Faculty of Arts and Social Sciences


# Assessing tuna fisheries governance for community wellbeing: case studies from Indonesia and Solomon Islands

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## Acronyms

AP2HI – *Assiosiasi Pole and line dan Handline Indonesia*. Indonesian Pole and Line and Handline Fisheries Association
AW – archipelagic waters
CSO – Civil Society Organisation
DWFN – Distant Water Fishing Nation
EAF – Ecosystem Approach to Fisheries
EEZ – Exclusive Economic Zone
EU – European Union
FA – Fishers Association
FAD – Fish Aggregating Device
FAO – United Nations Food and Agriculture Organisation
FMA – Fisheries Management Area
GDP – Gross Domestic Product
HL – Handline
HL/TL – Handline/Troll line
IPNLF – International Pole and Line Foundation.
PNA – Parties to the Nauru Agreement
IUU – Illegal, Unreported and Unregulated fishing
MDPI – *Masyarakat dan Perikanan Indonesia.* An Indonesian CSO: Communities and Fisheries Indonesia
MFMR – Ministry of Fisheries and Marine Resources, Indonesia
MMAF – Ministry of Marine Affairs and Fisheries, Indonesia
PL – Pole-and-line
IFC – International Finance Corporation
IOTC – Indian Ocean Tuna Commission
PS – Purse-seine
RFMO – Regional Fisheries Management Organisation
SSF – Small-scale fishers
tRFMO – Tuna Regional Fisheries Management Organisation
US – United States
WCPFC – Western and Central Pacific Fisheries Commission
WPP – *Wilayah Pengelolan Perikanan.* An Indonesian term, which translates in English to “Fisheries Management Area”

## Notes on species

The following species are referred to in the text by common names, and are listed here with scientific names.

| Common names used in this report | Scientific name |
|---|---|
| **Skipjack tuna**<br>***Cakalang* (Indonesia)**<br>***Bonito* (Solomon Islands)** | Katsuwonus pelamis |
| **Yellowfin tuna** | Thunnus albacares |
| **Bigeye tuna** | Thunnus obesus |
| **Neritic/coastal tunas, commonly referred to as *Tongkol* in Indonesia** | Auxis spp.<br>Euthynnus affinis |
| **Rainbow runner** | Elagatis bipinnulata |
| **Black marlin** | Makaira indica |
| **Silky shark** | Carcharinus falciformis |

# 1 Introduction

## 1.1 Summary of key findings

The key question addressed in this project is how the governance of fisheries affects the wellbeing of coastal communities. The aim of the project is to contribute to the development of a methodology for structured and evidence-based decision-making for policies and projects intending to benefit coastal communities.

In developing methods to support these policies, we include consideration of the potential benefits and risks associated with policy changes and projects, who derives those benefits or is exposed to the risks, and to what extent intended benefits are in fact realised over time. These are not usually assessed or monitored in fisheries in relation to social and economic outcomes at the community level.

The method for the project involves four case studies of tuna fisheries in Indonesia and the Solomon Islands, utilising qualitative interview data augmented with scientific and technical literature and available statistical reports. These form the basis of a comparative analysis across the case studies. From the analysis we developed a framework with which governance interventions can be assessed in terms of their likely impact on the wellbeing of coastal communities.

### Key findings on tuna fisheries' contributions to coastal communities' wellbeing

**As well as generating revenue for regional economies, tuna fisheries generate livelihood opportunities up and down the value chain. These opportunities are important sources of income for people who may have few other economic options, but many of these livelihoods are chronically insecure and some carry significant physical risk.**

Key economic contributions to local and provincial economies occur firstly through revenue generation, with tuna fisheries being a major sub-sector of the economy in Eastern Indonesia and rural Solomon Islands, each of which have significant development challenges and relatively few other major industries. Tuna fisheries generate significant contributions to regional development and to government revenues at provincial and national levels.

This supports the second major contribution, the provision of employment and livelihoods along the value chain. Tuna fisheries support a wide variety of fishing, trading and processing roles in formal export chains, and businesses supplying inputs and services to the fishing industry. Additionally, a wide variety of livelihood opportunities exist for smaller-scale fishers, processors and traders in informal market chains and fisheries supplying markets in villages and provincial centres. Lower-paid roles in formal and informal market chains are open to people across the social and economic spectrum.

Working conditions are highly variable and influence the extent to which these employment/livelihood opportunities support the wellbeing of workers, or expose them to risks and vulnerabilities. Key variables here relate to income security and workplace safety. In particular, fishing roles tend to be less secure overall, often relying on insecure catch-share models, and – in general – expose workers to greater health and safety risks than land-based trading/processing roles. Similarly, informal market chains supplying provincial

and local markets around ports/landing sites tend to be less secure forms of work and with fewer safety protections in place for known risks than those in the formal sector.

**Domestic tuna market channels, including informal domestic channels associated with export markets, provide significant sources of food for coastal communities.**

While the largest tuna fisheries have been primarily driven by export markets, even these export-oriented fisheries generate important food supply benefits. These include canned tuna distributed throughout the Solomon Islands and likely extensive distribution of canned and prepared tuna throughout Indonesia (less readily available data exists on domestic markets for canned tuna in Indonesia). Informal market chains selling coastal tuna species, low-value bycatch and discards in provincial and local markets around landing/trans-shipment sites also provide substantial volumes of fresh and smoked fish to rural and regional communities. Moreover, two of our case studies are fisheries that solely supply tuna to growing urban populations in provincial centres. Tuna fisheries thus play important and largely under-appreciated roles in domestic food supply. However, due to the low value of these domestic chains, regulation or market-driven improvements are not commonly implemented, and food quality and safety issues with fresh fish in particular are common. These detract from the wellbeing contributions these chains make to both fishers/traders and consumers.

**Tuna fisheries provide important "welfare" functions through providing livelihoods and food for the poorest in society, in some cases directly alleviating poverty and providing food security at the community level.**

Tuna fisheries in Indonesia and the Solomon Islands support livelihoods and food supplies to the poorest people in communities several ways. Through supporting a basic standard of living where few other alternatives exist (safety net function); through absorbing excess labour in the economy and thus alleviating the impacts of wider economic changes (safety valve/labour buffer function); and through providing basic subsistence (food security function).[1] Due to the multi-sited nature of our study we have not been able to establish the extent of these functions for particular fisheries and communities. Further research of this nature would be of high value to future planning and management processes. Ideally this would be based on national-level household survey raw data, disaggregated for tuna fishing communities, and with further targeted data collection.[2]

In all four cases, tuna fisheries are providing livelihoods for people in the poorest groups in communities. In the case of large-scale fisheries, high levels of internal migration for low-paid work suggest that these fisheries may provide a safety valve/labour buffer function, although focused studies into the "push factors" associated with entering low-paid tuna work in the Solomon Islands and Indonesia do not exist.

In small-scale fisheries, migrant communities fish offshore for tuna in part due to their entrenched status on the margins of rural society and lack of other options. While returns from tuna fishing can be periodically attractive, the risks of these livelihoods are very high. The available evidence suggests that in the Solomon Islands tuna fishing is an important economic opportunity for marginalised migrant communities with few other sources of income or food. In Indonesia, migrant communities in export handline fisheries exist periodically below the poverty line due to seasonality of fisheries. Rural areas of Eastern

[1] See Béné et al. (2010) and FAO (2005) for discussion of the poverty alleviation and food security functions of fisheries introduced here.
[2] In Indonesia SUSENAS national household socio-economic survey is conducted annually by the National Bureau of Statistics. Reporting of data is publicly available for download at https://microdata.bps.go.id/mikrodata/index.php/catalog/SUSENAS. Raw data may be accessed via request to the bureau. In Solomon Islands, the Household Income and Expenditure Survey (HIES) is a decadal survey run by the Solomon Islands National Statistics Office. For national and provincial level reporting see https://www.statistics.gov.sb/statistics/demographic-statistics/household-income-and-expenditure-surveys. Raw data may be accessed via request to the office.

Indonesia and the Solomon Islands each have high levels of fish consumption. The presence of informal market chains supplying large amounts of fresh and smoked tuna in regional and provincial towns and villages indicates that tuna therefore plays an important role in the daily subsistence of many community members. While some of this fish is of lower quality than that entering export chains, creating food safety issues, it provides an accessible low-cost source of food and micronutrients for low-income consumers, performing a food security function.

**Regional agreements, government regulation, market standards (certification) and community-led management all have roles to play in keeping tuna fishing within sustainable catch levels.**

Healthy stocks underpin the social and economic benefits of tuna fisheries flowing to coastal communities. Co-operative regional management and efforts to reduce IUU, driven by national governments and government institutions in end markets (particularly the EU), have impacted on large-scale fisheries supplying canneries in both Indonesia and the Solomon Islands. While the impacts are complex and varied, these have contributed to important improvements in government policy and capacity that arguably underpin the longer-term sustainability of these fisheries. Regarding small-scale fisheries, Indonesian government policy focused on IUU has seen a shift in effort towards small and medium-scale vessels as a potentially environmentally sustainable form of tuna fishery. These are yet to have documented positive impacts on stocks or sustainable levels of effort, and effort reductions in large-scale foreign vessels are reported as being steadily replaced by effort in domestic small and medium vessels (Cabral et al., 2018). However, civil society and market-based efforts focused on “one-by-one” fisheries (e.g. handline) have had a substantial impact on how small-scale fisheries contribute to overall sustainability, through supporting the development of robust data collection initiatives that will support the longer-term development of effective management systems. In the Solomon Islands voluntary community-based effort management in the small-scale tuna fishery in Gizo has had a greater impact on the level of fishing than government policy for small-scale tuna fisheries. While this is an extremely small fishery and these changes were driven primarily by economics, it provides a potentially instructive example of how small-scale fisheries with restricted markets can contribute to implementing catch/effort limits.

In general, future stock sustainability relies on effective catch and/or effort limits being in place regardless of the allocation of catch to small-scale or large-scale vessels, or to domestic or foreign fleets.

# Key findings on governance factors influencing wellbeing

## Government policy encouraging domestic tuna fishing and processing can generate positive impacts on community wellbeing.

Longstanding domestic fisheries and onshore processing development policies in both Indonesia and the Solomon Islands have at different times been successful in delivering wellbeing benefits to coastal communities.

The development of a Solomon Islands domestic fleet and processing sector since the early 1970s provides a particularly long-lived and on-the-whole successful example of domestic-sector development, creating the largest private-sector employer in the country. This is in spite of the high- cost operating environment and highly competitive market conditions of Pacific tuna fisheries creating barriers to profitability that commonly hamper domestic-sector development elsewhere in the Pacific Islands.

Between the early 2000s and 2014 the Indonesian government supported increasing the capacity of the fleet operating in Indonesian waters, tied to incentives to invest in onshore processing and to land-catch domestically. Indonesian tuna production substantially increased, especially in major ports in Eastern Indonesia. While this trajectory was not without problems and the situation has changed substantially since 2014, it did provide livelihood opportunities in tuna ports across Eastern Indonesia, with tuna production in Bitung employing almost 14,000 people and responsible for 87% of provincial agricultural production at its peak.

## Maintaining wellbeing benefits from domestic tuna industries requires policy co-ordination.

Implementation of domestic-sector development policies requires co-ordination with wider government fisheries policy and with other arms of government to successfully deliver wellbeing benefits to coastal communities. Where planning and policy co-ordination is not undertaken then the wellbeing benefits for coastal communities associated with domestic-sector development can be diluted, or placed at risk, including by increasing vulnerabilities for lower-paid workers.

In the case of interacting fisheries policies, problems related to IUU fishing created substantial fisheries management challenges in both Indonesia and the Solomon Islands that potentially threatened domestic-sector benefits, and the contrasting experiences of addressing these are instructive by highlighting the importance of policy co-ordination.

In the case of the Solomon Islands the issuing of an EU yellow card threatened access to the EU, the principal market for tuna exports. This required substantial reforms to government fisheries management processes, to address and maintain the viability of the domestic sector, which occurred over a four-year period. In this case meeting these requirements was undertaken in a way that did not unduly impact on domestic-sector operations, and the benefits it delivers to coastal communities.

In the case of Indonesia, substantial amounts of catch being illegally trans-shipped created resource pressure that impacted small-scale fishers and reduced catch flowing to domestic processing operations. Efforts to address IUU that were implemented quite suddenly in late 2014 by the Indonesian government did substantially reduce trans-shipment of catch outside of Indonesia. However, these efforts also had the effect of reducing landed catch in major Eastern Indonesian ports by as much as 60%, which may potentially have been lessened or avoided with transition planning. While Indonesia's IUU regulations may in the future deliver benefits to small-scale fishers, and it is not clear how widespread the negative impacts were of these regulatory changes, however the abruptly implementation of regulations reduced the wellbeing benefits associated with the existing large-scale fishing and processing

operations. Reductions in landed catch led to over 5,000 job losses in Bitung, reduced the volume of catch entering informal market chains supplying food to villages and provincial urban markets, and greatly reduced livelihood security for remaining workers, particularly those in lower-paid, casualised roles. This led to heightened risks of labour abuse.

The need for policy co-ordination applies to policies beyond the remit of fisheries agencies alone. The persistent insecurity and danger of work in fishing jobs significantly dilutes the benefits of entering tuna fisheries, particularly where catch-share models or dangerous offshore working conditions are prevalent. Where issues relate to provision of adequate housing, sanitation and basic services exist in tuna ports and fishing-dependent areas, they also dilute the benefits of entering tuna work. Provision of these services goes beyond the responsibilities of fisheries agencies to deliver alone, however, and policy co-ordination with other arms of government is required to ensure the benefits of tuna fishing flow back to coastal communities, and support their overall wellbeing.

### In case-study areas government fisheries policies have not yet had substantial positive impacts on small-scale tuna fisheries.

In the Solomon Islands small-scale tuna fishers supply markets in the country's urban centres. Despite notable benefits associated with these fisheries in the form of livelihoods to fishers and traders, and a locally important source of fresh fish, these fisheries have so far been the focus of very little government effort or activity. Greater support from government for these fisheries, including addressing the lack of business support, providing safety equipment and developing inshore Fish Aggregating Devices (FADs), may be highly beneficial for these fisheries.

In Indonesia small-scale tuna fisheries exist to supply both lucrative export markets, and substantial urban markets in provincial centres. Government policies for domestic-sector development have sought to shift fishing effort from large to small-scale fisheries since 2014. Current Harvest Strategy development similarly has the capacity to deliver benefits to small-scale fisheries upon implementation, and efforts to support the basic rights of small-scale fishers and vessel crews have been put in place in recent years. However, benefits flowing from these policies to small-scale fishers and traders were not yet apparent in case-study areas at the time of fieldwork in 2018, or in available published literature.

Of note here is that Indonesian FAD management regulations have yet to be implemented effectively, but if they are implemented they may reduce wellbeing benefits flowing from some small-scale fisheries, depending on the nature of the regulations. This particularly applies to fisheries supplying markets in provincial centres, where small-scale vessels rely on co-operative arrangements with a variety of FAD owners for resource access. Focused research on different FAD management options would enable the Indonesian government to account for vulnerable fishers and the needs of coastal communities in implementing FAD management.

### In large-scale fisheries relationships between government fisheries managers and the private sector are critical for ensuring coastal community wellbeing is not unduly impacted by changes in fisheries management or policy.

In the Solomon Islands, public–private partnerships have always underpinned the viability of the large-scale domestic tuna fishing and processing sector. The commercial viability of large-scale tuna fishing and processing is the foundation for community wellbeing benefits, and thus should be considered in the context of government policy changes. During the period under the EU Yellow Card, for example, changes in government fisheries management systems occurred largely in collaboration with industry and therefore did not lead to loss of market access, and the negative impacts on coastal communities that would have caused.

In Indonesia, as noted the rise of IUU fishing and particularly illegal trans-shipment led to major regulatory changes in 2014, which were carried out by the national government. This had substantial impacts on the wellbeing contributions from these fisheries to coastal communities in Bitung and Ambon, and also contributed to a deterioration in trust between the fisheries ministry and domestic-sector companies. Effective management systems, however, require collaboration between government and private-sector actors in data sharing, policy development, policy implementation, and monitoring the outcomes of policy in both environmental and social terms. As a result, the wellbeing benefits that flow from fisheries rely on these relationships being in place, and the impacts on domestic private-sector operations should be considered in policy transitions.

### Export market preferences including certification strongly influence the operation of fisheries, and the benefits that flow from them.

Extensive and specialised tuna fisheries have primarily emerged in response to export market demand, and whether tuna fisheries are connected to export or domestic markets tends to strongly influence the benefits associated with them.

Export markets have enabled significant wealth generation in some parts of the chain and have provided new livelihood opportunities in rural and remote areas. The nature of export market connections varies, and this influences food safety, sustainability and labour practices. In particular, export markets in the EU and the US have significant upstream influences on fisheries. Buyer preferences related to labour standards and sustainability have always exerted informal influence on fisheries, while improvements in food safety and hygiene have been driven by both buyer standards and government regulation. The rise of standards under Fair Trade, MSC and other global and market-specific labels have come to play a significant role in securing market share and access in EU and US markets that underpin the viability of entire fish chains in Indonesia and the Solomon Islands. In many cases these initiatives have as substantial an impact on the benefits flowing to coastal communities as government policy in tuna fisheries.

Domestic-oriented fisheries tend to be lower value, and benefits may also be restricted due to small market sizes. As a result, benefits are focused more around food supply and new livelihood opportunities in rural and remote areas, rather than wealth generation. Domestic markets also tend to have lower standards around health and safety, and little attention from government or market actors regarding implementation of regulations and standards.

### Relationships between fishing, trading and market actors along the value chain influence the flow of benefits, and the ability of stakeholders to effect change.

In export-oriented small-scale fisheries in Maluku, Indonesia, patron–client relations and relations with processing and trading firms each facilitate access to lucrative export markets, and enable the flow of benefits to remote coastal communities that were not available prior to the growth of the export-oriented fishery. In particular, connections to exporters to the US market have enabled enhanced benefits associated with Fair Trade-certified product to be delivered to fishers and communities. However, patron–client relations also lead to persistent debt for some fishers, and the accretion of financial benefits from tuna fishing among relatively few traders. Meanwhile fishers receive an adequate, though not lucrative and at times highly insecure livelihood.

By contrast, in the Solomon Islands, independent handline tuna fishing families in Gizo do not rely on patrons for capital, engage in both fishing and trade, and have been able to voluntarily limit effort within the fishery, thereby capturing the greatest share of the value of the catch, and maintaining high prices. However, they lack a connection to trading firms that can facilitate high-value export market access, and therefore the returns from the sale of fish are comparatively limited, due to the small size of their market.

In domestic-market oriented fisheries, such as those in the Maluku and Gizo case studies, relations between non-FAD owning small-scale vessels and FAD owners influence resource access, and therefore to a large extent the viability of these fisheries to provide employment and food supply to provincial urban centres. Due to the fact that these are low-value domestic fisheries, market-based efforts to influence sustainability, traceability or labour standards are also not likely to be effective, and so little attention is paid to these fisheries by government or certifiers.

In large-scale fisheries in Indonesia, a variety of both integrated and independent vessels, trading firms, canneries and informal traders mediate the flow of fish. This affects consistency of supply, price negotiations for raw materials, and whether fish enter the cannery chain, or the informal chain for consumption in provincial towns and villages. The complexity of these relations makes implementing certification and standards around sustainability, traceability and labour conditions particularly challenging. The diversity of end markets and the presence of many independent vessels can dilute incentives to enter certified chains.

In large-scale fisheries in the Solomon Islands, the high cost of fishing operations and the highly competitive nature of the global tuna market means that integration of fishing and processing operations under a single firm with global trading connections is an important aspect of operational viability. This also makes implementation of certification and standards around sustainability, traceability and labour conditions relatively simple.

**Social relations shaped by socio-economic status, migration and gender influence the distribution of wellbeing benefits at the community level, and represent a type of informal governance influencing how fisheries operate at the community level.**

In general, socio-economic status influences the ability of individuals and communities to participate in different types of economic activities, and gain access to opportunities to advance socially and economically (see e.g. Stiglitz et al., 2009). In tuna fisheries individuals or communities of lower social-economic status are more likely to occupy lower-paid jobs in formal chains, as well as more unsafe and insecure roles such as offshore fishing in small-scale fisheries, or casual trading roles in informal chains. Migration and gender norms are two further influences intersecting with socio-economic status, which in combination affect the distribution of benefits within communities.

The influence of migrant status on socio-economic background and outcomes in fishing communities is a well-established phenomenon globally (e.g. Bailey et al., 2008; Cassels et al., 2005; Jul-Larsen et al., 2003; Kramer et al., 2009; Bailey, 1997). In small-scale tuna fisheries in Maluku and Gizo, migrant Butonese and Gilbertese communities who arrived two to three generations ago experience entrenched social and economic marginalisation in coastal communities, which structures their participation in tuna fisheries. Offshore tuna fishing is a viable but often dangerous livelihood available to migrant communities with few other economic options, and something that locals are often unwilling to do.

The distribution of benefits and costs resulting from this division of labour is variable – in Maluku it economically advantages local traders over migrant fishers, while in Gizo it economically advantages fishers who monopolise both fishing and trade. However, in all cases it exposes marginalised communities to the riskiest aspects of the fishery. A further aspect of general significance is the influence of these dynamics on the feasibility of implementing initiatives that rely on harmonious relations between fishers and coastal communities, such as Fair Trade certification. Migrant fishers often have highly variable relationships with coastal communities, as indicated by their marginal social and economic status, and so in cases where co-operative relations cannot be brokered, fishers with legitimate claims to meeting certification standards may not be capable of accessing these schemes.

In large-scale tuna fisheries in both Bitung and Noro labour migration is a key feature of the operations of the chain. The presence of Filipino labour in the Bitung fishery was central to its historical development, and internal migrants from Java and across Eastern Indonesia continue to have a strong presence among vessel crew today. In Noro, most employees in the fishing and processing sectors are internal migrants, with people seeking work in Noro from all over the archipelago. In addition to remittances distributing economic benefits across Indonesia and the Solomon Islands, the classic macroeconomic "safety valve/labour buffer" function of fisheries revolves around internal migration due to economic shocks or excess labour in the rural economy leading to entry into fisheries and fisheries jobs, to alleviate landlessness (see e.g. Bailey, 1997) or unemployment (see e.g. Jul-Larsen et al., 2003). Further research into these "push and pull" factors leading to labour migration would be of high value for understanding the economic functions of tuna fisheries.

