATION	Strengthening coordination and accountability between national/local levels
	Strengthening implementation at local level
	Community-based management of fisheries
	Strengthening legal basis to support decentralisation
STRENGTHENING MONITORING, CONTROL AND SURVEILLANCE (MCS)	Strengthening MCS information systems
	Strengthening MCS co-ordination
	Building entry/mid level MCS skills
	Port state measures
	Risk assessment/compliance planning
	Encouraging voluntary compliance
STRENGTHENING REGIONAL AND INTERNATIONAL COOPERATION	Strengthening capacity for complementary management of transboundary stocks
	Strengthening capacity for joint (and common) stock assessment (RPOA stock assessment platform; defining stock structure)
	Strengthening capacity for cooperative MCS
	Strengthen capacity for international engagement
STRENGTHENING LEGAL, POLICY AND ADMINISTRATIVE SUPPORT	Clarifying institutional roles/responsibilities
	Encourage strengthening of legal frameworks (inc. improving compatibility; capability to address emerging issues)
	Strengthening capacity of senior executives to promote importance of fisheries
	Strengthening capacity for internal needs assessment
	Public performance reporting

## Framework outcomes and activities

**Table 2: The outcomes and proposed deliverables of the framework (DAFF 2011) relevant to research and capacity building**

Activities	Proposed deliverables
<b>Outcome 3: Information systems strengthened</b>	
Activity 3.1: Strengthening fishery independent monitoring systems	Reliable sources of fishery independent information designed and implemented for main fisheries – for example independent observer programs, VMS, port sampling, surveys
	Information on trends in catch rates as indices of stock abundance available to fishery managers
	Enumerator and analysts trained
Activity 3.2: Strengthening information management	Integrated information management systems established; capable of collecting, processing, storing and exchanging information; support cross-verification of data and analysis
	Data collection (catch/effort) and compilation systems established at all spatial levels (national and provincial)
Activity 3.3: Improving design of information collection systems	Management and compliance needs assessed for each main fishery
	Information collection systems designed and implemented to support management plan objectives
Activity 3.4: Strengthening monitoring of fisheries trade	Electronic databases established that link traceability and trade (supporting the EU catch certification system)
	Trade statistics and market intelligence available to fishery policy makers and planners
Activity 3.5: Strengthening fishery dependent monitoring systems	Robust catch and effort logbook systems in place for the main fisheries
<b>Outcome 4: Regional and national scientific capacity strengthened to support fisheries management planning</b>	
Activity 4.1: Strengthening scientific analytical capability and capacity to gather information	Analytical capacity sufficient to undertake robust assessments of main stocks/ fisheries (particularly tropical multi-species, multi gear fisheries)
	Capacity for stock assessment/risk assessment in data poor environments strengthened
Activity 4.2: Integrating scientific advice into management planning	Institutional structures established to ensure integration of scientific outputs/ advice into management planning
	Management planning performance indicators (for example limit and target reference points) monitored regularly
Activity 4.3: Strengthening economic impact analysis capacity	Capacity to assess socio-economic impacts of alternative policy options strengthened
	Economic advice integrated into management performance evaluation
Activity 4.4: Strengthening capacity for assessment of	Strengthened capacity to assess national fisheries implications arising from climate change and implement

<b>Activities</b>	<b>Proposed deliverables</b>
climate change adaptation/ mitigation in fisheries, inc. fishing vessel emissions	adaptation strategies
Activity 4.5: Research planning	Fishery specific research plans in place for each of the main fisheries, with research tied to explicit management planning/policy objectives
<b>Outcome 7: Regional and international cooperation strengthened</b>	
Activity 7.1: Strengthening capacity for complementary management of transboundary stocks	Increasing RPOA country coordination and support for collective transboundary management decisions
	Formal institutional structures established to ensure complementarity of management for shared stocks (for example bilateral, multi-lateral)
Activity 7.2: Strengthening capacity for joint (and common)stock assessment (RPOA stock assessment platform; defining stock structure)	Regional initiatives in place that harmonise arrangements for data collection terminology, formats and exchange mechanisms
	Regional stock assessment platform for joint and common stocks established
Activity 7.5: Strengthen capacity for International engagement	Strengthened engagement in international fisheries management arrangements
	International obligations in fisheries management are met

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