The wider literature (ADB, 2015; Chaaban & Cunningham, 2011) indicates investing in women's training, skills, education and workforce participation has impacts on wider family and community wellbeing. Gender norms around work influence the nature of men's and women's participation in tuna fisheries at the community level, and tuna fisheries in Indonesia and the Solomon Islands reflect wider patterns of participation across Pacific tuna fisheries. Men tend to occupy roles associated with fishing, heavy physical labour, positions associated with authority, and trading roles associated with higher levels of wealth generation. Women tend to participate in roles associated with the trade of lower-value products, often occupy the majority of processing roles, and tend not to be in positions of authority. There are many exceptions to this, however these patterns can initially assist in understanding the distribution of benefits and risks in tuna fisheries at the community level.

Men are exposed to the greatest risks in tuna fisheries by virtue of their involvement in at-sea work, as well as having greater access to positions of influence and wealth generation along the chain. At the local level women are less exposed to physical risks as a result of their work, but often experience income insecurity through involvement in low-value local trading roles in informal markets. At the same time, In Indonesia this means many women build detailed knowledge of markets, prices, food supply and local trade through their work. In some cases, particularly in Indonesia, this has led to some upward mobility to enter more lucrative roles in export chains for both canned and fresh fish. In some prominent cases, by virtue of their involvement in successful fishing businesses, women have been able to leverage significant influence on fisheries management and politics in Indonesia, including the former fisheries minister Susi Pudjiastuti.

In the Solomon Islands, a focus on improving women's participation in the workforce through financial incentives and a range of training initiatives in Noro has also led to greater workforce participation and women occupying non-traditional roles. In some cases, upward mobility has also led to women increasingly occupying management positions in companies, as well as in fisheries management organisations.

These examples of social mobility and investing in women's working conditions warrant further research, in the context of seeking to understand the influence of gender roles and norms on tuna fisheries, and in developing strategies to enhance community wellbeing in tuna fishing communities.

## Key findings on planning for community wellbeing

**There is no "one size fits all" solution for delivering on coastal community wellbeing. Careful, co-ordinated planning by multiple stakeholders is required to deliver benefits to coastal communities, while mitigating risks for vulnerable groups.**

The cases presented in this report vary greatly in their basic operational characteristics, and the social, economic and governance contexts in which they operate. A key point to be made in developing governance interventions that are capable of delivering on sustainability and wellbeing outcomes for coastal communities, is that there are no solutions considered in these cases which could be successfully applied across all the conditions found in tuna fisheries. There are no panaceas. Arrangements that support worker welfare in Noro are not immediately transferable to Bitung. Arrangements that support implementing Fair Trade certification in handline yellowfin fisheries in Maluku are not immediately transferable to handline tuna fisheries in Gizo, or even to other handline tuna fisheries in Eastern Indonesia. Every fishery, and different communities within each fishery, has unique sets of challenges and opportunities. Context-specific planning needs to be undertaken to ensure feasibility and the achievement of socio-economic objectives, while maintaining fishing at biologically safe levels. At the same time this process must fit within the capacities of stakeholders and regulators to design and apply context-specific planning approaches. Given that there is no "one size fits all" solution, and the complexity of the factors that influence the flow and distribution of benefits from tuna fisheries, multi-stakeholder co-operation is required in order to deliver on community wellbeing outcomes. This includes fisheries agencies, as well as other government departments with responsibilities that overlap with fisheries, industry actors, civil society organisations and coastal communities themselves.

**Planning and decision-making processes for tuna fisheries should adopt explicit objectives that include ensuring the wellbeing of communities, and/or the welfare of vulnerable groups reliant on tuna fisheries, is maintained or enhanced, alongside objectives related to biological, ecosystem and high-level economic considerations.**

In light of the substantial contributions tuna fisheries make to regional and coastal economies, food supply, and to groups and communities seeking to alleviate economic hardship, insecurity and social marginality, tuna fisheries' planning processes can and should explicitly seek to manage for wellbeing outcomes in coastal communities. This ideally would occur through adopting management objectives that include ensuring the wellbeing of communities, and/or the welfare of vulnerable groups reliant or tuna fisheries is maintained or enhanced, alongside objectives related to biological, ecosystem and high-level economic considerations.

Existing regional and national fisheries legislation and policy provide a sound basis for this in case study sites.

In the Solomon Islands, the Regional Roadmap for tuna fisheries have clear goals to increase domestic employment in onshore processing, nested within the wider regional strategy and monitoring processes of the Pacific Islands Forum.[3] At a national level the Solomon Islands Constitution, and the Solomon Islands National Fisheries Policy and the National Tuna Management and Development Plan each support policies which have already delivered outcomes in relation to community wellbeing, and the welfare of vulnerable groups, in large-scale tuna fisheries. However these have not yet been implemented in small-scale tuna fisheries.

In Indonesia the Indonesian Constitution, the objectives of the Fisheries Management Act 2004 (and amendments 2009), and the policy priorities of the current ministry provide a

[3] The roadmap and periodic report cards can be downloaded at https://www.ffa.int/node/1569.

sound basis for policies focused on community wellbeing and the welfare of vulnerable groups. While some policies with the aim of supporting wellbeing/welfare outcomes in small-scale fishing communities have been implemented, there have yet to be major attempts to account for wellbeing/welfare outcomes in large-scale fisheries.

To build progress requires taking these wider legislative and policy instruments and incorporating wellbeing/welfare objectives into ongoing planning, monitoring and management cycles for specific tuna fisheries is required.

**Collating and collecting data on the social and economic aspects of tuna fisheries at the provincial and, where appropriate, the community level can assist in monitoring objectives related to coastal community wellbeing.**

Currently there is a substantial amount of data that is collected for tuna fisheries at the sub-national level, that can be collated and disaggregated (where necessary) for tuna fisheries and tuna fishing communities. The following are existing sources of information, or data that is regularly collected by agencies and companies, that could potentially be used to begin informing decision-making, where objectives related to community wellbeing are concerned.

**Solomon Islands**

- Catch, value, employment and earnings data for the domestic sector collected by the Solomon Islands Ministry of Fisheries and Marine Resources, and reported under Forum Fisheries Agency fisheries indicators and report cards.
- National coastal fisheries catch data collected by the Solomon Islands Ministry of Fisheries and Marine Resources.
- Markets data in Gizo, Honiara and Auki collected under the HapiFis program.
- Household Income and Expenditure Survey household socio-economic survey raw data collected by the Solomon Islands National Statistics Office.
- Internal reporting attached to Fair Trade fisheries certification and implementation of independent labour standards collected by domestic private sector companies and certifying bodies.

**Indonesia**

- Fisheries data (Catch, production, vessel numbers, fisher numbers, price and cost data) collected by provincial fisheries ministry offices and port authorities. In some cases this is publicly available on the national ministry website's data portal.[4]
- Fisheries data (Catch, production, vessel numbers, price and cost data) collected via port sampling programs within provincial Fisheries Co-Management Committees (FCMCs).
- SUSENAS national household socio-economic survey raw data collected by the Indonesian Bureau of Statistics.
- Internal reporting attached to Fair Trade fisheries certification collected by private companies and certifying bodies.

While these data sources may not cover all aspects of relevance to community wellbeing, they can contribute to developing a baseline understanding of the social and economic aspects of tuna fishing communities, where data is able to be shared with planning/policy development processes. and can help in developing more targeted data collection processes. This can help in developing more targeted data collection processes, and

[4] At the time of publication the web address for this portal is http://sidatik.kkp.go.id/

establishment of regular monitoring cycles. Section 4.3 of the full report provides a framework to assist in developing data collection and monitoring systems for wellbeing in tuna fishing and coastal communities.

**Consultation with industry, civil society actors and communities, and co-management of fisheries can support the initial identification of broad likely impacts of policy, and work to address these during implementation.**

While social and economic data is critical for making robust, evidence-based decisions, in many cases the broad likely impacts of policy can be forecast in the early stages of planning, to allow for management options to be canvassed that do not unduly impact on the wellbeing of communities or the welfare of vulnerable groups. This can be done via consultation with knowledgeable industry, civil society and community stakeholders where collaborative relationships exist, alongside consulting independent experts and using readily available information.

Given the resource-intensive nature of data collection and analysis in what are often complex fisheries, careful consideration therefore should be given to what new data is required, and the extent to which consultation with knowledgeable stakeholders and experts, alongside existing available information, can identify likely social and economic impacts of policies. It is also worth noting that where effective co-management of fisheries exists, development of a knowledge base about fisheries and effective implementation of policy can be supported by clear agreements on data and information sharing between industry and government, for the purposes of effective management (see e.g. Hatfield, 2018; Jentoft et al., 1998; PIRSA, 2013).

In some cases consultation and co-management processes may be sufficient to craft workable policy that accounts for social and economic impacts adequately, and support its effective implementation, and these should be explored in the context of tuna fisheries. However, such processes will in many cases also highlight knowledge gaps that need to be filled via further research or analysis, and in all fisheries certain aspects of decision-making will always remain the responsibility of government agencies.

## A framework for assessing the potential impacts of governance changes on community wellbeing in tuna fisheries

The assessment framework is a set of topics to consider sequentially. Depending on the level of knowledge or data available in a fishery, the framework may be used to perform a “first pass” qualitative assessment that can help orient future research efforts, or it may be able to provide a more robust assessment of the likely effects where a high level of knowledge and data availability exists. Including evidence to support assessments increases the robustness of the assessment.

Our framework does *not* provide policy-makers with prescriptive solutions – it is not a model that can generate decisions, or a table that once filled out will produce an obvious answer. Instead, it clarifies the key questions to ask in order to find out what the impacts of a change in fisheries management might be on the wellbeing of relevant communities, and what information can be used to answer those questions.

**Table 1. Framework for assessing fisheries governance in terms of community wellbeing**

| | |
|---|---|
| **The potential governance intervention** | The intended change in a fishery, or a set of options for managing a fishery or an aspect of a fishery, is listed. |
| **The fishery affected** | Relevant information on gear/vessel type, target species, geographical focus, destination market or any other characteristics of the fishery that are relevant to determining the scope of the intervention are included. |
| **Potential benefits to coastal communities** | The intended or anticipated benefits that would arise from the initiative, as well as whether these are likely to be realised in the short, medium or long term. Where relevant, this should include consideration of contributions to wellbeing related to economy, food and nutritional security, and healthy environmental systems, as well as consideration of poverty alleviation and food security functions the fishery may perform. |
| **Who in the value chain benefits?** | The actors, communities or stakeholders who would receive the benefit are listed. Close consideration should be paid to socio-economic status, participation of migrant communities or migrant labour, and gender. |
| **Potential lost benefits/risks to coastal communities** | The benefits that may be lost as a result of the intervention (such as livelihoods if catches are restricted), are listed, with likely time frame (short, medium or long-term). Where relevant, this should include consideration of contributions to wellbeing related to economy, food and nutritional security, and healthy environmental systems, as well as consideration of poverty alleviation and food security functions the fishery may perform. |
| **Who in the value chain bears the loss/is exposed to risk?** | The actors, communities or stakeholders who might lose benefits, or be exposed to risks, are listed. Close consideration should be paid to socio-economic status, participation of migrant communities or migrant labour, and gender. |
| **Factors influencing effectiveness and the ability to mitigate risks/vulnerabilities** | Any factors likely to influence the effectiveness of an initiative, or if present may mitigate the risks of an initiative, are listed. For example, the presence of alternative livelihoods, alternative food sources, or the presence of effective monitoring or management systems. This allows for realistic assessment of the feasibility of an initiative in the context of a specific fishery and management system. |

A series of “hypothetical assessment examples” are provided in Section 4.1 of the main body of the report, that illustrate how this framework might be used. A monitoring framework for selecting indicators relevant to tracking wellbeing in particular fisheries is provided in Section 4.2.

## 1.2 Background and key issues

This report assesses how the governance of fisheries affects the wellbeing of coastal communities, providing a framework for evidence-based decision-making. The method for the project involves four case studies of tuna fisheries in Indonesia and the Solomon Islands, utilising qualitative interview data augmented with scientific and technical literature and available statistical reports. These form the basis of a comparative analysis, and development of a set of methods via which this question can be answered by various stakeholders, in the context of the specific fisheries and issues that they are engaged in.

Where analysis of the benefits and risks of changes in management or policy occurs, the standard approach to social and economic management of fisheries may be described as "wealth-based" management. Typically this focuses on resource rent and resource value as the main indicators of fisheries perfomance (Béné, et al., 2010; Cunningham et al., 2009), and in many cases adopts the objective of maximisation of profit in the fishing fleet. Each of these can be tracked by management agencies through the gross value of production and basic information from licensing systems (Béné et al., 2010; Christensen, 2010).

Tuna fisheries have often been seen as a wealth-based fishery largely due to the fact that they are among the world's most valuable fisheries, being harvested by industrial fleets operating under national government licensing systems. Recent high-profile political and management shifts in Pacific tuna fisheries, for example, have therefore focused on adjusting licensing systems and resource access arrangements across vast areas of ocean, so as to increase resource rents flowing to those countries (Aqorau, 2009; Hanich et al., 2010; Havice, 2013). Meanwhile research into tuna fisheries economics has simultaneously sought to demonstrate the benefits of reducing effort for both biological and profit-oriented objectives (Grafton & Kompas, 2006; Kompas et al., 2010; see also Squires et al., 2017). Wealth-based management is prominent in the context of debates over how tuna fisheries should best be managed.

Yet tuna fisheries also support substantial small-scale and coastal fisheries in different parts of the world (Barclay, 2013), and have the potential to be a major food supply for developing countries (Dueri et al., 2016; Bell et al., 2015). Moreover development approaches reducing resource rents for foreign fleets in exchange for local social and economic development may be less prominent in the global profile of tuna fisheries, yet have been ubiquitous in many tuna resource owning countries (Barclay & Cartwright, 2008; Havice & Campling, 2013; Havice & Reed, 2012). There is much to be gained therefore in tuna fisheries in addressing the possibility of an alternative to wealth-based management.

Researchers working on small-scale fisheries have proposed that for these fisheries, "welfare-based" fisheries management may be more appropriate (Béné, et al., 2010). In these approaches a range of economic and social benefits in addition to profit and resource rents are recognised as being important for communities, and that wealth- and welfare-based policies may both be appropriate in different contexts, and at different stages of economic and national development (Nunan, 2014; Ratner & Allison, 2012). In this project, looking at tuna fisheries in Indonesia and the Pacific that support the livelihoods of millions of people on low incomes in developing countries, and that span both large-scale industrial fisheries and small-scale coastal fisheries, we seek to develop some of the conceptual and methodological building blocks of a welfare-oriented approach to tuna fisheries. What would welfare-based tuna fisheries governance look like?

## Wellbeing and fisheries

In looking beyond consideration of resource rent and profit alone in assessing the performance of fisheries, in this project we draw initially on concepts from within the wider field of "wellbeing studies". Adopting wellbeing as an orienting concept requires us to understand and assess social and economic progress in ways that look beyond GDP growth per capita as the only measure of development progress (Stiglitz et al., 2009). In order to do so, a critical aspect of assessing fisheries is to consider the *functions* fisheries play in economies and societies (Bailey et al., 2015; Béné, Hersoug & Allison, 2010). In this way of looking at social progress, participation in an economic or social activity *per se* is not of inherent value, but instead lies in what valuable end that participation enables (Stiglitz et al., 2009; Sen, 1985). A simple example is that catch of fish in itself is not of inherent value, but is valuable because it provides a basic food supply and nourishment for a community, or livelihoods for fishers and traders.

In the context of fisheries, specific examples such as in Béné et al. (2010) highlight that at local, regional and national scales fisheries in the developing world perform important functions related to poverty alleviation, for exsmple, in a range of ways (Béné et al., 2010, see also FAO, 2005). This most obviously occurs by maintaining a basic standard of living for communities vulnerable to poverty either through subsistence or trade, or by providing a pathway out of poverty where economic returns from fish trade may be sufficient. Yet fisheries may also insulate groups from poverty by absorbing excess labour when economic shocks occur in sectors outside fisheries (see e.g. Jul-Larsen, 2003). Consideration of benefits spread along the value chain can therefore also illuminate the ways that fisheries contribute to diverse sectors of the economy, and perform functions for diverse groups in society (Bevilacqua el al., 2019; Christensen, 2010; Purcell et al., 2017).

The focus on poverty alleviation and resilient, inclusive economic development also points to the critical social functions fisheries play, such as ensuring food supply and food security at a macro level, and underpinning food security for vulnerable populations (Dueri et al., 2016; Béné et al., 2010; Bell et al., 2014; Béné et al., 2016). In all of these examples, participation in a fishery is valuable because it enables the achievement of basic social goods and fundamental needs.

This consideration of these macro-level social and economic functions of fisheries, as opposed to only focusing on aggregate wealth creation through resource rent and fishing profit, still has direct import for fisheries decision-making. For example, Christensen notes – in contrast to most wealth-based analyses – that fishing at MSY in wild-catch fisheries can provide a greater cumulative economic benefit to society, while spreading those benefits through the value chain. Conversely fishing at MEY provides a greater gross profit in the fishing fleet, but reduces gross revenue from the fishery as a whole by concentrating benefits in the fishing sector (Christensen, 2010). In this case there is a potential argument in favour of fishing at MSY based on distributing the economic benefits of a fishery amongst a greater array of participants – in certain circumstances this may perform the function of alleviating poverty for particular groups, or creating greater resilience through reducing inequality.

Dueri et al. (2016) explore this issue in the context of Pacific skipjack fisheries. Wealth-based approaches to fisheries management tend towards achieving MEY for fishing operations, yet in order to do so they must restrict supply, raising questions about the ability of such approaches to address food security. "In all the scenarios [modelled in this paper], a MEY strategy is more profitable than MSY but leads to the lowest catches and the highest prices. This raises ethical questions in a world where food security may become a top priority." (Dueri et al., 2016). Yet if increased economic benefits from fishing at MEY were hypothetically to flow to vulnerable communities and enable them to lift themselves out of poverty, then an approach focused on the social function of fisheries may also mean that increasing profits in the fishing sector is the right approach in that situation.

Focusing on the social benefits from fisheries therefore has direct relevance for decisions that are at the core of fisheries management practice, which focus on aggregate catch and value. Yet it requires us to look beyond the aggregate catch or value levels, to consider what the ability to generate catch or value allows communities and societies to do – including to whom catch and value are distributed. In these cases, focusing on the function of a fishery, and for whom the fishery performs that function, allows us to consider the value of fishing at MSY relative to MEY, for social reasons.

The literature also points to more fine-grained outcomes within fishing communities, and outcomes that may not be quantifiable using standard economic methods. These include understanding the capabilities and assets that communities participating in fisheries have available to them to produce the functions necessary to cope with social, economic and environmental change (Bailey et al., 2016). As different communities may have different capacities and assets, fisheries therefore may provide opportunities to particular groups to fulfil basic functions related to livelihoods, income, food supply, or over time to develop skills, knowledge, co-operative networks or shared values and practices that support the fulfilment of important functions.

Who derives such opportunities may be based on socio-economic status where poverty and food security is concerned (Jul-Larsen et al., 2003) but this may also intersect with gender status (Barclay et al., 2018), migration (Bailey et al., 2008), or membership of distinct ethnic or cultural communities (McGoodwin & FAO, 2001; Lokuge & Hilhorst, 2017). Participation in fisheries may also lead to advancement for groups in positions of social or political marginality, through basic economic empowerment or the transformation of important social and political relations over time (see e.g. Bailey et al., 2015).

Taken together, these considerations highlight how fisheries management can draw substantially on human rights-based approaches (Allison et al., 2012). These approaches seek to initiate social and political development, alongside economic development, as a means of addressing challenges in developing-country fisheries, and particularly vulnerability relating to poverty. It refocuses fisheries discussions of “rights-based management”, which is primarily about conferring secure rights of access to fishing entities (property rights) (see e.g. Squires et al., 2017), towards human rights. In this approach, the rights of fishing and coastal communities are related to the quality of the community members’ lives and their overall wellbeing. As such these rights are not restricted to benefiting from fisheries through access to resources, but also through access to decision-making processes that impact upon them, and to pathways to progress in society on the basis of their involvement in fisheries. A rights-based approach asks us to consider the effect on the wellbeing and overall quality of life of individuals and communities from their engagement in fisheries. We must ask then, through their involvement in fisheries, or through a change in fisheries management, are people’s lives in fact better off than they would otherwise be?

A wellbeing approach to fisheries management that incorporates this wider understanding of rights aligns with the model of the human dimension of fisheries proposed in the UN Food and Agriculture Organization (FAO) *Ecosystem-Based Approach to Fisheries* (EAF), and the FAO *Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries* (FAO, 2003; FAO, 2015). How then can these related recommended frameworks be translated into an approach for evaluating the performance of fisheries governance?

Based on the above discussion, three key questions can form the basis of an evaluation approach:

1. **What are the social and economic benefits and the important functions of fisheries in coastal communities?**
   The volume and value of catches are important indicators of fisheries performance, yet they do not capture all of the contributions, or the important social or economic functions, of fisheries at the community level. It is important to identify these contributions and functions beyond aggregate catch and value, so that they are visible in management decisions. For example, income from sale of catch may be important in maintaining a basic standard of living for fishers where few other livelihood options exist, in which case poverty alleviation is one function of the fishery.
2. **How do fisheries management interventions impact particular groups or communities?**
   Fisheries often perform multiple social and economic functions, and management measures may affect the welfare of various groups in the fishery in different ways. It is necessary not only to track aggregate values around catch and value, but also the *distribution* of the benefits and costs of participation in fisheries. It is important to be clear about for whom a fishery performs an important function, and the impacts of various management options on different groups or communities.
3. **Do the management interventions improve the overall quality of life for vulnerable communities?**
   As fisheries decisions often involve complex trade-offs between different social or economic benefits, it may not be possible to avoid all negative social or economic impacts, particularly when addressing biological sustainability issues. It is important, however, that management measures do not have negative impacts on *vulnerable communities*. If increasing the total economic value of a fishery means that fishers previously relying on it for poverty alleviation or food security can no longer participate in the fishery, alternative management approaches should be considered, or robust initiatives should be implemented to generate alternative livelihoods, additional economic support or ensure access to reliable food supply. Addressing the welfare of vulnerable communities supports the legitimacy of difficult management decisions – communities whose basic needs and quality of life are maintained in the course of reducing catch levels are more likely to accept such reductions.

## Governing the human dimensions of fisheries

These principles also lead to the clear reality that fisheries management measures are not the only factor influencing fishing operations. A range of social, market and other factors are also involved in influencing how a fishery operates, what functions a fishery performs for society and communities, and how the benefits and costs of participation in fisheries are distributed (Campling et al., 2012; Jentoft & Cheunpagdee, 2015). Transforming fisheries into forms that are ecologically sustainable and also meet the social and economic needs of the communities relying on them for income and food, and developing fisheries policies that are widely recognised as legitimate, requires looking beyond fisheries management, therefore, to a broader understanding of fisheries governance (Kooiman et al., 2005).

These issues beyond managing for target levels of fish stocks, and managing fishing catch or effort, are often called the human dimension of fisheries (Fulton et al., 2011). It has been widely recognised for many years that fisheries science should generate better understanding of the human dimensions as well as the biological. This is laid out, for example, in the internationally ratified UN EAF (FAO, 2003) and *SSF Guidelines* (FAO, 2015), and in regional and national-level fisheries policies deriving from the international frameworks.

It has proven difficult, however, to integrate social and economic knowledge with biological knowledge and to use this as a basis for policy-making. This is in part because data on the human dimensions of fisheries are often not available for fisheries managers, and in part because biologically trained fisheries scientists and managers have been unable to work out how to effectively integrate social approaches. While ground has been made in fisheries economics in relation to implementing wealth-based approaches, and approaches from outside fisheries economics focused on welfare economics appear to have much to offer the field of fisheries (Just, Hueth & Schmitz, 2004), in most cases fisheries management remains restricted to a biological knowledge framework and a fish-stock focused policy framework. This is especially the case in developing-country fisheries, where a welfare-based approach is arguably most needed.

One of the main obstacles to developing knowledge about the social aspects of fisheries governance that can then be feasibly used in fisheries management is how to assess the performance of a fishery in social terms. Fisheries performance is usually assessed in terms of fish stock or ecological health, and sometimes in terms of economic outcomes, such as maximum economic yield. In Indonesia and the Pacific economic outcomes have usually been framed in terms of industrial fisheries development, through two means. Firstly, by providing access to foreign vessels for access fees: increasing government revenue through resource rents. And secondly, through increasing the size of domestic fishing fleets and increasing onshore processing of fish: replacing foreign with local investment in fishing. These measures, however, are about changes visible at the national scale, and are assumed to improve local welfare, but the extent to which fisheries actually address the needs of communities relying on them is rarely assessed. Moreover, increased revenue at the national level, or increased jobs and GDP in local sectors, are assumed to be distributed evenly and fairly, and to contribute to the overall development of the country and its economy in an unproblematic way.

While there is an emerging consensus that the social success of a fishery is crucial to its long-term environmental success (for example Adhuri et al., 2016; Christie et al., 2009; Pollnac et al., 2001), how to best assess this success remains an area of considerable conceptual and empirical debate. The rhetoric about tuna fisheries in government circles is that their development is for improving the lives of local people, and the assumption is that if domestically based fishing and processing and government revenue increases, then coastal communities will benefit. Do they? And if so, who gets what kinds of benefits, and how does this shift with changes in the fishery?

In order to address these questions we have sought to analyse our case studies in the context of two different methodological approaches – wellbeing analysis and governance analysis.

## 1.3 Methods

**The wellbeing approach**

As well as providing the conceptual basis for an alternative to wealth based approaches to fisheries management, the wellbeing approach also provides a methodology by which the social and economic aspects of fisheries can be assessed within coastal communities (Coulthard et al., 2011; Voyer et al., 2017). As a methodology, the wellbeing approach builds on decades of research in the fields of quality of life studies and development studies, which found that human wellbeing cannot be assessed through material economic factors alone. In addition to material factors, power relations and social capital factors are important, as "relational" dimensions of wellbeing. Furthermore, how people perceive and feel about their situation in life is crucial, and this is the "subjective" dimension of wellbeing. The approach is sometimes therefore called "3D wellbeing", with its combined emphasis on the material, relational and subjective aspects of human wellbeing. So, for example, someone who has their material needs met but who is socially isolated due to experiencing sustained conflict with others, politically disenfranchised, or whose emotional or mental health needs are not met, may not have wellbeing. Each of these factors relate to the relationships people maintain, as well as their subjective perception of their situation.

The value of the 3D wellbeing approach for elaborating an approach to tuna fisheries management is that it allows us to look beyond aggregate catch or gross value of production, to address other factors that may be critical in the life of a community – economic opportunities for the poorest members of society, food security and social cohesion. While many of these aspects may be beyond the traditional purview of fisheries management, communities nonetheless seek opportunities for themselves to better their lives, including by participating in fisheries. A welfare-based approach to management would value whether the outcomes for communities participating in fisheries support the overall betterment of people's lives, as well as whether vulnerable groups are being impacted in certain ways. A wellbeing analysis provides concrete terms for understanding how and when that might be happening. This kind of multi-dimensional approach has been recommended as more appropriate than prevailing GDP-per-capita growth approaches to understanding social progress internationally and for national governments (OECD, 2013; Stiglitz et al., 2009).

The wellbeing approach does not prescribe a strict methodology, but is more of an umbrella. Various targeted methods for assessing social or economic aspects of wellbeing may be brought under it. Wellbeing studies usually employ mixed methods, with the overall approach explored and validated with target communities via interviews and focus groups, and quantitative measures woven together with qualitative analysis. As an umbrella, the wellbeing approach is most useful in bringing different methods together to consider the three dimensions of wellbeing, and give holistic assessments of contributions to community and individual wellbeing in ways that are immediately recognisable to stakeholder groups. The specific methods used to explore wellbeing in any given case will depend on the nature of the fishery, and the key issues that influence wellbeing in a given fishery.

Some of the indicators and methods that may be utilised within a wellbeing assessment include:

- fishery performance indicators (Anderson et al., 2015; McCluney et al., 2019)
- analyses of livelihoods using the assets and capabilities approach (e.g. Bailey et al., 2015), assessments of fisheries dependency (Stanford et al., 2014), or socio-economic measures used in rapid fisheries appraisals such as RapFish (see e.g. Murillas-Maza et al., 2013)
- economic methods such as regional economics (Voyer et al., 2017), value chain economics (Purcell et al., 2017), or estimates of the value of ecosystem services (Barnes-Mauthe et al., 2013)
- mixed methods approaches to assessing wellbeing that incorporate social and psychological indicators (Britton & Coulthard, 2013; Coulthard & Britton, 2015).

In this project the team members' expertise and funding did not extend to including quantitative elements to build on the overall qualitative approach. In presenting results to stakeholders, however, it is clear where quantitative work, especially on measuring the economic benefits to various groups, could make the framework developed in this project even more useful as a tool for assisting policy- and decision-makers to consider social and economic impacts in their deliberations.

Our use of wellbeing for this study therefore builds on the standard use of wellbeing in development studies, which asks: what is the wellbeing status of this group of people? In our project we ask: how do these fisheries contribute to the wellbeing of this group of people? This use of wellbeing to evaluate the contributions of fisheries to community wellbeing has been developed by project lead Professor Kate Barclay in previous studies on coastal fisheries and aquaculture in Australia (Voyer et al., 2017).

**Governance analysis**

We use the "interactive governance" approach for analysing the governance of fisheries. In this approach governance is understood not only as what governments do in relation to a sector of society or a particular issue relevant to government policy, but all of the factors influencing the operation of that sector of society, or outcomes in a particular policy area, including a variety of non-government influences (Jentoft & Chuenpagdee, 2015; Kooiman et al., 2005). At a conceptual level, adopting the interactive governance definition of governance means this study includes the following broad elements:

- government and non-government actors
- the simultaneous importance of influences from multiple scales – local, national, regional and global.
- the importance of formal influences (laws, regulations, institutions) and informal influences (everyday practices, social relations, values, norms, perceptions).

One of the contributions of this project will be to analyse how different governance influences unfold 'on the ground' – which aspects work and which aspects do not – in order to understand improvements that could be feasibly implemented.
As a method, interactive governance studies of fisheries can be so large as to be unwieldy (Song et al., 2018). For the sake of manageability in this project, which also employs the wellbeing approach, we have therefore used interactive governance in two practical ways. Firstly, by identifying and characterising the Fish Chain (sometimes known in governance studies as the "system to be governed"), and the Governing System. This approach allows governance influences at a range of scales to be conceived as impacting on fisheries at

specific points along value chains, rather than focusing only on the harvest node of the chain (Barclay et al., 2016; Steenbergen et al., 2019). Secondly, by taking a nested approach in which factors affecting governance are considered at multiple levels. For example, at the global and international level markets and regional fisheries management organisations (RFMOs) are key influences, at the national level tuna policies and subsidies for poverty alleviation are important, and so on down through the provincial and local levels.

### Wellbeing and governance for a fisheries assessment framework

As far as the authors are aware, this study is the first to apply the wellbeing approach to tuna fisheries and the first use of this approach for fisheries in Indonesia and Solomon Islands. The project approach is also innovative in that we use community wellbeing as the key criteria for assessing fisheries governance. The way we have mixed a wellbeing approach with an interactive governance approach is outlined below.

Prior to fieldwork, through the project inception workshops, we sketched out each case-study fishery as a Fish Chain, starting from the ecological system, and moving through harvest, processing, distribution, marketing and consumption nodes. Through a collaborative process with stakeholders participating in the inception workshops, we plotted out initial wellbeing benefits, and considered to whom they are accruing. We also plotted out the governance influences (state and non-state; local, national or global in scale) acting on each node of the chain, which reveals the governing system and provides an initial sense of which aspects of the governance system might affect wellbeing impacts generated by the fishery.

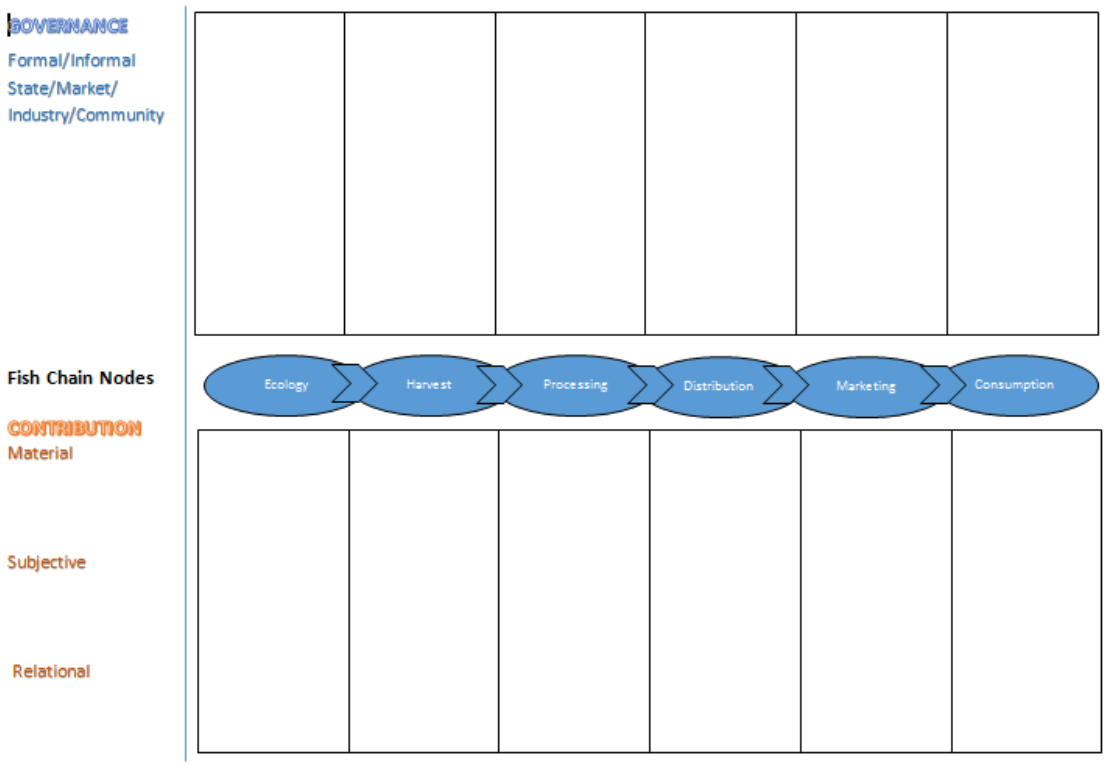


**Figure 1. Elicitation tool used in stakeholder workshops to sketch out governance influences and wellbeing contributions along the nodes of a fish chain.**

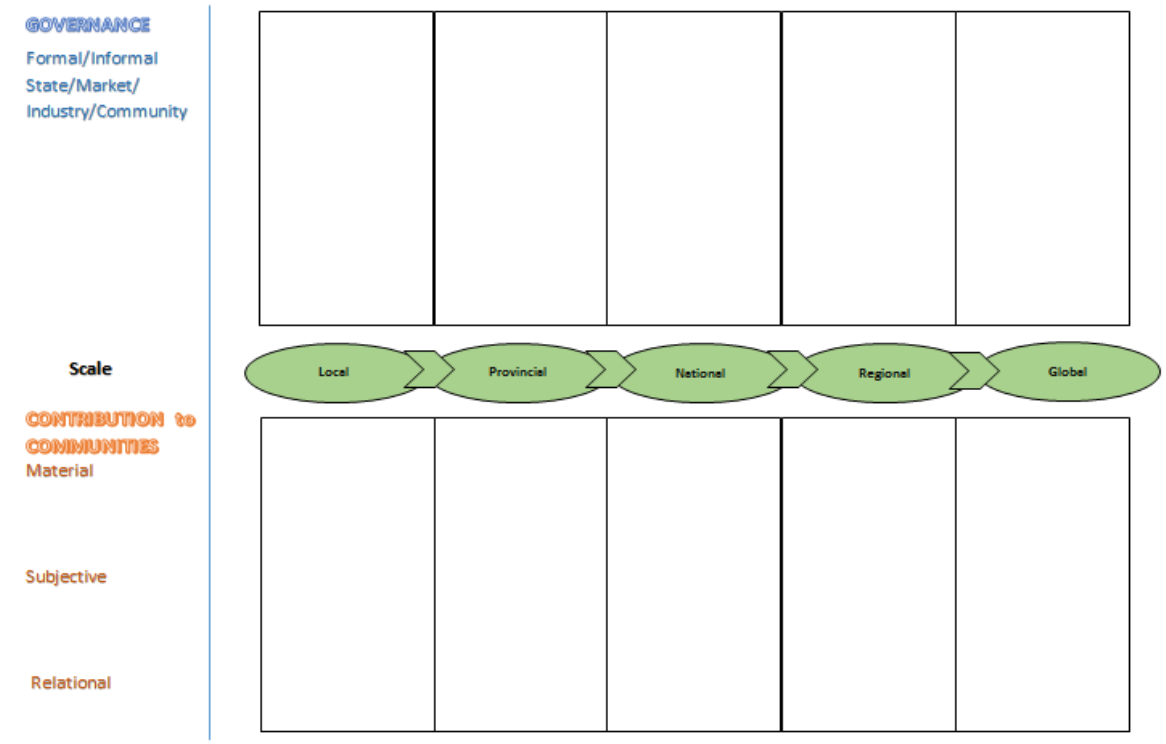


**Figure 2. Elicitation tool used in stakeholder workshops to sketch out governance influences and wellbeing contributions at different scales.**

This initial drafting of the elements of governance and wellbeing influencing each fish chain was then used as a basis for thematically identifying broad contributions to wellbeing, and aspects of the governing system, which could be investigated and elaborated upon in fieldwork. Based on these workshops, seven key domains of wellbeing that tuna fisheries might contribute to were identified, that we then used as the basis for our interview questions in fieldwork:

1. a diverse and strong local economy
2. food
3. health and safety
4. education and knowledge generation
5. cultural heritage and identity
6. inclusive and connected communities
7. a healthy environment

The aim of fieldwork was to investigate more systematically the wellbeing benefits generated by the fishery, and the likely influences on those benefits, both in terms of types of benefits and their distribution.

To augment interviews and workshops, we utilised existing studies and data in those countries, to assess the governance of tuna fisheries against these indicators. The framework takes into consideration the kinds of reporting that is feasible for fisheries agencies to conduct themselves, leading to a methodology for the ongoing monitoring of the social aspects of tuna fisheries.

## Case study selection

Case studies were initially selected based on the wider governance structure operating in Indonesian and Pacific fisheries. Fisheries operating in high seas and EEZ waters are subject to the rules and policies of regional fisheries management organisations for tuna (tRFMOs), the Western and Central Pacific Fisheries Commission (WCPFC) for Pacific fisheries, and the Indian Ocean Tuna Commission (IOTC) for Indian Ocean fisheries. Archipelagic waters falling under national sovereignty default to regional commission rules but can, at the discretion of a national government, be subject to national-level rules and policies developed specific to those waters, so long as they align with the wider rules and policies of the appropriate tRFMO. Indonesian tuna fisheries span the WCPFC and IOTC jurisdictions, and the Solomon Islands are wholly within WCPFC jurisdiction. Each country also has substantial archipelagic waters (AW) zones. Our intended case studies were originally designed to be able to identify fisheries that operated in both AW and EEZ/high-seas waters, and to compare significant differences between these areas based on the differing rules and policies in operation in each.

In addition to site selection based on wider jurisdictional and regulatory variations, we also focused on specific fish chains in these ports in order to provide case studies across gear types. In both Indonesia and the Solomon Islands we look at a case study of a large-scale cannery chain utilising a combination of purse seine and pole-and-line vessels to supply canneries. These case studies are Bitung (Indonesia) and Noro (Solomon Islands). In each country we also look at a small-scale handline tuna fishery utilising boats below 10 GT, and most commonly 1–2 GT to supply fresh fish to both export and local markets. These case studies are Maluku (Indonesia) and Gizo (Solomon Islands). The governance analysis starts from these communities, and continues through provincial, national, regional and global factors affecting the case-study fisheries, and the social and economic benefits flowing from them. The wellbeing focuses on those benefits, structured in terms of the suite of wellbeing domains identified in inception workshops.

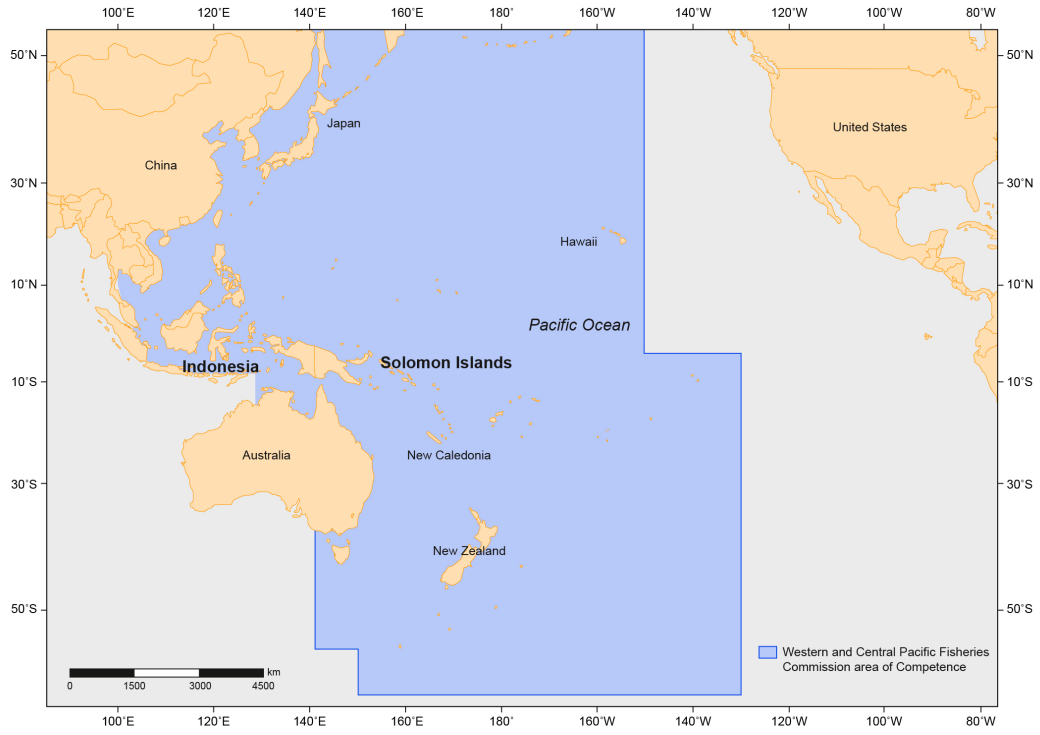


**Figure 3. Map of the Pacific Ocean showing boundaries of the Western and Central Pacific Fisheries Commission Area of Competence.**

### Project consultation, research design and data collection

This report documents our qualitative analysis of tuna fisheries governance, based on semi-structured group and individual interviews and document review, and incorporating publicly available statistical information where possible. This study identifies types of benefits, and key relationships between governance interventions and wellbeing benefits, however, in each case there are limitations in quantifying either the magnitude of these benefits, or the impacts of certain governance factors on wellbeing. The process of consulting with stakeholders, inviting input into the designing of the research and fieldwork proceeded as follows.

### Inception and culmination workshops

Project inception workshops were held in national capitals. These were used to socialise the project, to act as key informant focus groups for eliciting the knowledge, perceptions and opinions of national-level stakeholders, and to help select fieldwork sites. Inception workshops were used to initially sketch out the relevant fishery value chains, and identify the main likely wellbeing domains and benefits, and main likely governance influences on those benefits. Seven potential domains of wellbeing focused on economy, food, health and safety, education and knowledge generation, integrated communities/social cohesion, environment, and culture and identity were identified for investigation in the field. Based on these initial insights, field sites were selected that could be expected to provide a broadly representative suite of wellbeing benefits across jurisdictions and gear types of interest, and with potentially relevant variations in governance. The Solomon Islands inception workshop was held on 7th and 9th November 2017 in Honiara, with 14 attendees from stakeholders in national-level ministries, CSOs, regional fisheries management bodies and industry. The Indonesian inception workshop was held in Jakarta on 4th and 5th December 2017, with 19 attendees from stakeholders in national-level ministries, CSOs, research institutes, foreign aid agencies and industry representative groups.

Culmination workshops were held in national capitals and field sites. These were used to present preliminary findings, validate results with stakeholders, and elicit further details of importance to the final analysis and interpretation of data. In addition, stakeholders provided input into dissemination of the research and identifying priority issues for communication pieces.

Culmination workshops in the Solomon Islands were held in Honiara on 18th March 2019 with eight attendees from government, CSOs, regional fisheries management bodies and industry. Field site workshops were held in Noro on 19th March 2019 with five attendees from local and provincial government and local farmers' co-operatives, in Titiana and Babanga on 21st March 2019 with nine attendees in Titiana and six in Babanga, all local fishermen. Culmination workshops in Indonesia were held in Ambon on 26th March 2019 with 14 attendees from provincial fisheries ministry offices, CSOs, research institutes, foreign aid agencies and industry representative groups; in Bitung on 27th March 2019 with seven attendees from provincial and local fisheries ministry offices and industry and in Jakarta on 28th March 2019 with 14 representatives from national fisheries ministry offices, CSOs, foreign aid organisations, research institutes and industry representative organisations. In total, 94 attendees were recorded across all inception and culmination workshops, once attendance at more than one workshop by an individual was accounted for.

## Fieldwork

Fieldwork was undertaken in Indonesia between 1st and 21st March 2018 in Ambon and Bitung, and in the Solomon Islands between 17th and 29th June 2018 in Noro and Gizo.

Interview questions were semi-structured to elicit information from respondents about what they saw as the main wellbeing benefits, using domains of wellbeing identified in the inception workshops, and the main governance influences in the fishery. A grounded approach was taken, which allowed respondents to identify with minimal prompting what they viewed as the important elements of wellbeing and governance with reference to broad themes. As interviews progressed and patterns emerged in answers, interviewers were able to crosscheck details, and elicit responses to common opinions and views among other respondents. The overall aim of this qualitative interviewing technique was to document the "spread" of responses to particular issues and to elicit depth of individual experiences, rather than quantify how many respondents viewed particular issues as more or less important. As a result, the concept of saturation played a key role in determining the adequacy of data collected. Saturation is considered reached when new information is no longer being provided by additional interviews.

Interviews took place in a range of locations, including villages, local markets, fishing ports, company premises and regional government offices. In a small number of cases, phone interviews were undertaken with key informants not based in field sites. In five cases, interviews were run as focus group discussions with up to six participants. In total, 134 individuals participated in one-on-one interviews or focus group discussions across four sites in two countries.

**Table 2. Research participant numbers by country and sector**

| Country | Fishing | Processing/trading | Government | Civil society | Total |
|---|---|---|---|---|---|
| Indonesia | 29 | 34 | 15 | 8 | 86 |
| Solomon Islands | 17 | 22 | 6 | 4 | 48 |

Interviews were undertaken in Bahasa Indonesia and Solomon Islands Pidgin, with a minority in each country in English. Dedi S. Adhuri led most interviews in Bahasa Indonesia, with assistance from Terry Indrabudi, who also undertook some interviews in Bahasa Indonesia. Reuben Sulu led all interviews in Solomon Islands Pidgin. In each case Nick McClean supported, and undertook interviews where English was the primary language being used.

## Analysis

Field interviews were recorded, translated into English and transcribed. For background and phone-based interviews detailed discussion notes were taken by researchers. All transcripts were then coded using Nvivo. Nick McClean was the main coder and analyst. Coding protocols were developed by Nick McClean, Kate Barclay and Michael Fabinyi, and coding was checked by Andrew Song, Kate Barclay and Michael Fabinyo for inter-coder reliability and analysis results during the writing process.

Coding allowed for systematic thematic analysis to be undertaken across sites, and for researchers to crosscheck details, experiences and findings as analysis and writing proceeded. During the analysis and writing stage, relevant literature from both scientific and technical reports was reviewed to contextualise interview material. Culmination workshops also provided an opportunity for member-checking of facts (e.g. the structure of fish chains in specific fisheries), validation of the analysis, and elicitation of further knowledge where gaps in understanding existed.

During fieldwork and analysis some of the domains identified in workshops, such as cultural heritage and identity, did not emerge as strong contributions to community wellbeing in tuna fisheries. Moreover, the points that were raised for these less significant domains could be discussed as part of other, more significant domains of wellbeing. After data collection and analysis, we distilled the seven domains identified in the inception workshops down to three main domains of wellbeing to which tuna fisheries contribute:

1. **Economy and livelihoods.** This included consideration of two main elements: contributions to the local and regional economy through revenue generation; how tuna fisheries support livelihoods for specific groups, including the ways in which working conditions in different roles impact on wellbeing contributions of those livelihoods.
2. **Food and nutritional security.**
3. **An environmentally sustainable fishery.**

In order to include structured analysis of working conditions, we developed a basic set of indicators on income security and workplace safety that allowed us to incorporate this information into our livelihoods discussion, and undertake a common analysis across case studies. Based on interviews, published sources, and consideration of whether through their employment or other means, we described to what extent and how workers were provided:

- Formal contracts and agreements.
- Wage payments, catch share payments, or a mix.
- Ready access to health care or insurance in the case of an accident or injury.
- Level of known/obvious safety risks.
- Processes for identification of safety risks in place and actions taken to address these.

These indicators were then placed in the context of what we know about the fishery to consider the extent to which people are in secure/insecure, safe/unsafe working situations as a result of participating in tuna fisheries.

### Ethics and research approvals

This research was undertaken according to Human Ethics Research procedures of the University of Technology Sydney, approval no. ETH17-1462. Fieldwork in Indonesia was undertaken under foreign research approval processes from the Indonesian Ministry of Research, Technology and Higher Education with partner research organisation Indonesian Institute of Sciences. Fieldwork in Solomon Islands was undertaken under foreign research approval processes from the Ministry of Education and Human Resources with the sponsorship of the National Ministry for Fisheries and Marine Resources.

### Structure of this report

Each case study presents material on the following aspects of governance and wellbeing:

- **National overview.**
  There is a country overview prefacing each set of case studies outlining tuna fisheries and key governance structures. This includes an overview table documenting the governance system for each fishery. The governance system includes national-level government institutions, legislation/regulations/policies, and specific government programs at regional, national, provincial and local scales that influence how tuna fisheries operate. It also includes non-government influences on fisheries governance covering factors attributable to ecological and environmental dynamics, resource production (fishing and processing), markets (trading, retail and consumption), community-level governance, and social relations that influence how tuna fisheries operate.
- **Case study overview.**
  A text description and visual representation of the fishery including key elements related to fishing activity, local value chains, export value chains and consumption, and discussion of the key contributions of the fishery to community wellbeing, in relation to economy, food and nutrition, and environmental sustainability.
- **Integrated discussion of governance and wellbeing.**
  Here we present case-specific analysis of the ways in which governance factors have influenced the wellbeing of coastal communities. This includes discussion of: 1) government and non-government aspects of the governance system that shape the types and flows of wellbeing contributions; and 2) factors which influence the distribution of wellbeing contributions within coastal communities.
- **Summary and recommendations.**
  A distilled summary of the standout wellbeing contributions from tuna fisheries in the case study, and the key governance influences on those contributions. We recommend ways different stakeholders can maintain or improve these wellbeing contributions through governance initiatives.

These four case studies have then been used as the basis for developing an initial set of findings related to the question of “how does the governance of a fishery impact the wellbeing of coastal communities?”

In addition to presentation of case studies, two practical tools have been developed to assist tuna fisheries stakeholders to use the insights of this study for practical fisheries governance purposes:

- A framework that can assist in assessing the likely impacts on community wellbeing of particular governance initiatives. This assessment framework aims to help in addressing practical management dilemmas faced by a range of stakeholders, in a simple, step-wise format.
- A framework to assist in monitoring the impacts on community wellbeing of particular governance initiatives. This framework aims to display common indicators, grouped according to domains of wellbeing, that can be used to construct a site/fishery/issue-specific monitoring protocol.

### Limitations of this study

Given the novelty of this study methodologically, its focus on a restricted number of cases in some of the largest and most complex fisheries globally, and the use of qualitative methods without quantitative analysis, these case studies and our overall findings cannot be taken as definitive assessments of tuna fisheries contributions to community wellbeing, or the factors influencing them. Future research would ideally elaborate on the analyses provided here to provide more in-depth assessments of the importance of a given domain for community wellbeing or factors impacting its contributions, measure the wellbeing contributions quantitatively, and possibly model scenarios under different management interventions.

A key limitation has also been the lack of publicly available data of relevance to the scale and focus of this study. While fisheries data and some social and economic data is available at a national and provincial level in both Indonesia and Solomon Islands, giving insights into income and expenditure, housing conditions, health and education status, this is not reported in ways that can afford an analysis at the community level, or for tuna fishing communities specifically. In future, research collecting raw data at the national and provincial level and disaggregating for tuna fisheries and tuna fishing communities has potential to add substantially to the approach applied here.

# 2 Indonesia

Indonesia is one of the largest tuna producers in the world, accounting for between 17–22% of global catch for the year 2015 (CEA, 2018). It has a large and diverse fleet across small and medium- scale vessels using handline, pole and line, purse seine and longline gear. A relatively small fleet of large purse seine vessels over 100 GT operates in its EEZ. Fisheries development from the 1980s until 2014 saw progressive expansions in catch and processing capacity, as foreign and domestic fleets alike took advantage of the abundant resources in Indonesia, a growing global market demand for tuna, and a favourable policy environment for fisheries development (Sunoko and Huang, 2014; CEA, 2018). In particular, the period 2006–2014 saw an increase in production from ~600,000 tonnes in 2006 to a high of ~1 million tonnes in 2014, and the combined value of the main tuna categories has nearly quadrupled from five billion IDR in 2006 to more than 20 billion IDR in 2016 (CEA, 2018).

While tuna is caught throughout the archipelago, a substantial proportion of commercial fishing activity is focused in Eastern Indonesia, with a number of major ports acting as processing hubs in Eastern Indonesia. Major export facilities exist in Bitung in North Sulawesi, with some direct exporting also from ports in Kendari and Ambon. Major urban centres on Java and Bali, particularly Jakarta, Surabaya and Denpasar, are also major exporting hubs for tuna products aggregating product from around the country.

Tuna accounted for between 60–70% of pelagic fisheries catch between 2006–2016 (CEA, 2018), with the three major species being skipjack tuna, known as *cakalang*, yellowfin tuna, known as *tuna*, and a series of neritic tunas (mostly eastern little tuna), known as *tongkol*. Together these are referred to in Indonesia as *TCT*. Combined, TCT make up roughly 22% of total marine fisheries capture in Indonesia, and 23% of total value for the years 2006–2016.

Indonesia is classified as a middle income country and, after a commodities boom in the last 20 years, has registered high levels of economic growth and the development of a substantial urban middle class. However, this growth has created substantial wealth inequalities – a persistent 12% of the population remain below the poverty line with no reductions in this rate since 2014, while a further 27% remain in vulnerable economic conditions (defined as living between the poverty line and less than 50% above the poverty line (World Bank, 2015). This “bottom 40%” represents 93 million people across Indonesia who risk sliding into poverty, or further into poverty, should economic conditions change negatively. Connecting the “bottom 40%” to secure livelihoods presents a major challenge in economic policy for the Indonesian government and a focus of multi-lateral development efforts (World Bank, 2015).

The significance of tuna fisheries in this wider economic and development context is twofold. Firstly, Eastern Indonesia is widely recognised as being among the most economically disadvantaged areas in the country, with the highest poverty rates in the country (up to 30% in West Papua) and major public health challenges stemming from challenges related to economic isolation, nutritional availability and lack of services (World Bank, 2015). Secondly, coastal and fishing communities are widely recognised as being disproportionately represented in the “bottom 40%”. Poverty rates are among the highest in the country in fishing communities, with some estimates as high as 90%, and poverty reduction efforts in these areas are constrained by the challenges imposed by remoteness, low population density, dispersed locations and weak governance (World Bank, 2015).

In this context, the abundance of tuna resources in Indonesia, and the presence of infrastructure for production, processing and distribution of high-value products to export markets and lower-value but potentially nutritionally valuable products domestically has the potential to play a substantial role in poverty reduction and food security needs In Eastern Indonesia. Indeed it is already widely recognised that the tuna industry plays an important role in the economic wellbeing of Eastern Indonesia, and the industry is a focus of major policy efforts to support the development of remote and small-scale fishing communities (see e.g. Cabral et al., 2018).

### Governance system for Indonesian tuna fisheries

The following table displays elements of the governance system for tuna fisheries of relevance to Indonesian tuna fisheries in EEZ and AW in the WCPFC area of competence, and with specific reference to case-study fisheries in Ambon and Bitung. That is, this table encompasses both government and non-government influences on how these tuna fisheries operate.

**Table 3. Indonesian tuna fisheries governing system – government**

| | Government | | | |
|---|---|---|---|---|
| | **Regional** | **National** | **Provincial** | **Local, District and Regency** |
| **All sites** | UNCLOS and UN fish stocks agreement.<br>FAO compliance agreement.<br>FAO code of conduct for responsible fisheries.<br>WCPFC Convention, and associated rules and procedures for EEZ and archipelagic waters (until National AW Harvest Strategy Implemented).<br>SPC – Annual catch estimates incorporated into regional assessments. | Indonesian Constitution Article 33(3) on marine tenure, role of government and the goals of marine resource management.<br>National Tuna Management Plan.<br>National Tuna Plan of Action.<br>Fisheries Management Act 2004 and amendments 2009.<br>Banning of trans-shipment at sea MMAF.<br>Regulation (Permen) No. 57/2014.<br>MMAF Regulation (Permen) No. 56/2014, and No. 10/2015 on re-registration of vessels and restrictions on ex-foreign vessels.<br>Vessel registration and licensing – above 30 GT national government. Limit of two WPPs per licence over 30 GT. New licenses in AW for vessels <100 GT only.<br>Limit on foreign investment in fisheries – Presidential Regulation (Perpres) No. 44/2016.<br>National FAD management plan.<br>Ministerial Regulation No. 26/PERMEN concerning fish aggregating devices (FADs).<br>Ministerial Regulation No. 4/2015 on Banda Sea closures.<br>Development of Harvest Strategy for AW tuna fisheries.<br>Fish Quarantine and food safety regulations for EU and US Market access.<br>National Law No. 7/2016 on the Protection and Empowerment of Fishermen, Fish Raisers and Salt Farmers.<br>Social welfare programs for "lowest 40%" including gas subsidy redistribution, rice subsidy schemes,<br>Kartu Nelayan/"One Window" program through National Poverty taskforce.<br>Loan facility programs for SSF from Ministry and Pertamina under FMA 2004 Articles 60–64.<br>Ad hoc relief support in event of climatic change, flood.<br>Fuel and non-fuel subsidies to the fishing industry.<br>BJPS universal insurance scheme.<br>Labor Law 2003<br>Ministerial Regulation 42/2016 on Seaworking Agreement for Fishing Crew. | FAD management plan (for up to 12 miles by local government).<br>Vessel registration and licensing (30 GT and below for provincial government).<br>Mitigation policy for bycatch and ESR.<br>Statistical systems and data collection (under Article 46 of Law 45/2009). | Provision of FADs by local government.<br>Development of fisher co-operatives. |
| **Bitung PS/PL** | No data recorded. | Site for Fisheries Acceleration program.<br><br>Special Economic Zone for fisheries development. | No data recorded. | No data recorded. |
| **Maluku HL** | No data recorded. | No data recorded. | No data recorded. | No data recorded. |

Sources: Inception workshops, primary interviews, CEA (2018), Muawanah et al. (2018), PSHK (2019).

**Table 4. Indonesian tuna fisheries governing system – non-government**

| | Non-government | | | | |
|---|---|---|---|---|---|
| | **Environmental and ecological** | **Resource production dynamics (fishing and processing)** | **Market dynamics (retail, trading and consumption)** | **Community level governance** | **Social relations** |
| **All sites** | Seasonal availability of fish and fluctuations in stocks.<br>Seasonal accessibility of fish as monsoon winds change during musim timur (east season) and musim Barat (west season).<br>Potential for tuna range shifts eastwards under climate change conditions.<br>Live bait stock uncertainty.<br>Tuna aggregation with other species. | Use of FADs. | Export market demand and market preferences.<br>Fish price fluctuations at global level.<br>MSC certification (in pre-certification).<br>WTO rules of origin.<br>EU Food Safety import standards.<br>EU yellow card system. Fishery Improvement Projects. | Community ownership, management of FADs by fisher associations. | Gender – At the community level and in ports, men take on fishing, heavy labour and roles with authority, with some exceptions. Women take on processing and local trading roles, including some roles of authority in local trading chains. At the national level, some positions of key influence are occupied by women in industry associations and national ministry. |
| **Bitung PS/PL** | No data recorded restricted only to Bitung | Use of PS and PL.<br>Variability of integration between fishing and processing.<br>Overcapacity in processing sector. | Fair Trade certification (in pre-certification). | Customary ownership of baitfish/Bagan grounds. | Social-economic status and migration – Labour migration a key feature and may be associated with socio-economic "push" factors. People from across Eastern Indonesia and Java participate in the fishery.<br>Filipino fishers and companies largely absent after IUU and foreign investment regulations. |
| **Maluku HL** | Potential breeding ground for tuna. | Use of HL targeting freeshools for export chain.<br>Patron–client relations in export chain.<br>Aggregation of product by collectors and companies to access export markets.<br>Informal FAD access agreements for SSF supplying local markets.<br>Mix of independent and integrated operations in local market chain. | Fair Trade certification. | No data recorded. | Social-economic status and migration – Socially and economically marginalised migrant Butonese, Bugis and Bajau become fishers, local Ambonese become traders, with some exceptions. |

Sources: Inception workshops, primary interviews, CEA (2018), Muawanah et al. (2018), PSHK (2019).

### Guiding documents for fisheries policy and management in Indonesia

Article 33 (3) of the Indonesian constitution vests power with the state to manage natural resources "for the prosperity of the people" and this provides the basis for developing management approaches that explicitly incorporate social and economic considerations into fisheries management and planning. Reflecting this, the Fisheries Management Act 2004 includes nine management objectives, including six that explicitly address social and economic priorities. This includes objectives for improving the living conditions of fishing communities, and addressing food supply and food security. Strategic objectives and priorities shaping current fisheries policy development also include the current policy priorities of the Indonesian National Ministry for Marine Affairs and Fisheries, which focus on Sovereignty, Sustainability and People's Welfare. These various objectives and priorities are detailed in the following table.

**Table 5. Aims and objectives of Indonesian tuna fisheries management**

| Legal/policy instrument | Relevant aspects for social-economic analysis |
|---|---|
| **Indonesian Constitution 1945** | Article 33(3) asserts the power of the state to control land, waters, and the natural resources they contain therein for the greatest prosperity of the people. |
| **Fisheries Management Act 2004 (and modifications under UU 45 2009)** | Identifies nine objectives for fisheries management:<br>• improve the living standards of small-scale fishermen and fish farmers<br>• increase state revenues and foreign exchange<br>• increase employment opportunities<br>• increase the availability and consumption of fish protein<br>• optimise the management of fish resources<br>• increase productivity, quality, added value and competitiveness<br>• increase the availability of raw materials for the industry fish processing<br>• achieve optimal utilisation of fish resources, aquaculture<br>• guarantee the sustainability of fish resources and aquaculture. |
| **Policy priorities of Ministry for Marine Affairs and Fisheries under Minister Susi (2014–2019), and *Tuna-Cakalang-Tongkol* Fisheries Management Plan 2014.** | Identifies three thematic priorities for fisheries policy and management generally, and tuna species specifically:<br>• Sovereignty<br>• Sustainability<br>• People's welfare |

As in most countries around the world, there is not yet sufficient social and economic reporting for fisheries to enable evidence-based policy work implementing these various principles, objectives and priorities. There is also currently insufficient clarity as to how these various mandates and objectives interact in the context of sector-specific management planning processes. As a result the Indonesian government has expressed as a priority need since at least 2013 the development of methods appropriate for the explicit incorporation of social and economic considerations within its fisheries planning and management processes (ACIAR, 2015; Stobutzki et al., 2014).

The Fisheries Law of 2004 and subsequent amendments in 2009 provide the legislative basis for the ministry to develop socio-economic information systems and reporting mechanisms. Economic data is collected by Indonesian port authorities of potential value to structured and evidence-based policy work on tuna fisheries (see McClean, 2017; Proctor et

al., 2019). Similarly, a large amount of socio-economic data is collected with specific reference to fisheries via annual household socio-economic surveys, but is not disaggregated for tuna (McClean, 2017). However, these various data sources are often considered unreliable or are not reported in ways that allow for sector-specific analyses beyond aggregate catch and value where ports data is concerned, or for analyses specific to tuna fishing communities where household socio-economic data is concerned (see e.g. CEA, 2018; McClean, 2017; Stanford et al., 2013). Recent efforts of the ministry have the potential over time to address this lack of an explicit connection between current tuna management processes and wider social and economic objectives in guiding documents, such as via ongoing development of a Harvest Strategy for AW tuna fisheries.

**Key system elements – Government**

A number of key elements of both the architecture of Indonesia's tuna fisheries management system and the recent history of government efforts to regulate tuna fisheries are worth highlighting at this stage.

Tuna fisheries are managed within the wider fisheries management system, and the Fisheries Management Act 2004 mandates the overall architecture of this management system. Fisheries management is structured around 12 Fisheries Management Areas/Wilayah Pengelolah Perikanan (WPP).5 Policy and decision-making functions, licensing and vessel registration for vessels over 30 GT, and management of maritime areas outside 12 NM fall to the national government offices of the ministry. The responsibility for licensing and vessel registration for vessels up to 30 GT, and management of maritime areas up to 12 NM sits with the provincial government offices of the ministry. Currently vessels up to 10 GT are required to register their vessels annually but in line with longstanding practice, small-scale fishers (that is, owners of vessels up to 10 GT) are not obliged to pay any licence fees.

Historically Indonesian tuna fisheries management has largely operated on the basis of a "development" mindset aiming to facilitate industry expansion, both in regards to expanding domestic and foreign fleets, as well as establishing domestic processing capacity (Sunoko & Huang, 2014). Moreover, Indonesia is generally regarded to have low levels of technical and enforcement capacity relative to the size and extent of its fisheries, a complex governance system, and a low level of co-ordination between agencies and levels of government, with overlapping ministerial responsibilities and regulations often lacking clear processes for prioritisation. Tuna fisheries in particular have been regarded as operating under defacto "open access" arrangements (McCluney et al., 2019) while at the same time industrial fishing has historically been encouraged as a policy priority (CEA, 2018; Sunoko & Huang, 2014).

As a result, systematic management systems for tuna fisheries have not been established historically to facilitate effective management of catch and effort. One consequence of this is that relative to neighbouring waters, Indonesia has a relative paucity of data and relatively weak management systems (Cabral et al., 2018; CEA, 2018). The status of Indonesia and the Philippines in particular as large tuna-fishing nations with relatively weak systems of governance was one of the chief justifications for establishing regional fisheries management bodies such as the WCPFC. Through the WCPFC in particular, Pacific nations hoped to better engage Indonesia and the Philippines in the management of shared stocks (Hanich et al., 2009).

Therefore the first of two key developments in the Indonesian government's tuna fisheries policy since 2009 relate to efforts to align with wider RFMO policies and rules. Indonesia previously became a member of both the Indian Ocean Tuna Commission (IOTC) and the Commission for the Conservation of Southern Bluefin Tuna (CCSBT) in 2007. The national

[5] For detailed overview of Indonesia's fisheries management system see Muawanah et al. (2018). For an overview of tuna fisheries management systems see Hatfield (2018).

government amended the FMA 2004 to include a renewed mandate for increasing engagement in RFMOs in 2009, and joined the Western and Central Pacific Fisheries Commission (WCPFC) as a member state in 2013. In order to align national fisheries policies and procedures with the obligations of its membership to the WCPFC particularly, the national ministry has put in place a number of regulations and planning processes. In addition to extensive efforts to align reporting, licensing and vessel registration and monitoring processes with WCPFC and IOTC standards, two processes in particular stand to have a substantial impact on the social and economic aspects of tuna fisheries. The development of a Harvest Strategy for tuna fisheries in archipelagic waters to align with regional requirements for harvest control rules in tuna fisheries, and the development of FAD management regulations to align with regional requirements for FAD management. It is important to note that neither of these initiatives have yet reached the stage of implementation, yet they are nonetheless of longer-term significance given the historical background of weak governance of fisheries, and represent significant regional governance influence. These are summarised in the following table.

**Table 6. Recent policy initiatives aimed at aligning Indonesia's national fisheries management planning processes with RFMO rules and procedures, of direct relevance to social and economic outcomes.**

| Regulation/Planning process | Key elements |
|---|---|
| **Harvest Strategy for AW skipjack and yellowfin tuna fisheries (see MMAF, 2018)** | • Tuna fisheries in WPP 713, 714, 715 to be managed under a Harvest Strategy and associated Harvest Control Rules developed by the national ministry, consistent with ministerial priorities focused on sovereignty and sustainability.<br>• AW Harvest Strategy must align with minimum standards of WCPFC rules and procedures.<br>• Tuna fisheries in EEZ waters and Indonesian flagged vessels on high seas to be managed under WCPFC and IOTC harvest strategies and/or rules and procedures. |
| **FAD Management Plan and Ministerial Regulation no.26/2014 on FADs (see MMAF, 2014)** | • FADs must be no less than 10 NM apart.<br>• Ownership of FADs limited to one per vessel.<br>• All FADs must be registered.<br>• Seasonal closure of FADs from July–October.<br>• FAD Management Plan to be reviewed and updated every two years.<br>• FAD management must comply with IOTC and WCPFC rules. |

Sources: National Harvest Strategy Policy (MMAF, 2018), National FAD Management Strategy (MMAF, 2014).

Harvest Strategy planning processes in tuna fisheries are the first such processes to be developed in Indonesian fisheries generally, and they represent the first effort to develop systematic fisheries management systems for tuna fisheries. FADs have been used as a means of increasing the efficiency of tuna fisheries since well before substantial commercial fisheries have existed. However, rapid increases in fishing effort in the purse seine sector since c.2000 are reported to have been driven by the widespread deployment of FADs (McClean, 2017). Today the total number of FADs is not known, and in general it is considered that a large number of illegal FAD deployments have occurred over this time (Nurani et al., 2018).

In October 2014 a change in national government brought about the second major development in tuna fisheries policy. While RFMO membership was already achieved by October 2014, further reforms initiated by the Jokowi administration in October 2014 represented a significant ramping up of this momentum. Susi Pudjiastuti became the Minister for Marine Affairs and Fisheries, serving until October 2019, and instituted the new policy priorities focused on sovereignty, sustainability and people's welfare. As her first act in

office she brought in regulations to reduce IUU fishing and to prohibit foreign vessels from fishing in Indonesian waters, many of which had direct and lasting effects on tuna fisheries (Cabral et al., 2018; CEA, 2018). These regulations were extremely effective in reducing direct export of tuna via trans-shipment at sea and the use of ex-foreign vessels in Indonesian fisheries, and have led to a 40% drop in fishing effort in fleets known to be responsible for IUU in Eastern Indonesian tuna fisheries (Cabral et. al., 2018).

Table 7 summarises recent laws and regulations of direct import to tuna fisheries, regarding policies focused on foreign participation in Indonesian tuna fisheries and IUU fishing.

These national policies sought to address, broadly speaking, the ministerial priorities focused on sovereignty and sustainability. In particular, these regulations responded to research indicating that large amounts of IUU catch, including tuna being trans-shipped across the Philippines border and being processed outside Indonesia, was leading to 20 billion USD in lost revenue for Indonesia each year (Cabral et al., 2018; Witular, 2016). With the introduction of these policies, former Minister Susi responded to a wider set of social values in Indonesia that has made the nation “an exemplar of resource nationalism” (Warburton, 2017) – the principle enshrined in Article 33(3) that Indonesian resources be managed primarily for the benefit of Indonesian people.

**Table 7. Recent regulations of relevance to IUU and ex-foreign vessel involvement in Indonesian fisheries**

| Regulation | Implications |
|---|---|
| **Ministerial Regulations (Permen) No. 30/2012 on licensing, import of ex-foreign vessels, and investment in domestic processing** | Allowed the import and the re-flagging of ex-foreign vessels over 100 GT to: facilitate more effective exploitation of allowable catch in the EEZ; increase the supply of raw material to domestic processors; accelerate industrialisation of the sector. |
| **Ministerial Regulation (Permen) No. 30/2012 on trans-shipment at sea** | Introduced an exception to requirements to land fish domestically by permitting trans-shipment at sea for direct export by purse seiners over 1,000 GT. |
| **Ministerial Regulation (Permen) No. 56/2014, Ministerial Regulation (Permen) No. 10/2015** | Introduced moratorium on all licensing of vessels in the EEZ and territorial waters for 12 months while a compliance audit was undertaken. This has since been extended indefinitely. |
| **Ministerial Regulation (PP) No. 57/2014** | All forms of trans-shipment at sea rescinded. Failure to land catch at designed ports in Indonesia to result in an immediate withdrawal of capture fishery and transport licences (SIPI and SIKPI). |
| **Presidential Regulation (Perpres) No. 44/2016 (negative investment list)** | Capture fisheries closed to foreign investment, fully reversing the policies of the early 2000s. Operations must be 100% domestically financed and specially approved by the MMAF with respect to resource allocation and geographic co-ordinates. |

Source: PSHK (2019, pp. 102–106).

Tuna fisheries were also a key aspect of meeting the Sustainability priority of the ministry, as former Minister Susi stated:

> Depleted stocks, ecosystem destruction and sustainability of the seas will affect the overall health and productivity of our seas. Why? Because in the fishing industry, there are many migratory fish. For example, 68 percent of the world’s stock of yellow fin tuna spawns in the Banda Sea in Maluku, then they travel around the globe before returning to the Banda Sea to spawn again.
>
> Susi Pudjiastuti. Quoted in Jakarta Post, 2018

To address the theme of people's welfare, Minister Susi also announced a policy to replace the large-scale foreign-owned vessels banned under anti-IUU regulations with 3,325 new small to medium-scale vessels to be built and distributed to Indonesian fishers by 2019. In addition to justifications of the IUU regulations that they will lead to greater availability of tuna for small-scale fishers (see e.g. CSF and PSIK, 2017), and proposals that small-scale fishermen be provided permanent spatial allocations within the Harvest Strategy process (see e.g. McClean, 2017), this policy represents an attempt to shift effort in Indonesian tuna fisheries from large-scale operations to smaller-scale fleets.

In addition to these regulatory efforts relating to catch and allocations for small-scale fishers, a number of policy and regulatory efforts have also been made that aim to support the basic rights of fishers and fishing communities. These are either through fisher-specific programs, or through wider health schemes, as displayed in the following table.

**Table 8. Regulations and government programs supporting the basic rights of fishers and communities.**

| Regulation or program | Implications |
|---|---|
| **Fisheries Regulation (PP) No. 35/2015 on a System for Certifying Human Rights in the Fisheries Sector** | Sets out areas of compliance on working conditions and worker and community rights; mandates the establishment of criteria and a system for accrediting certifiers; provision for compliance training, monitoring, and sanctions; mandates compliance on all vessels and licensing within a year of promulgation of the regulation. |
| **Ministerial regulation No. 42/2016 on Sea Working Agreement for Fishing Crew.** | Mandates provision of a written work agreement (PKL) for fishing crew. |
| ***Kartu Nelayan*/One Window Card program** | Aims to provide fishers with an identification card which acts as a single entry point for access to government-provided services specific for fisheries. This includes provision of life and disability insurance, and subsidies directed at fishers by MMAF, as well as connection to private-sector operators to deliver those services. |
| **BPJS Universal Insurance Scheme** | Aims to provide affordable universal health care to the entire Indonesian population. Requires registration and payment of premiums to a government-run health care payment scheme. |

Sources: PSHK (2019), USAID Oceans (2017), Jones et al., (2019).

### Key system elements – Non-government

With regards to non-government influences that are common across tuna fisheries, relations with end markets and between actors along the chain are significant aspects of the governing system. Two common points across cases bear highlighting here.

Firstly, trading relations along the chain that facilitate export market access are crucial for business viability for many fishers and traders, and a wide range of formal and informal business and trading relations have been developed that allow fishers and traders to overcome these barriers. Examples include FAD access arrangements, and arrangements related to credit and financing of fishing operations, which are highly varied at a range of scales.

Secondly, buyer preferences in end markets have a significant upstream influence on fishing activity. The EU, US and Japanese markets are major destinations for canned and fresh tuna products, and each have extensive food safety standards regulating import, along with an increasing interest in sustainable, ethical sourcing of product, which exert upstream influence on fishing operations globally and in Indonesia (Havice & Campling, 2017). These, however, are only the most prominent and Indonesian tuna is also exported to over 30

markets globally, each with specific preferences regarding quality, price, preparation and chain practices (see e.g. USAID Oceans, 2017).

Further to this, across case studies, both social relations around gender and links between socio-economic status and migration that are common to Indonesian tuna fisheries are significant influences on how tuna fisheries operate.

In regards to gender, Indonesian tuna fisheries are generally reflective of wider gender dynamics in Indo-Pacific tuna fisheries (see Sullivan et al., 2001; Barclay et al., 2015), with some noteworthy and significant exceptions. Men tend to occupy roles associated with fishing and heavy physical labour, positions associated with authority and trading roles associated with higher levels of wealth generation. Women tend to participate in roles associated with lower-value trade, processing and tend not to be in positions of authority in local chains (USAID, 2018a). This gendered division of labour is not unchangeable. Nor do all interviewees completely agree on the roles of men and women in the fish chain, and there is some variation in how people describe gender relations in our case studies, which are explored where they are significant for understanding gender relations in case-study fisheries. Our analysis is of overall patterns, however this is an important wider pattern that affects all cases we present here.

The major exception that needs to be noted in this case at a national level is that while men tend to occupy positions of authority, and those associated with wealth generation, some highly influential players in tuna fisheries at a national level in the last 10 years have been women. In particular, Fisheries Minister Susi Pudjiastuti, the longest-serving fisheries minister since the return of democratic rule in 1998, serving until October 2019, and Janti Djuari, the Secretary General of the Indonesian Pole and Line and Handline Fisheries Association.

In regards to migration, Indonesia has an extremely long history of inter-island trade, internal labour migration, and migration across historically fluid borders with neighbouring countries, and it is a feature of Indonesian fisheries (Bailey, 1987; Silvey, 2001; Allison & Ellis, 2001; Cassels et al., 2005; Kramer et al., 2009). Moreover, labour migration in Indonesia has historically been associated with low socio-economic status across the economy, including in fisheries. The influx of landless agricultural labourers into the Java Sea demersal fishery following the large-scale trawl ban in the 1980s is the most prominent relevant example (see Bailey, 1997; Buchary, 1999). While there are no published studies on the issue, the participation of a very wide range of migrants in Indonesian tuna fisheries is a ubiquitous characteristic of the sector. Javanese are regularly involved in larger-scale fisheries, and Filipino migrants historically played an important role in the development of the sector. Migrant fishers from Sulawesi participate in smaller-scale fisheries across Eastern Indonesia, alongside local fishers and traders, and in some cases Filipino handline fishers (see e.g. Satrioajie et al., 2018; Proctor et al., 2019). Where migrant status is significant in terms of wellbeing outcomes, such as through influencing participation in certain roles, and the distribution of benefits and risks, these factors are elaborated on in specific cases.

In the context of the tuna fishery and broad governance trends, the two case-study sites of Bitung and Maluku are well placed to provide insight into these various developments. Both are bases for substantial tuna fishing and processing operations and are situated within the AW zone subject to Harvest Strategy planning, while Bitung also sources a large amount of raw material from operations within the Pacific EEZ of Indonesia. Both are situated near known “hot spots” for FAD usage (Proctor et al., 2019; Satrioajie et al., 2018), and, previously, IUU activity (PSHK, 2019, pp. 102–106; CEA, 2018).

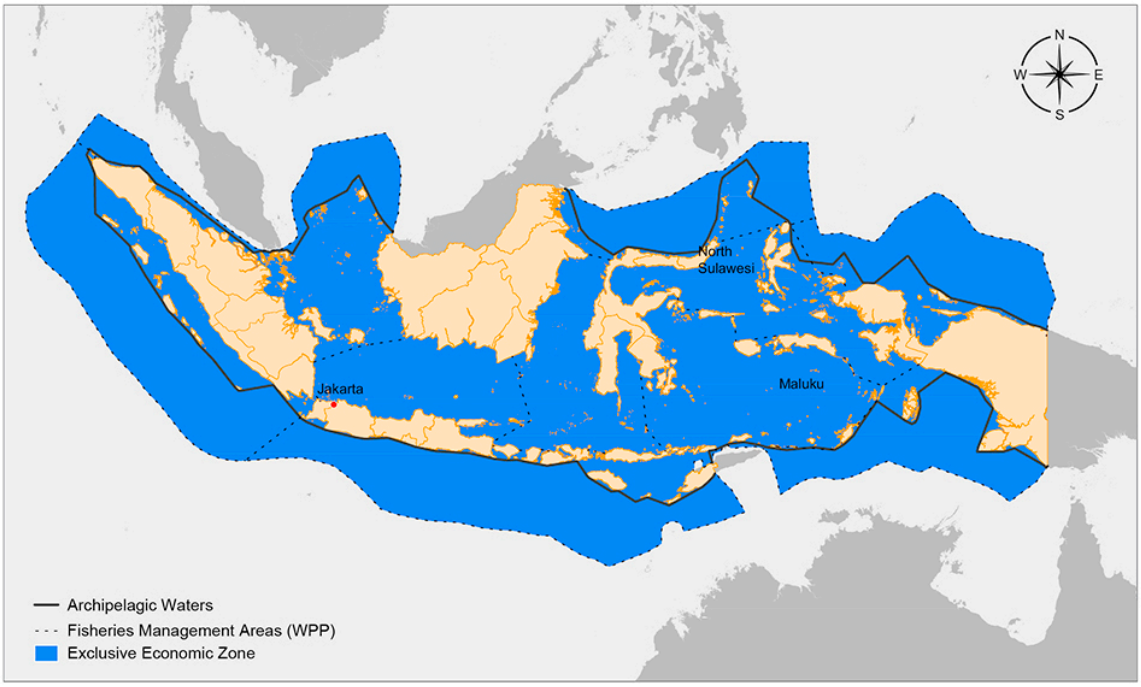


**Figure 4. Map of the Indonesian archipelago and maritime setting.**

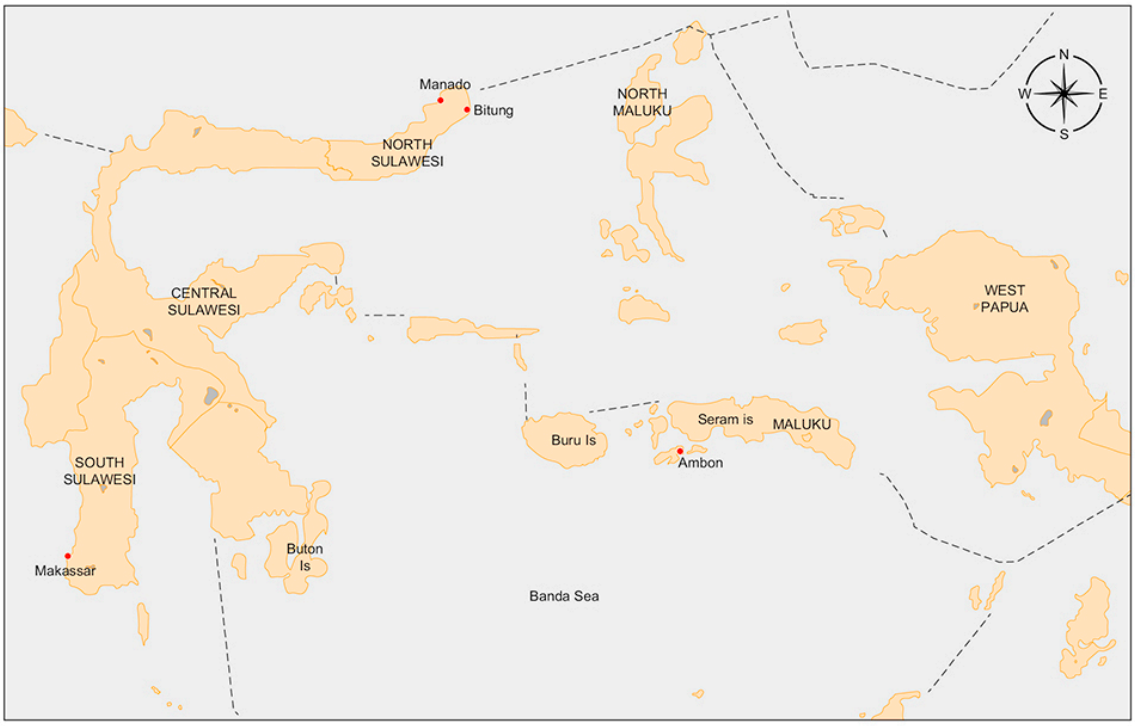


**Figure 5. Map of Eastern Indonesia including field sites.**

## 2.1 Maluku handline fisheries

Handline fisheries in Maluku Province targeting tuna species are widespread in the coastal regions of Ambon, Seram, Buru and surrounding islands. Export trade is centred on the regional capital, Ambon, and is the main provincial base for tuna fishing operations. This includes purse seine, longline, pole and line, and handline operations. Smaller local markets in Ambon City and in towns on Buru and Seram Islands also trade in a range of tunas, particularly those that are not of sufficient quality to enter the export chain. Village-based sale and consumption of smaller and lower-quality tunas is also common.

Handline fisheries in Maluku include two main chains (see Fig. 6). The first involves village-based handline fishers operating vessels of less than 1–2 GT targeting large, high-quality yellowfin tuna. The second involves a small fleet of handline fishers based in Ambon, operating vessels of 5–8 GT, targeting a mix of tuna species on FADs, and selling mostly skipjack and small yellowfin into Arumbai Market in Ambon. While these can be understood as two separate chains, with one focused on export of large, high-quality yellowfin, and the other focused on local sales of skipjack, in reality there is overlap, as the diagram below displays. In each case, fish enter both the local market and export chains. However, in this case, the rationale for separating these out is the differences in vessel size (1–2 GT and 5–8 GT), predominant fishing strategies (non-FAD/FAD), species targeted (yellowfin and mixed species with a emphasis on trading skipjack and juvenile yellowfin and bigeye) and where the majority of catch goes, either for export or domestic sale through Ambon Market. It should be noted though that some skipjack and lower-quality yellowfin enters local markets from 1–2 GT village-based vessels, and occasionally 5–8 GT Ambon-based vessels catch larger yellowfin, which are then sold directly to companies. Figure 6 shows the two chains, while also representing this overlap.

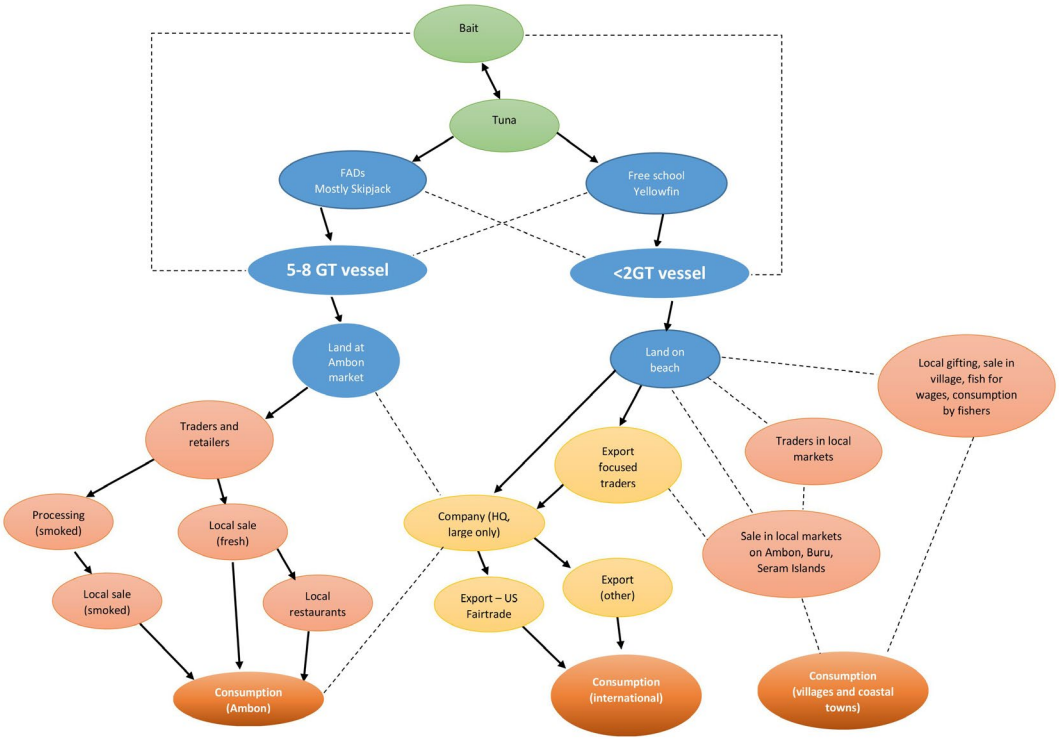


**Figure 6. Maluku Handline Fishery: 1–2 GT vessels targeting yellowfin and 5–8 GT vessels targeting skipjack.**

Note: Black arrows represent the principal market chain, dotted lines represent a secondary market chains.

### 2.1.1 Export-oriented tuna handline fishery: 1–2 GT vessels

This chain targets principally large, high-quality yellowfin tuna in free-schools exported to overseas markets, typically the EU and USA, as fresh steaks, but with opportunities to export elsewhere depending on quality and market conditions at any given time. In addition, lower-quality and undersized fish are sold in markets in Ambon City, Namlea (Buru Island) and Amahai (Seram Island), while smaller fish are also sold in the village or kept by fishing families for household consumption. Fishers are widespread throughout coastal Maluku, in Ambon City itself and scattered in villages across Ambon, Seram and Buru Islands.

Typically, one to two fishers fish up to 50 km offshore in small 1–2 GT canoe-style vessels, powered by a small outboard motor (see Fig. 8). Gears include droplines, troll lines and kite fishing, typically using lures to attract tuna, but also bait. Lures are fashioned from various materials including coloured plastic sheets and plastic bags, as well as using more conventional wooden and manufactured plastic lures. Fishers also reported using fresh bait, typically *Layang*, a pelagic scad found throughout Eastern Indonesia. Fishers reported that this fishery is typically not FAD-based, instead using the presence of dolphins and seabirds to find schools of fish. However, fishers often use FADs to catch smaller skipjack and yellowfin when they are unsuccessful in catching free-school yellowfin, and many of these fish are sold in villages and local markets in coastal areas of Ambon, Buru and Seram Islands. In some cases larger yellowfin tuna will be sold into local markets where ice is not readily available.

**Figure 7. Mature yellowfin tuna caught on a small handline vessel in Maluku Province, Indonesia. Generally these will be sold into lucrative export markets, however where fish have not been loined and iced on board, they will sometimes be sold in local markets as shown here. (Photo: Nick McClean).**

**Figure 8. Handline vessels in Maluku Province, Eastern Indonesia (Photo: Dedi S. Adhuri).**

**Figure 9. A landing site for yellowfin tuna on north Buru Island (Photo: Dedi S. Adhuri).**

**Figure 10. Maluku Handline Fishery: 1–2 GT vessels targeting yellowfin and 5–8 GT vessels targeting skipjack (Photo: Dedi S. Adhuri).**

**Figure 11. Example of a handline and lure used for surface trolling and kite fishing for yellowfin tuna (Photo: Dedi S. Adhuri).**

Prior to the establishment of a commercially oriented fishery, opportunistic fishing for tunas occurred as part of the customary economy for subsistence. This was not a distinct fishery nor viewed as an economically significant activity (Hayward & Mosse, 2012), and most likely focused on smaller tunas that can be found in coastal areas and inshore lagoons. Our respondents reported that customary tenure of reef resources does not extend to offshore areas where large yellowfin are most prevalent.

The handline yellowfin fishery as it currently operates appears to have developed and expanded rapidly during the 1990s, with some reports of fishing as early as the 1980s, as a response to lucrative new market opportunities for fresh tuna processing and export. Informants report that company representatives from Ambon first came to Seram and Buru Islands in the early 1990s to source supply from various local fishers and collectors. On Ambon Island itself a small commercial cannery operated on the northern side of the island with surrounding villages supplying fish through local collectors for at least a decade and a half before this closed down around 2006.

Typically, tuna will be loined and iced at sea by fishermen. Upon landing, these loins are either sold directly to a village-based trader, known as a “middleman” or a “collector”, or will be further cleaned, packaged and iced in village “mini-plants” before being provided to the trader. The trader will then sell these loins to one of three export companies in Ambon, who will then clean, grade and package the loins further before export.

**Figure 12. Fresh tuna loins in a village mini-plant, cleaned and packed ready to be iced and transported to Ambon (Photo: Dedi S. Adhuri).**

**Figure 13. Ice boxes and a storage shed for prepared tuna on Seram Island. This was built by the exporting company in Ambon and is regularly used by local fishers (Photo: Dedi S. Adhuri).**

In the context of the process of development of the fishery, trading relations along the chain can be understood as operating under a loose integration between fishers, local village-based traders and companies accessing export markets based in Ambon. This essentially operates under a situation where fishers sell to traders who sell to exporting companies under longstanding trading agreements, but with the possibility of flexibility in where fish are sold. For example, fishers and traders based on the northern side of Ambon Island reported that they had the option to sell to village-based traders, directly into the local village market, directly to a processing company in Ambon, and in the past to a cannery that used to operate on the northern side of Ambon Island.

As displayed in Figure 14 and Table 9, the choice of where to sell fish among these various options is determined by the size and quality of fish, as well as by the nature of credit and financing arrangements between fishers and traders. Fish above ~15 kg would fetch a good price in the export market, and so if they are of sufficient freshness and quality then all fish of this size would be purchased by village-based traders, known locally as “middlemen” or “collectors”, and sold to companies in Ambon for further processing and export. Fish under 15 kg, or fish that is not of a sufficient quality for export, will usually enter local markets. Patron–client relations between local fishers and traders in coastal communities also constrain the flexibility of fishers in this chain. Where a fisher is operating independently, they are free to source the best price for the fish that they have. Where they are tied to a patron who provides credit and financing for ice, bait and fuel supplies, they are obliged to sell directly to their patron.

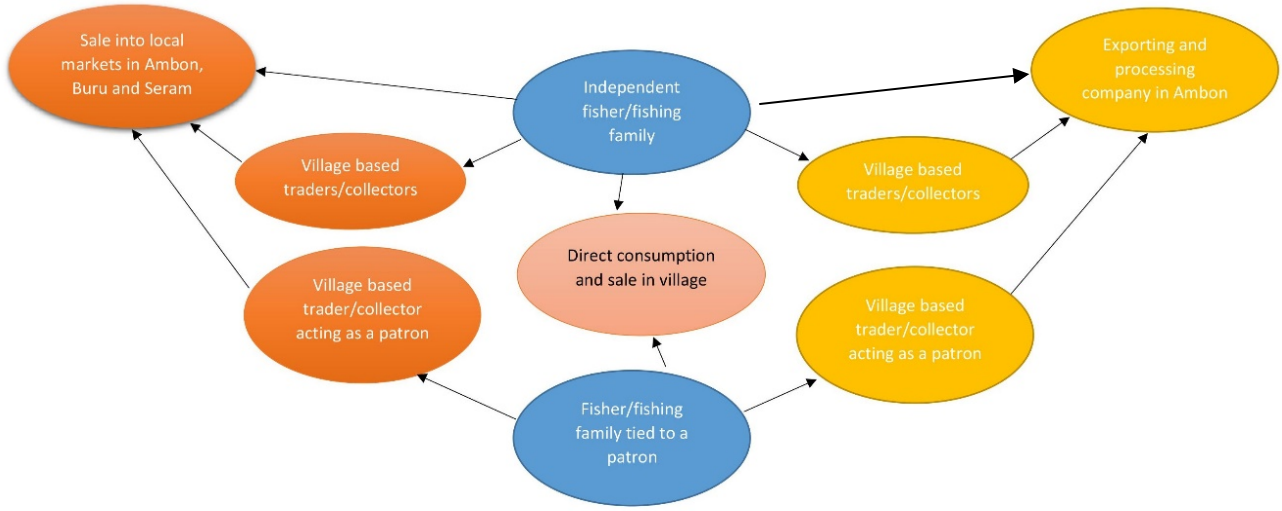


**Figure 14. Trading relations in village-based HL yellowfin fisheries.**

Colour coding: Blue = Fishers/fishing families. Light red = Village-based sale and consumption of skipjack tuna. Dark red = Sale of small and lower quality yellowfin and skipjack into local markets on Ambon, Buru and Seram Islands. Yellow = sale of large, higher quality yellowfin in export chain.

**Table 9. Trading relations in handline yellowfin fish chains in Ambon**

| Type of trader | *Village, local market or export market sale* | *Acts as a patron to fishers providing credit and supplies* | *Gender* |
|---|---|---|---|
| **Exporting companies based in Ambon** | Exports higher-quality large fish. Some direct sale of fish in Ambon. | No, but does provide some cold storage for collector traders and fishers. | Mixed men and women, depending on roles (see gender analysis below). |
| **Village-based traders focused on export, known as "suppliers" "middlemen" or "collectors"** | Aggregates tuna from fishers, sale to exporting company in Ambon for high-quality fish, and some sale in local markets for lower-quality fish. | Yes, but also buys from independent fishers. | Mostly men. |
| **Village-based traders selling primarily into local markets** | Sale of smaller and lower-quality fish in local markets on Ambon, Buru and Seram, sometimes some processing (e.g. salted/dried fish). | No. | Mixed men and women. |
| **Fishing family traders** | Sale of small and low-quality fish in village or sometimes in local markets on Ambon, Buru and Seram. | No. | Mostly women. |

Sources: Primary interviews, Bailey et al. (2015).

Patron–client relations are a key aspect of the operation of this fishery, and have been crucial factors in the development of the fishery. Following a common pattern in Indonesia and developing country small-scale coastal fisheries (see e.g. Adhuriet al., 2016; Duggan et al., 2017), individual fishers often lack capital to cover the costs of entry into the fishery, and also find it difficult to access credit from banks. In these cases traders, who often own existing businesses and infrastructure in the community for provision of fuel, motor repairs, ice and so on, provide finance for the building of a boat and purchase of a motor, and cover costs associated with fuel, ice and bait supply for a fisher. The fisher is obliged to sell fish to that trader as long as they remain in debt to them. In Maluku traders reported up to 62 fishers being in a client relation to them, while studies elsewhere in Indonesian HL yellowfin fisheries have recorded reports of traders financing and collecting fish from up to 200 fishers (McClean, 2017). As a result there is a mix of situations for fishers in regards to financing their operations and trading their products. Independent fishers are able to operate with far more autonomy in the market and sell according to the best price. However, fishers in patron–client relations have less autonomy to sell to wherever they please and are instead typically obliged to sell to their patron.

Processing and exporting firms and a range of civil society organisations focused on small-scale handline fisheries have played a critical role in advocating for national level reforms, Fishery Improvement Programs and sustainability certification that prioritise handline fisheries. Such efforts have contributed to the initiation of the Harvest Strategy process, FAD management regulations, and data collection, training, and certification initiatives (see e.g. MDPI, 2018). A similar justification has also underpinned IUU and ex-foreign vessel regulations, and the construction of new small-scale vessels, on the basis that prioritising small-scale fisheries will in the long run be more sustainable than larger-scale fisheries, such as purse seine and longline fisheries (Witular, 2018; CEA, 2018).

An important recent development in this fishery has been the formalisation of supply chain arrangements under Fair Trade USA certification. This has seen formal fisher groups (Fishers' Associations) established at the community level, through which certification, traceability and incentive payments returned to fishers can be managed. The principal driver of this change in the fishery has been the creation of the Fair Trade USA standards, and retailer preferences in the US for fisheries to meet sustainability, ethical sourcing and supply standards. The rationale of Fair Trade certification is that a fixed percentage of sales of certified product are returned to fishers and managed in a Premium Fund that the Fishers Association manages collectively. This fund is used to invest in community projects in fishing communities, or for equipment such as safety gear and GPS units. A key aspect of the Fair Trade approach is that the Fishers Association cannot use the funds on the private costs of fishing or to improve their private business operations, such as fuel purchase or paying down debt. Funds must be used so as to have a general benefit to fishers as a group or the communities in which they live.

**Figure 15. (L) A mosque entrance on Ambon Island repaired and concreted using Premium Fund finances. (R) A mosque on Buru Island which had flood damage of a retaining wall repaired using Premium Fund finances (Photos: Dedi S. Adhuri).**

As a result of entering certification, catch documentation must be formalised so as to demonstrate sustainable management of fisheries. 770 fishers now participate in data collection activities across Ambon, Seram and Buru Islands in this chain, with this data feeding into provincial-level data management and fisheries decision-making multi-stakeholder committees. Through these committees, industry-supported CSOs such as Masyarakat dan Perikanan Indonesia (MDPI) and government fisheries and research staff work together to manage provincial data collection processes, and feed these into national management planning processes, such as the Archipelagic Waters Harvest Strategy planning process. This represents an important development in the fishery, and a substantial step forward in developing effective fisheries management systems for Indonesian tuna fisheries.

## Standout wellbeing contributions to coastal communities

### Economy

In general, the presence of a stable export market for tuna has lead to substantial income generation at a regional level. While provincial-level data is considered to be of variable quality and has not been crosschecked, government statistics for Maluku province provide some insight into the regional economic contributions of this fishery (see BPS Maluku, 2018). Production of yellowfin for 2017 was reported as 17,611 tonnes, while exported yellowfin in 2017 was reported as 912 tonnes. This exported tuna had a total value of 190.8 billion IDR/13.65 million USD for the year 2017 (BPS Maluku, 2018). This makes up 4.6% of the total GDP for Maluku of 3.9 trillion IDR/292.5 million USD.

This fishery contributes to the wellbeing of coastal communities in Maluku in three broad areas. Livelihoods for fishers in the export chain, income for traders in the export chain, and livelihoods for other downstream workers.

#### *Income for village-based fishers in the export chain*

Through the establishment of this fishery, fishers living in sometimes isolated villages across Maluku province have gained access to a relatively stable livelihood. According to Duggan et al. (2015) monthly incomes of HL fishers in Maluku fluctuated between just above the provincial minimum wage (123 USD /1,775,000 IRD) during the month of April, and just below the provincial poverty line (27.42 USD /378,538 IRD) for the months of August–December. These fishers have low incomes, and many are in poverty. Given the context of few alternative economic opportunities in remote villages, the marginalised status of many migrant fishers and the relatively low levels of formal education and training among fishers, it is reasonable to assume fishing is a very important livelihood opportunity, and likely provides a basic poverty alleviation function by supporting a basic standard of living.

Moreover, it is worth noting that the considerable risks related to safety at sea detract from livelihood contributions to coastal community wellbeing. Fishers related many instances of motor breakdown at sea, and drifting for many days until coming ashore or being rescued. A further risk this livelihood exposes fishers to is income insecurity. The nature of fishing means that fishers are entirely reliant on day-to-day catch, and with little ability to build a wealth base from fishing alone. As a result, fishers often go into debt with patrons in order to finance their fishing operations, to ameliorate this insecurity.

The recent implementation of Fair Trade certification has improved the livelihoods of some Maluku handline yellowfin tuna fishers, through the payment of incentives to FT FAs via Premium Funds, increased training opportunities, and increased access to safety and navigational equipment. However FT certification has also led to community wellbeing benefits not previously associated with this fishery. The funding of community projects by FT FAs have led to improvements in social cohesion in communities through increased status in the community for fishers, and the development of direct relations between FAs and companies have resulted in fishers being in a better position to bargain with collectors and other traders they interact with (Interview #5; Bailey at al., 2015).

### *Income for village-based traders in the export chain*

Village-based traders in the export chain6 were reported as gaining the greatest financial returns from tuna fishing in coastal communities, and some traders were considered to have been able to accrue considerable wealth from tuna trading. Typically, traders in the export chain act as patrons extending finance to many fishermen and own businesses in villages, including those supplying fuel, ice and mechanical repairs.

The income these traders receive collectively is a contribution to coastal community wellbeing in terms of boosting the regional economy, and their activities enable the fisheries in terms of providing channels to markets and, in some cases, financial services and the supply of inputs. These traders have good livelihood capabilities and are less at risk in terms of workplace safety and poverty than the fishers. In terms of income security, traders usually also have the ability to source supply from at least some of their fishers in the event of a downturn, and also have village-based businesses to fall back on that do not rely solely on tuna trading. Interventions for the purpose of improving livelihood contributions would likely not be targeted at village-based traders for export markets. Nonetheless, it is also worth noting that in the context of the establishment of FT FAs, traders tended to experience a reduction in their influence over price setting, and possibly some reduction in business where fishers choose to sell directly to companies.

### *Livelihoods in other downstream trading and processing activities*

In coastal communities, where yellowfin tuna or skipjack enters local markets rather than going for export, the fishery supports livelihoods downstream. This includes a range of smaller trading operations that sell in villages and in town markets on Ambon, Seram and Buru, which in turn support casual processing workers, retailers and transport workers. In general these livelihoods are characterised by a high level of insecurity due to the informal nature of the local chain. They do not generally entail the high levels of physical safety risk that fishing does.

In Ambon itself, export companies employ mainly processing workers who loin whole fish as well as clean, grade and package fresh loins, which provides a stable livelihood for some hundreds of urban workers across three companies that export fresh tuna. These jobs are relatively secure due to the fact that they are formal jobs with basic contracts and formalised health and safety procedures. The wider tuna processing sector has seen a major downturn in Ambon due to the impacts of IUU and ex-foreign vessel regulations (Interview #6; Witular, 2016). In the case of companies focused on export of HL yellowfin, it would appear these workers have not been exposed to volatility due to regulatory change to the extent that workers focused on larger-scale operations have.

[6] These are often known in Indonesia as “suppliers”, “middlemen” or “collectors” when translated into English.

**Table 10. Working conditions for different roles in the handline yellowfin fish chain, Ambon**

| Position | Security of work | Work Health and Safety conditions |
|---|---|---|
| **Fishers** | **Relatively insecure**<br>Entirely reliant on day-to-day catch, with little ability to ride out low periods, except for the fact that a good day can yield benefits beyond daily needs. In many cases fishers maintain relations with a patron to address this insecurity.<br>Some fishers are reported as maintaining relations with patrons in order to ameliorate issues of livelihood insecurity, high-risk work environments and seasonal availability of fish. In these cases patronage is viewed as a source of social welfare in the absence of state service, as well as fulfilling functions relating to business viability, access to resources/credit and product marketing/distribution. | **High-risk work environment with few safeguards**<br>Fishers operate in a very high-risk setting on the open seas. Many related experiences of engine failure and drifting at sea for multiple days. Historically little access to safety equipment, formal health care and typically no insurance cover, though this is beginning to change particularly in certified chains. GPS introduced in recent years for fishers involved in certification schemes. |
| **Traders focused on export trade and often acting as patrons** | **Relatively secure**<br>Generally they have access to capital of some sort prior to entering trading, whether from fishing or prior business interests. Patrons are able to spread their risk across many fishers. While patrons are also subject to the fluctuations in fish availability over time, they tend to always have a sub-set of fishers providing them with supply. | **Lower-risk work environment with some safeguards**<br>Traders tend not to be subject to major safety risks and many have financial resources to access health care. Unclear to what extent insurance cover exists. |
| **Village-based traders selling primarily into local markets** | **Relatively insecure**<br>Local chains are entirely informal. Operators are largely independent, and employees casual/informal labour. These roles tend to be subject to the fluctuations in the market, with little ability to ride out downturns or shortages of supply, particularly for processing and retailing roles. | **Lower-risk work environment with few safeguards**<br>Local chain roles tend not to be subject to major safety risks, however these roles have no formal health care or insurance cover. |
| **Workers in downstream/processing sector companies** | **Relatively secure**<br>While these roles are also subject to the fluctuations of fish supply, company employees have formal contracts that provide a basic minimum wage as well as terms of engagement and severance. | **Lower-risk work environment with adequate safeguards**<br>Processing company roles exposed to some safety risks, but generally have structured health and safety procedures, access to government health care and insurance in work contracts. |

Sources: Primary interviews; Bailey et al. (2015).

### Food and nutrition

While this fishery targets export markets, through the livelihoods generated the fishery contributes to fishers' and other low-income processing workers' food security. Furthermore, there are direct food benefits from the portion of the catch that is not exported and enters village or town-based markets in Ambon and surrounding islands (lower-quality fish and skipjack). Where fish enters local chains, this provides a steady supply of fresh fish which was likely less available to remote communities prior to the establishment of commercialised fisheries, beyond the opportunistic catch of tunas in inshore reef areas (Hayward and Mosse, 2012).

In light of the remoteness of fishing communities and the fact that many migrant fishing communities do not have access to gardening land in Maluku province, the importance of this contribution is likely significant, even though food supply is not the primary focus of this chain. Considering that data is collected at the provincial and district level on fishing households and gears, disaggregating data for tuna fisheries, and determining the contributions of export-oriented fisheries to local food supply via undersized and lower-quality catch presents as a valuable aspect of future research efforts on this chain.

| Pathway | Details |
|---|---|
| **Village-based consumption of tunas** | Direct consumption by fishing families, as well as gifting and sale of small and lower-quality yellowfin, skipjack and coastal tunas in villages leading to household consumption of tuna. |
| **Increased cash income leads to consumption of food** | Tuna livelihoods leads to increases in cash income for fishers, traders and processing workers in remote coastal towns and villages. Literature (e.g. Fabinyi et al., 2017; Allison et al., 2015) indicates that increases in cash income to fishers, traders, processing workers and retailers leads to an increase in consumption of higher-quality food (fresh fish, fresh meat, fresh vegetables etc.). |
| **Supply of smaller and lower-quality tuna boosts local consumption in coastal towns and villages** | Sale of small/lower-quality SKJ/YFT into local markets (Ambon, Seram, Buru) leading to household and restaurant consumption. |
| **Domestic supply of lower-quality products by export focused companies boosts consumption in Ambon** | Direct sale of lower-quality products in Ambon by processing and export companies, and sale of products in domestic markets outside Ambon leads to household and restaurant consumption of tuna. |

Source: Primary interviews unless stated in the text.

### Environmentally sustainable fisheries

A major contribution of this chain lies in the development of a system for data collection in small-scale tuna fisheries since 2013. This has been recognised as a substantial contribution to the development of wider management systems capable of managing tuna fisheries sustainably in Indonesia (Antara, 2019), particularly considering the historical lack of effective management systems and regulation for these fisheries (Proctor et al., 2019; Duggan and Kochen, 2016; Sunoko and Huang, 2014). These data collection systems currently cover 755 fishers involved in Fair Trade schemes, as well as portside enumeration that is capable of capturing data across small-scale tuna fisheries, at landing sites across Maluku Province. As a result this data collection systems covers a substantial amount of small scale fishers in Maluku. The collection and management of this data via multi-stakeholder Fisheries Co-Management Committees at the provincial level, and its use in national-level analysis via the national Harvest Strategy process are significant developments in Indonesian tuna fisheries management.

Stock assessments in 2017 for the Western and Central Pacific Ocean indicate that at a regional level the yellowfin are currently fully exploited and are not able to absorb any further increases in catch (ISSF, 2018). In light of this, handline yellowfin fisheries are widely viewed in Indonesia as potentially contributing to greater sustainability of fish stocks by virtue of the fact that it is a “one-by-one” fishery targeting large free-schools of tuna (see e.g. McClean, 2017; Duggan & Kochen, 2016). This means that there is virtually no bycatch of juvenile tuna or non-tuna species, and tuna targeted are at an age where they are likely to have already bred prior to capture. This is in contrast to many FAD-based fisheries, which typically result in the capture of juvenile yellowfin, along with target skipjack (PEG, 2011; Holmes et al., 2019).

In the context of wider management approaches, the possibility of ensuring allocations of catch to smaller-scale “one-by-one” fisheries has the potential to underpin the long-term viability and profitability of Indonesian tuna fisheries, as long as overall catch/effort is effectively managed and maintained at sustainable levels.

## Integrated discussion of governance and wellbeing

Key insights revolve around the potential long term impacts of national government regulations to favour small-scale fishing, as well as the historical impacts of the growth of an export fishery, and more recently market certification, on benefits that flow to coastal communities. The distribution of these benefits is clearly impacted by social relations focused on internal migration within Eastern Indonesia, socio-economic status, and gender.

### Government regulation and wellbeing

There was little discernible influence of recent national-level government reforms on this small-scale fishery reported in the course of our interviews during April 2018.

This accords with analyses that suggest that FAD regulations have been not yet been implemented effectively (Proctor et al., 2019), and that as a Harvest Strategy is still in development, it is yet to impact on the ground management and fishery dynamics (McClean, 2017). It should be noted however that implementation of data collection processes in HL yellowfin fisheries, which are being used to design a Harvest Strategy and management process, represent a substantial step forward in developing sound fishery management systems.

Interviewees noted that the anti-IUU regulations had substantial negative impacts on the tuna fishing and processing sector in Ambon as a whole, while media reports suggest that as many as 39 fishing companies and 11 cold storage units closed operations following the moratorium on vessel registration. Reports suggest this led to a 7.5% increase in unemployment in Maluku (Interviews #6, #56; Witular, 2016 citing research by Bank Indonesia). There is, however, no robust evidence to suggest in either our interviews or in published literature from Maluku that this impact on the supply of raw materials was felt in the handline yellowfin export sector specifically, given its focus on small-scale vessels.

Our findings contrast with other analyses that have reported positive impacts from anti-IUU and ex-foreign vessel regulations, in particular with anecdotal reports of greater fish availability for small-scale fishers (e.g. Cabral et al., 2017; CSF and FPIK 2017). They also contrast with reports of negative socio-economic impacts on small-scale fishing communities as a result of the Banda Sea closures (e.g. Duggan & Kochen, 2016; Satrioajie et al., 2018). Such impacts were not reported by our fisher or trader interviewees in this fishery.

This raises the important question as to the impact of a potential shift in effort from larger-scale to smaller-scale fisheries, and whether increased effort in small-scale fisheries in the future would ultimately lead to similar problems of resource over-exploitation in the medium term. This is a critical planning issue for the sector, and has been raised by a number of commentators as requiring attention in the next phase of planning and fisheries policy

development (CEA, 2018; Cabral et al., 2017; CSF and FPIK, 2017; McClean, 2017). In relation to national-level management, the role of fresh tuna exports in the regional economy is arguably heightened in light of the substantial downturn in the fishing and processing sector generally in Ambon since the advent of anti-IUU regulations. Any policy focus aimed at increasing this dependency by prioritising small-scale and high-value export fisheries, however, comes with risks around resource sustainability, and replacement of foreign vessel effort since 2015 by the domestic fleet has already been documented (see Cabral et al., 2017). Ensuring that the wider fishery is managed for sustainable catch or effort limits will ultimately underpin the sustainability of the considerable social and economic benefits these fisheries provide coastal communities.

### Influences of the structure of export market channels, including Fair Trade certification, on wellbeing

Connecting with export markets has been the basis of establishing this fishery, which has created livelihood opportunities in villages across Maluku province for people with few alterative economic options. The nature of trading relations at the local level including those under Fair Trade certification influence significantly the flow and distribution of benefits (see Table 9).

**Table 11. Benefits associated with different types of trading relations in the HL yellowfin export chain.**

| Change in the structure/governance system of the chain | Implications for the flow and distribution of wellbeing benefits |
|---|---|
| **Development of an export market (1990s)** | • Provided fishers and traders in remote coastal areas new economic opportunities.<br>• Fishing livelihoods subject to seasonal fluctuations in resource availability.<br>• Fishers exposed to dangers of offshore fishing in small basic technology vessels. |
| **Informal trading relations in chain (i.e. non-certified chain, with patron–client relations common)** | • Village-based traders acting as patrons ameliorate fishers' livelihood insecurity through access to credit and by providing informal "social welfare" at the village level.<br>• Traders contribute to community via donations, support for village infrastructure projects.<br>• Traders aggregate catch for export companies, facilitating access to this market channel for small-scale fishers.<br>• Export companies provide access to buyers in export markets. |
| **Formal trading relations via Fair Trade USA certification in the export chain** | • Fair Trade requires the creation of Fisher Associations (FA), which form a direct connection between export companies and fishers, leading to increased knowledge of destination markets and bargaining power for fishers.<br>• Premium Funds from Fair Trade to FAs provide fishers with: 1) safety and navigational equipment, leading to increased safety; and 2) a means of contributing to community via donations and funds for village infrastructure, leading to increased community standing for fishers.<br>• Direct connection between companies and FA leads to potential for reduced business and influence of local traders. |

Sources: Primary interviews with fishers and traders, Bailey et al. (2015), Borland and Bailey (2019).

Substantial efforts are ongoing to promote the sustainable development of export-oriented handline fisheries, via market instruments such as Fair Trade, MSC certification, Fishery

Improvement Programs (FIPs), and via management approaches that are seeking to prioritise the small-scale fishing sector in Indonesia's archipelagic waters. In terms of building and improving the flow and distribution of benefits from these fisheries to coastal communities in Eastern Indonesia, certifiers and companies working together with communities can increase benefits from fisheries. However a number of key issues require consideration, that potentially influence the ability of such schemes to be "scaled out" to other coastal communities.

First, market-led fisheries certification in general has been developed in the context of an "audit culture". This approach relies on methods for defining standards and demonstrating compliance which have been developed largely in the context of developed world fisheries, as well as displaying a focus primarily on environmental standards (Auld et al., 2015; Borland & Bailey, 2019; Bush et al., 2013; Stratoudakis et al., 2016). Small-scale fisheries in low-income contexts such as those in Maluku primarily involve participants with low levels of formal education and literacy, and who are marginalised from wider scientific management processes that impact on them. These factors represent a substantial barrier for small-scale fishers to enter into certification processes. This can have the effect of excluding fishers whose fishing practices are widely considered to be sustainable, even where they have the active support and partnership of companies or associations willing to manage the burden of compliance that comes with certification (Bush et al., 2013; Stratoudakis et al., 2016).

The Maluku case is instructive in this regard. Our interviews and a recently published study by Borland and Bailey (2019) indicate that Fair Trade certification involves a lower burden of compliance regarding environmental standards, while incorporating the equitable enhancement of social and economic benefits into its certification standards. This provides a pathway to certification that marginalised fishers are able to engage in from the perspective of data collection and evidence gathering, and are willing to engage in from the perspective of incentives (Borland & Bailey, 2019). Development of data limited methods for environmental assessment that reduce burdens of compliance, and incorporating the equitable enhancement of benefits flowing to communities into standards, are important ways in which wider certification processes can be improved so as to support small-scale communities enter into these market based schemes. Given that HL yellowfin fisheries in Maluku and elsewhere in Indonesia are entering MSC certification processes, and that data collected for certification purposes is also fed into national-level HS processes, such improvements to make data collection processes work for handline fishers could increase participation of fishing communities in certification, as well as support wider scientific management processes.

**The influence of socioeconomic status and migration on distribution of wellbeing benefits**

In general, socio-economic status influences the ability of individuals and communities to participate in different types of economic activities, and gain access to opportunities to advance socially and economically (see e.g. Stiglitz et al., 2009). In the case of Maluku, this plays out for fishing communities, who tend to be of lower socio-economic status, and even more so for migrant fishers, because of a correlation between lower socio-economic status and migrant status. How does this influence the distribution of wellbeing benefits that flow from the fishery?

The few studies that exist on this chain state that small-scale tuna fishers are economically and socially marginalised in Maluku and considered to be "at the bottom of the tree" in coastal communities (see Duggan et al., 2015; Hayward and Mosse, 2012). Our inquiries suggest that when fishers are migrants this is a key influence on their socio-economic status, and therefore on their participation in fisheries, and the distribution of benefits and risks from the fishery. Discussing the pole-and-line fishery operating out of Ambon City, Hayward and Mosse (2012, p. 4) noted that social relations since the 1980s have been influenced in part by "the low-socio-economic status of many recent … migrants [from

Sulawesi], who lacked socio-economic networking and commercial opportunities on the island".

According to our interviewees, handline fishers in Maluku are most commonly ethnic Butonese migrants who settled in Maluku two generations ago from their home villages in southeast Sulawesi, with some reports suggesting Butonese migrants settled in coastal Seram as early as 1965. In Maluku, ethnic Butonese do not have rights of ownership to forested lands or inshore reef resources, which are managed under customary ownership. The emergence of export markets for tuna, a resource not governed under customary institutions, thus presented an important livelihood opportunity for Butonese migrants. Local Ambonese tended not to enter this fishery in part due to the riskier nature of offshore fisheries, since they already had sufficient livelihoods via subsistence farming and existing nearshore fishing and trading businesses.

The trader patrons who support this fishery are generally Ambonese traders. The traders financed the establishment of recently arrived migrant Butonese fishers, who did not yet have a secure foothold in the local economy. As fishers are obliged to sell fish to their patrons, over time traders have been able to accumulate substantial profits from tuna fisheries, while owner-operator fishers have been to access a relatively stable, though not wealthy livelihood.

In this way social relations of class and ethnicity at the community level, centred around the status of ethnic Butonese as migrants and their marginal social and economic position, have been reproduced in the context of the development of tuna fisheries in Maluku over a 30-year period. These social relations have heavily influenced the choices and strategies of individual fishers and traders alike under changing circumstances, and the subsequent distribution of benefits. These social relations are changing somewhat with Fair Trade certification schemes, which foster direct linkages between companies and fishers that reduces the influence of patrons, and the investment of Premium Funds in communities, which raise the social status of fishers. Our study found, however, that there are barriers to enter the Fair Trade scheme for poorer fishers, and particularly for migrant fishers.

Firstly, to enter Fair Trade, a buyer in the US is required to initiate the certification process and ensure its overall economic viability. A key informant involved in liaising with communities about Fair Trade noted that relations between fishing groups and US buyers are typically brokered by the exporting company, and as a result many coastal communities who may be involved in HL fisheries but do not have a relationship with an exporter to the US who is interested in buying Fair Trade product, find it very difficult to become involved in the Fair Trade process (Interview #56).

Secondly, reports were provided that in the case of Fair Trade, as fishers did not personally receive better prices for fish sold in this chain, but instead received the community-oriented Premium Fund, some fishers reported that they perceived greater short-term economic advantage in remaining outside Fair Trade schemes (Interview #24).

Thirdly, in some cases restrictions on how Premium Funds could be spent also led to difficulties for communities to maintain their involvement in Fair Trade certification programs. Examples were reported of fishers wanting to use funds on buying fuel in bulk through the FA, reducing debt and paying for private boat costs (Interview #56). In one case, a village which had successfully entered Fair Trade certification had their certification revoked due to fishers using Premium Funds to finance private fishing costs (Interview #5).

While aspirations to gain better prices, and reduce costs and debt may be common in businesses, in this case they also speak to the socially and economically marginal position of fishers. A commonly reported reason for misuse of funds was also the low level of financial literacy of fishers. With many fishers in persistent debt due to patron–client relations, the ability to pre-purchase fuel and pay down debts already accrued may lead to

reduced dependency in unequal patronage relations, and the ability to gain greater independence and autonomy.

A further barrier that is specific to migrant fishers is that many cannot meet the Fair Trade criteria of a "fishing community" to receive the Premium Fund, which is a precondition of entry. A CSO employee working in both Fair Trade and non-tuna fisheries described this barrier as follows:

> Respondent: There are two pre-conditions if you want to implement the Fair Trade – I always ask do you have the buyer that actually wants to buy? And the second, do you have the fishers from the same community [where the fund will be housed and premiums disbursed]? Like in Indonesia usually they are not from the community where they fish – like in Lombok actually the fishermen is mostly from the Bone, which is from Sulawesi…
>
> Interviewer: So they are not registered as local citizens?
>
> Respondent: No, only seasonal … We have a supply chain in Lombok, and they really eager to have Fair Trade. But it's difficult, we cannot enter because the fishermen is not from there. So how do you bring them in? Because the premium is for the community.
>
> Ambon (Interview #56)

In the case of migrant fishers, their ability to enter Fair Trade certification then is dependent on the quality of their relationship with the communities in which they live and fish. In the case of Maluku, some 755 migrant fishers across Ambon, Seram and Buru Islands, who have historically experienced difficulties including marginalisation, nevertheless have been able to develop co-operative relations over time with local traders and communities, which means they can participate in the Fair Trade market. However not all fishers in these areas participate in Fair Trade fisheries, and in some cases in Maluku and elsewhere in Eastern Indonesia where relations between migrant fishers and local communities are more difficult, or where fishers' presence is only seasonal, entry into Fair Trade has not always been possible. This is significant given the prevalence of migrant fishers in HL yellowfin fisheries in Eastern Indonesia, and the potential for conflict and difficult relations between migrant and local communities.

Overall then, these barriers indicate that while Fair Trade certification in Maluku provides a valuable example of how to improve wellbeing benefits from the fishery, it is not a "one size fits all" solution that can be scaled across all tuna fishing communities.

**Gendered division of labour and implications for fisheries governance**

The handline fishery targeting yellowfin has a gendered division of labour (men and women undertaking different roles). Understanding the gendered division of labour is important for understanding the way the fishery operates for the purpose of designing interventions in order to improve wellbeing contributions from this small-scale fishery, or to implement data collection about the fishery.

Men tend to occupy roles associated with fishing, with lifting heavy loads, with the most lucrative export-oriented trade and with positions associated with authority, such as managerial and executive roles in export companies and government offices. Women tend to participate in roles associated with lower-value local trade and village-based processing. They make up the majority of workers in exporting companies, and occupy administrative and sometimes middle management roles in companies and government offices. For example, in one exporting company in Maluku, women were reported as being 60% of the workforce on the floor, where their skill in cleaning and grading fish loins was seen as

particularly valuable, while men tended to undertake heavy lifting and transporting roles, as well as some processing roles. However, in the management side of the business, women made up only 30% of the workforce, with this being mostly administrative and middle management roles (Interview #5).

At the village level, this gendered division of labour in the handline yellowfin tuna fishery was described in shorthand by a number of fishers as the husband doing "all the activities on water" and the wife doing "all the activities on land". One informant discussed this in more detail as follows:

> Men and women usually make an agreement on how to decide how much is the price. If the fish is below twenty kilos [and therefore not able to be sold to a trader in the export chain], the woman will decide. So the man just catches the fish and leaves it for the woman. And after that woman will slice the fish and make salted fish or cook or sell, all over around the place. In some cases the woman will also provide for the boat in buying food, preparing food for husband to go for fishing. Even buying the oil, petroleum, and preparing everything for the business. The husband usually just gets ready to go fishing and come back. Here, in Ambon usually the wife also brings to the market to sell it or going around try to find market for their fish.
>
> Female CSO gender specialist, Ambon (Interview #9)

This gendered division of labour is not unchangeable. Nor do all interviewees completely agree on the roles of men and women in the fish chain, and there is some variation in how people describe gender relations in the chain. Our analysis is of overall patterns, rather than presenting these as immutable social facts, resistant to change or exception.

An important aspect of this common way of approaching family fishing businesses means that for small-scale tuna fisheries women tend to have greater exposure to financial management, and therefore can develop proficiency with finances and small business management. In Ambon some female traders in the local chain have been able to upscale and enter into trading in the export chain, where returns can be much more lucrative. It is not clear how many female traders exist in this chain, but one female informant reported having as many as 62 fishers in her operation. This is at the larger end of village-level trading arrangements in Maluku, with estimates provided of between 18 and 70 fishers attached to traders in the export chain during our primary interviews. However, in studies elsewhere in Indonesia up to 200 fishers have been reported as operating under a single patron (McClean, 2017).

This finding that women tend to do most of the trading in small-scale family-based fisheries in Maluku shows the possibility in coastal fish chains of women transitioning from informal trading or basic processing roles into more entrepreneurial roles with substantial influence in local settings, while fulfilling roles that accord with established social norms around gender in coastal communities. This dynamic is worthy of future attention for researchers, to consider the implications for efforts to improve women's livelihoods and their role in decision-making in coastal communities.

While this fishery is generally reflective of wider gender dynamics in global tuna industries (see Barclay et al., 2015; Sullivan & Ram-Bidesi, 2008), and of handline tuna fisheries in Indonesia (see e.g. USAID Oceans, 2018a), it also reflects some Maluku-specific aspects of gender relations. One key informant responsible for gender strategy within a large aid organisation also observed, in connection to these divisions of labour, that in Maluku women were in a position to have a greater role in public life at the village level than elsewhere in Indonesia.

> For Maluku I think one thing that is very interesting for me in the fishing families, it is the woman who usually decides what the price is … people really depend on their wives … And if we compare with other communities, for Maluku in general women have very strong responsibility. Women, usually they don't only sell fish and do household jobs, but they also try to be involved in organisations, church organisation or in the mosque, and in the life of the community ... So women [in discussions] they also can put their position quite strongly ...
>
> Female CSO gender specialist, Ambon (Interview #9)

What are the implications of the gendered division of labour for the governance of the fishery to promote community wellbeing? First, including women in stakeholder discussions and as participants in any training or other extension work is a key means of including their knowledge in fisheries discussions. The fisheries sector tends to consist of exclusively or mainly men in such activities. Any interventions to improve wellbeing outcomes of the fishery through financial training must include women because they are the main ones handling the finances. This also applies to data collection interventions for recording landings or auditing supply chains, particularly to capture information about fish entering local market chains, due to the fact that women have a high involvement in activities once fish is landed and in local market chains. Finally, women's wellbeing, as well of the wellbeing of fishing families, can be supported by increasing the involvement of women traders in the export chain. This can be done by providing targeted business training and development programs for women in local trading activities, to be able to move upwards into more lucrative export chains.

## Summary of key factors influencing wellbeing

In summary, the Maluku handline yellowfin tuna export fishery is generally considered to be ecologically sustainable in terms of its long-term impact on fish stocks, however this rests on the assumption that total catch/effort levels are maintained at sustainable levels. Furthermore, it produces substantial economic benefits that are distributed in remote areas of Indonesia, to groups who are in economically and socially marginal positions. Key benefits at the local level are influenced by access to export markets, and by local community relations that distribute those benefits among migrant fishers and a variety of local traders. This includes participation by some in the Fair Trade certification scheme, which has led to substantial new benefits flowing to fishers and communities, and has to some extent addressed the inequitable distribution of benefits among fishers and traders in the export chain. Based on this we summarise here the key factors influencing wellbeing in communities, and provide a series of recommendations.

### Government regulation

Recent reforms related to IUU and ex-foreign vessels have not yet had a direct impact in this fishery in terms of increases in fish abundance. Yet regardless of any benefits these deliver, a substantial medium-term risk exists in relation to small-scale effort replacing large-scale effort, leading to potential overfishing of yellowfin and erosion of the substantial social and economic benefits arising from the fishery. Establishment of sound fisheries planning processes and fisheries management systems remains critical for ensuring effort is effectively managed across all sectors, and the risk of overfishing is minimised.

Ensuring the AW Harvest Strategy promotes wellbeing in coastal communities, especially for the poorest people in coastal communities, is an important aspect of planning in this sector. Incorporating management objectives that address wellbeing/welfare alongside those addressing prosperity, as well as including explicit allocations of catch to small-scale tuna fishers, are key steps in working towards this outcome.

**Non-government influences**

The emergence of an export market chain for fresh tuna transformed tuna fisheries in the region and led to substantial new benefits flowing to remote and coastal villages. The distribution of wellbeing contributions from the fishery are shaped by the way the industry operates, as well as underlying social relations.

- Patron–client relations between fishers and traders have both supported the growth and development of the fishery, while also leading to a clear distribution of benefits in favour of traders operating in the export chain.
- US market demand for Fair Trade certified fish has led to wellbeing benefits (training, market knowledge, community development projects) for fishers able to meet the criteria for this market. However, barriers to entry into Fair Trade schemes exists, and incentives are not always aligned with fishers' aspirations and needs. The current standards, while highly promising, are unlikely to be scaleable across all similar HL yellowfin fishing communities.
- Ethnicity/migration along the value chain has structured participation in the fishery from its initial development, and therefore the distribution of economic benefits, as well as exposure to safe/unsafe work conditions for different groups. In particular, the marginal status of migrant Butonese has led to them become tuna fishers, which means they have gained fewer financial benefits than traders in the export chain, who tend to be local Ambonese, and they are exposed to greater livelihood insecurity and safety risks.
- Gender relations structure participation in the fishery in terms of which roles men and women occupy. While men tend to be associated with fishing and roles that focus on trading higher quality fish (associated with greater wealth accumulation), women have a key role in managing household income and local trading. As a result, some women have been able to use their financial and business literacy to achieve upward mobility and enter the higher value export chain.

### 2.1.2 Local consumption oriented handline/troll line fishery: 5–8 GT vessels

Handline/Troll line (HL/TL) vessels with a crew of around five to eight people operate throughout Eastern Indonesia, having originated in southern Sulawesi among ethnic *Bugis* fishermen and subsequently becoming widespread (Proctor et al., 2019). This fishery has received less attention than the export oriented handline yellowfin fishery, so there are fewer published studies available. Furthermore, constraints on fieldwork meant we conducted fewer interviews for this chain than the yellowfin chain, so overall this section contains less information than the yellowfin section of the case study.

We have focused this case specifically on HL/TL vessels of 5–8 GT that operate out of the municipal fish market in Ambon, known as Arumbai Market. These vessels sell largely skipjack, as well as sometimes considerable quantities of juvenile yellowfin and bigeye tuna through the market. It is the principal market for fresh fish for residents of Ambon City and is managed by the Ambon City government. It is distinct from the provincial government managed *Pelabuhan Perikanan Ambon* (Ambon Fisheries Port) some 1.5 km to the north, where a wide variety of vessels servicing larger processing and export companies are located behind the dock in a special development zone. The fish chain for Arumbai Market HL/TL fishery is displayed below in Figure 16.


**Figure 16. 5-8 GT Handline/Troll line fish chain in Ambon.**

There is no clear documentation of exactly when these vessels began operating out of Ambon to supply local markets, or the total number of vessels. Hayward and Mosse (2012) report that a local fishery in Ambon Bay had been supplying fish to coastal urban areas of Ambon since at least the 1950s. This fishery utilised pole-and-line techniques, introduced by Japanese fishers to Ambonese residents of coastal neighbourhoods in what is today the Galala/Hative Kecil district. Following the collapse of this fishery in the 1980s, a range of motorised vessels up to 40GT have been fishing throughout Maluku to supply companies and local markets in Ambon (Hayward and Mosse, 2012). It is likely this includes the 5–8 GT HL/TL vessels discussed in this case.


**Figure 17. Two handline/Troll line vessels docked at Arumbai Market.**

This chain as it operates today exists largely to service high demand within Ambon for skipjack tuna (*cakalang*), with occasional sales of larger yellowfin tuna in Arumbai Market and to companies in Ambon. The two principal market chains are for fresh fish, sold mostly in Arumbai fish market, and smoked fish known as *ikan asar*. *Ikan asar* is sold from a specialty market in Galala/Hative Kecil, a waterside locality on the south-eastern shore of Ambon Bay, and with a small amount sold by street vendors outside Arumbai Market.

Proctor et al. (2019) report that these 5–8 GT vessels are essentially multi-gear vessels making use of several different kinds of handlines including droplines, kite fishing and troll lines, and switching tactics depending on seasons and conditions. They fish almost entirely on FADs. This fishery in its current form and the benefits that flow from it rely entirely on access to FADs. In light of the lack of implementation of government FAD regulations thus far, currently effort is responsive to informal relations and ad hoc arrangements between FAD owners and boat captains, with very few fishing boats of this size owning FADs. FAD access arrangements reported in interviews and in Proctor et al. (2019) are summarised in the following table.

**Table 12. FAD management access arrangements for non-FAD owning vessels**

| Nature of access | Means of arranging access | Benefits |
|---|---|---|
| **Agreement with FAD owners for a fee** | A widespread arrangement for many gear types. This may be a large vessel owning company based in Bitung or Bali, or *Mitra Kolaborasi*. *Mitra Kolaborasi* are community fishers associations who build and maintain FADs with government support. | Mutual. FAD owners generate revenue, fishers gain access to the resource. In some cases this may also include HL/TL vessels providing catch to PS vessels as "payment" for accessing the FAD. |
| **Agreement with FAD owners/companies for free access to FAD** | Usually brokered via a personal relationship with a company employee or association member. | Mutual. HL vessels "guard" FAD and report use/abuse to companies (who can then levy fees on these boats for access), in exchange for access to the resource and shelter (they can tie up on the FAD). |
| **No agreement with owners – FAD accessed without permission.** | Usually FAD locations already known by captains. | Fishers gain access to the resource. No benefit for FAD owners. |
| **Agreement for PS vessels to access HL/TL fishing grounds for the purposes of deploying and fishing on FADs.** | Likely informal arrangement between vessels. | PS fishers gain access to the resource. HL/TL vessels receive catch from PS vessels or a payment. |

Sources: Primary interviews, Proctor et al. (2019).

Trips were reported in interviews as usually being up to a week in length with crew of between five and eight men in their teens, 20s and 30s. Our interviewees said most fishers left school after elementary grades or in early secondary years, often due to family financial pressures (see also Proctor et al., 2019). It appears that fishers are fairly mixed in this chain, with a large proportion being Bugis from Sinjai Regency in southwest Sulawesi, some fishers from other parts of Sulawesi, as well as fishers from Maluku working on boats owned by local companies and traders.

Reported catch was typically up to a tonne of fish over the course of a trip in Ambon, though Proctor et al. (2019) report catches of up to three tonnes at times for similar vessels in Kendari. Fish is stored in ice in the hold of the vessel. The target species is skipjack, but as is common with tuna FAD fishing catches also include some small yellowfin and bigeye tuna, and coastal tuna species (Hayward and Mosse, 2012), while marlin and dolphinfish were also observed being unloaded directly in Ambon Market.

Boats usually unload catch directly at the dock at Arumbai fish market and sell their catch to traders operating in the market. When not fishing they will often "tie up" for periods at Galala, which is some 3.5 km along the coast to the north. Traders in the Ambon Market hire networks of casual processors to clean and loin fish, and casual retailers who sell direct to the public.

**Figure 18. (L) and (R) Unloading a handline/Troll line vessel dockside at Arumbai Market (Photos: Dedi S. Adhuri).**

The smoked fish trade is an important aspect of the skipjack trade in Ambon City, though its volumes are much smaller than the fresh fish trade (Hayward and Mosse, 2012). The smoked fish trade still centres around the small waterside market in Galala/Hative Kecil district. This district has, according to Hayward and Mosse (2012), been the focus of fish trading activities since the Ambon Bay fishery began in the 1950s and the smoked fish trade began in the 1980s. It represents a remarkably durable feature of the local economy, and is testament to the popularity of skipjack tuna consumption in Ambonese food culture.

Smoked fish traders will often buy directly from Ambon Market, and transport to smoking houses behind the Galala/Hative Kecil market for processing and sale. In some cases fish smokers will pre-arrange an order of fish with a boat before it leaves from Galala and have fish directly delivered to smoking houses. Some smoked fish will also be sold by independent vendors on the streets in Ambon, particularly in front of the main fresh fish market.

No fishers we interviewed in the 5–8 GT HL/TL fishery reported the kind of long-term patronage evident in the handline yellowfin fishery, where fishers were financed to build boats by patrons, nor is such a patronage arrangement mentioned for this fishery in the published literature. It is common practice in the skipjack fishery for traders in the market to own boats and employ crews (Interview #21; Hayward and Mosse, 2012). Independent vessel owner-operators also exist, and will either fish independently, or will be financed on a trip-by-trip basis by a trader. In these cases, traders cover the costs of a single trip (ice/bait/fuel) and buy the catch from that trip. Owner-operators can freely switch between bosses as long as there is no accrual of debt related to ice/bait/fuel costs from previous trips. Owner-operators of this sort reported fishing for multiple bosses in Ambon, as well for bosses across multiple ports. Where no boss is paying for ice and fuel, fishers sell direct to buyers in Ambon Market and to fish smokers in Galala.

## Standout wellbeing contributions to coastal communities

### Economy

It is difficult to ascertain the exact volumes of this chain, as tonnages flowing through the Arumbai Market are likely infrequently reported to authorities. However skipjack (*cakalang*) is reported by provincial fisheries statistics as the third highest landed catch during the period 2013–2017, for a total of 46,893 tonnes (see BPS, 2018, p. 376). There is no published material on direct/indirect economic contributions, total employment or wages for this chain in Maluku.

#### *Livelihoods for fishers, casual workers and traders in Ambon*

Employment generated through this chain provides income to fishers, retailers and a range of casual labourers earning cash in hand and fish for wages. For some of these groups, it is unclear what other forms of employment may be available to them if *cakalang* landings decreased.

In regards to fishers, this fishery provides a source of employment for fishers who have come from Ambon and from across Eastern Indonesia and particularly Sulawesi. Fishers in this chain are paid on a catch-share basis. While no public data is available for Maluku, Proctor et al. (2019) report that for vessels based in Kendari, an average of 97 USD per trip was calculated per crew member, based on data from 2014–2015. If these figures remain broadly indicative of returns and individual wages from this fishery across Eastern Indonesian waters, then two week-long trips per month would be required for a crew member to achieve the basic minimum wage in Maluku (currently it is $181 USD per month). According to Proctor et al. (2019), the fact that this fishery offers a better wage than the provincial minimum wage provides an incentive for young fishers to leave school after elementary grades or in early secondary school and enter the fishery.

With regard to roles in Arumbai Market itself, a range of casual positions open to workers from lower socio-economic backgrounds in Ambon exist. Teenagers help unload boats at the market, being paid in fish (reports are three fish per shift, or 50,000 RP if there are not sufficient fish), which are either sold for cash or consumed directly. In the market itself, networks of processors preparing, cleaning and loining fish, and retailers managing sales are typically made up of casual workers who are employed by a buyer and paid on a daily basis. While the financial rewards may not be particularly high for this work, one advantage of this situation is flexibility. A retailer may seek work from a buyer when that buyer's boats are in, but may choose not to work if they don't want to, or work for another buyer if their regular employer's boats are not in. A number of young women in retail roles reported that this flexibility allowed them to integrate work into their family life and obligations (Interview #38).

Traders operating in Ambon Market were reported as deriving the most substantial economic benefits from this chain. In some cases traders reported owning six vessels, and operating networks of up to eight retailers, who sell directly into the market (Interview #21).

#### *Working conditions*

The position of workers along the fish chain regarding employment security and work conditions are displayed in the following table. This fish chain is almost entirely informal and therefore there are significant issues around work insecurity as well as safety at sea for fishers.

**Table 13. Working conditions for different roles in the HL skipjack fishery based in Ambon**

| Position | Security of work | Work health and safety conditions |
|---|---|---|
| **Fishers** | **Insecure**<br>While wages are reported to be above minimum wage standards, crew are entirely reliant on catch share payments with little ability to ride out low periods. Often young men with little education and few alternative options who have entered the fishery due to financial stress. | **High-risk work environment with few safeguards**<br>Fishers operate in a very high-risk setting on the open seas. Historically little access to safety equipment, formal health care and typically no insurance cover. GPS introduced in recent years for some fishers. |
| **Traders in Arumbai Market** | **Relatively secure**<br>While local buyers are also subject to the fluctuations in fish availability over time, they run extended networks of fishers and retailers and are considered likely to have a sufficient capital base to ride out periods of shortage. | **Lower-risk work environment with some safeguards**<br>Traders tend not to be subject to major safety risks. Some have financial resources to access health care. Unclear to what extent insurance cover exists. |
| **Fish preparation (loining and cleaning) and retail roles in the Arumbai market** | **Relatively insecure**<br>Local chains are entirely informal with no contracts, employees are instead casual/informal labour hired on a day-to-day basis. Some roles (e.g. unloading) operate on the basis of fish for wages. | **Lower-risk work environment with few safeguards**<br>Local chain roles tend not to be subject to major safety risks, although no formal health care or insurance cover reported. |
| **Family-based fish smoking businesses in Galala/Hative Kecil** | **Relatively insecure**<br>Subject to fluctuations in supply, and businesses small-scale and family based with little back up capital. However, they have access to local vessels and the Ambon markets have not yet reported critical downturns in supply. | **Medium-risk work environment with few safeguards**<br>Retailing roles have few safety risks, processing roles have long-term health risks associated with exposure to smoke. Some family businesses reported purchasing BJPS (govt) health insurance available to small traders. |

Sources: Primary interviews, Hayward and Mosse (2012) and Proctor et al (2019).

## Food and nutrition security

This fish chain supplies domestic markets thus providing substantial food benefits in Ambon. Being an affordable food source, it is available to people at all levels of income. In urban areas of Maluku between 2014–2017 seafood consumption made up 32 percent of daily protein intake (roughly three times the national average), and 11 percent of total household food expenditure (third only to cereals and prepared foods) (BPS, 2018 p.646). Our interviews suggest that a substantial percentage of this fish consumption and expenditure consists of *cakalang*. Some casual workers participating in this chain receive fish for wages, especially occasional labourers and teenagers who help unload boats. Reports of both sale of these fish and direct consumption indicate that this informal local chain is likely to contribute to basic food security for some of Ambon's more vulnerable urban communities.

The fishery has led to the development of a distinctive food culture where skipjack (*cakalang)* is considered to be a characteristic aspect of Ambonese food culture and daily life. In the last 15 years smoked fish has become particularly prominent as a typical Ambonese dish, and a higher value prepared product that has become popular as urban growth has occurred, costs of living have risen, and workers with less time to prepare fresh food are more prevalent (Hayward and Mosse, 2012). In Ambon fish is smoked with wood (no other additives), and is commonly eaten in shredded forms with sambal, as well as cooked fresh in a variety of dishes, such as in *kari ikan* (coconut milk fish curry), in *ikan kuah kuning* (yellow fish soup), *pepes* (cooked in banana leaf) or *rica-rica* (in spicy sauces).

**Figure 19. Smoked *cakalang* for sale in Hative Kecil (Photo Dedi S. Adhuri).**

Respondent: Especially the Maluku people, they get a headache if they have no fish to eat.
Interviewer: And mostly skipjack is for restaurants?
Respondent: Yes indeed. That's the king, it has (to) be skipjack.

Trader in Ambon Market

Interviewer: In Ambon, what is the first choice of fish?
Respondent 1: It is surely *cakalang*. Because if they open the stalls, they are all selling *cakalang*.
Respondent 2: People [here in Ambon] eat skipjack tuna. People most prefer the skipjack tuna.

Employees of a fish processing and export facility, Ambon

Our interviews, as well as Hayward and Mosse's 2012 study of the smoked tuna trade, suggest that skipjack tuna has a higher value in Ambon than in other areas of Maluku and Eastern Indonesia even where consumption of skipjack regularly occurs. The local variation in tastes may be a considerable influence on consumption patterns and therefore how fish chains operate, and would be worthy of further attention in future research.

Food and nutritional benefits from this chain in coastal communities occurs via four potential "pathways," as shown in the following table.

**Table 14. Pathways to increased fish consumption as a result of HL/TL skipjack tuna fisheries in Ambon**

| Pathway | Details |
|---|---|
| **Direct consumption of fish** | Consumption by fishing families, as well as casual labourers in Ambon markets who are paid in fish. |
| **Increased cash income may lead to better nutrition** | Tuna livelihoods leads to increases in cash income for fishers, traders and processing workers in Ambon. Literature (e.g. Fabinyi et al., 2017; Allison et al., 2015) indicates that increases in cash income to fishers, traders, processing workers and retailers leads to an increase in consumption of higher-quality foods (fresh fish, fresh meat, fresh vegetables etc.). |
| **Supply boosts consumption of fresh tuna in Ambon** | Sale of SKJ and YFT into local markets in Ambon leading to widespread household and restaurant consumption. |
| **Supply boosts consumption of smoked tuna in Ambon and in other parts of Indonesia** | Family-run businesses sell smoked fish to the public in Galala Market in Ambon, leading to widespread household and restaurant consumption in Ambon, and further afield when travellers buy to take home. |

Sources: Primary interviews unless stated in the text.

To fully realise the benefits of increased fish supply the fish must be safe to eat. In this chain fish handling and food safety standards tended to be low. Fishers, traders and retailers in Arumbai Market reported little formal education, and no training being provided to them from government sources, technical colleges or CSOs.

**Figure 20. Examples of fish storage in Arumbai Market. (L) Skipjack tuna stored in ice slurry. (R) Skipjack tuna being stored dockside while being unloaded from a vessel. The fish lying on the ground have been put aside as "fish for wages" by unloading crew (Photos: Dedi S. Adhuri).**

**Figure 21. Tuna being loined and prepared for sale alongside reef fish in Arumbai Market (Photo Dedi S. Adhuri).**

Practices in Arumbai Market are somewhat in contrast to the smoked-fish market in Galala/Hative Kecil, where smoking helps preserve the fish and well established practices of appropriate fish handling were reported. This included consumers being shown the fish preparation facilities to ensure that preparation is both hygienic and halal (Interview #32). Moreover retailers in the smoked-fish trade have received training in value-added processing, new smoking techniques using “liquid smoke”, and the development of product packaging to maintain product quality. These efforts have included training in product handling and hygiene, and have been largely driven by the emergence of a “tourist trade” in smoked fish that has prompted local government attention to this sub-sector of the fishery (Hayward and Mosse, 2012).

### Environmentally sustainable fisheries

While there are relatively few detailed published studies on the social and economic aspects of HL/TL fisheries, there is an increasing level of catch data being collected via port sampling initiated by civil society organisations. These operate under the auspices of the regional-level Fisheries Co-Management Committees and represent a promising development in sustainable tuna fisheries governance in Indonesia.

“One-by-one” fisheries such as handline and Troll line methods are seen as being a relatively environmentally benign form of tuna fishing, similarly to the HL yellowfin fishery. Stock assessments in 2017 for the Western and Central Pacific Ocean indicate that at a regional level bigeye tuna are overexploited, skipjack and yellowfin are currently not overexploited, however yellowfin are fully exploited and are not able to absorb any further increases in catch (ISSF, 2018). In light of this, handline fisheries are widely viewed in Indonesia as potentially contributing to greater sustainability of fish stocks by virtue of the fact that they are “one-by-one” fisheries (see e.g. McClean, 2017; Duggan & Kochen, 2016).

In the case of FAD-dependent HL/TL fisheries, this may be mitigated by the catch of juvenile yellowfin or bigeye tuna alongside target skipjack tuna. In general however, HL/TL fisheries were considered by respondents in this study to be far more sustainable than larger purse seine fisheries operating on FADs, due to the volume of catch per vessel, and the lack of bycatch of ETP.

In the context of wider management approaches, the possibility of ensuring allocations of catch to smaller-scale “one-by-one” fisheries has the potential to underpin the long-term viability and profitability of Indonesian tuna fisheries, as long as overall catch/effort is effectively managed and maintained at sustainable levels, particularly for juvenile bigeye and yellowfin tunas.

## Integrated discussion of governance and wellbeing

There is a lack of detailed published studies on FAD-based HL fisheries across Eastern Indonesia regarding basic catch data, and the types and extent of social and economic benefits from these fisheries. However there is an increasingly extensive body of catch data collected via port sampling, and some unpublished social/economic data which is beginning to be published (see e.g. Satrioajie et al., 2018).

Key aspects of the governing system on these fisheries are as follows:

#### *Government*

- Government regulations regarding FAD management and labour and safety standards have not had a major influence on these fisheries as yet, with some minor exceptions in regards to FAD management.

- There remains a lack of understanding about how implementation of FAD management would affect wellbeing contributions coming from the fishery.
- This case identifies that contributions to low-income and potentially vulnerable groups flow from this fishery. Regulation has to be carefully planned in order not to exacerbate poverty or food insecurity among those groups of people.

***Markets and business operations***

- Wellbeing is significantly affected by relations between actors in the fish chain. In particular, access arrangements for FADs between FAD owners and HL vessels are a critical aspect of ensuring that resource access, and therefore wellbeing benefits, can be maintained for this chain.
- Being focused on domestic and low-value markets, this fish chain is almost entirely informal. As a result, residents of Ambon with little income or education can participate, however this also means there are issues regarding food safety, work conditions and a lack of income/employment security.

***Distribution of benefits***

- Socio-economic status and the gendered division of labour influence the distribution of benefits in this fishery.
- Further research is required to build the evidence base on who derives basic poverty alleviation and food security benefits, and identify clear patterns related to the participation of migrant fishers.

## Government regulation and wellbeing

Similar to the yellowfin handline fishery findings, our interviews and literature research showed that government fisheries reforms and regulation are yet to have a significant effect on this fishery. Similarly, no reports of direct linkages with government were made in interviews with fishers, leading to the conclusion that fishers in this chain have relatively low levels of engagement with and influence on wider management processes. Traders appear to have had more regular contact with local and provincial authorities, especially where they run vessels that require regular licence renewals, however beyond this basic engagement there were no substantive relations with government reported. This is important in three contexts: fisheries data collection, FAD management, and health and safety standards.

### *Fisheries data collection*

There is a lack of detailed studies on FAD-based HL fisheries regarding either catch volumes or the types and extent of wellbeing benefits from the fishery. This is particularly the case where chains focused entirely on direct local consumption exist, such as the case in Arumbai Market. In this case it is possible that reported catch and price data is not included in provincial government statistics. Moreover, the specific contributions focused on poverty alleviation and food security have no data tracking these. Without such information, or a broad proxy in the form of total catch with percentages of catch that enter either processing companies via the main Ambon Fisheries Port, or Arumbai Market for local consumption, incorporation of the important functions these chains play in decision making at provincial and national levels is challenging.

### *FAD management*

Our finding mirrors studies of other FAD-dependent small HL/TL vessels in Eastern Indonesia, which report as yet no effective implementation of FAD regulations or management plans (Proctor et al., 2019), with the exception of some FADs being cut from their lines by MMAF surveillance units in Ambon (Proctor et al., 2019, p. 41). Given the high level of FAD dependency, future efforts to manage FADs may affect community wellbeing. In particular, where historical over-deployment of FADs may lead to regulatory efforts aimed at a future reduction in FAD numbers (see e.g. Nurani et al., 2018; Yusfiandayan, 2013), then the largely domestic benefits from this fishery are potentially at risk in the medium term.

The low level of linkages between government and fishers/traders in this entirely informal chain is cause for some concern, given the potential impact on these fisheries of any change in FAD management. Improving direct connections and communications between fishers and provincial governments may provide a means for developing FAD management regulations that take into account this reliance, and the potential impacts any given management approach may have on these fisheries, and the food supply benefits accruing from them.

### *Labour and workplace safety standards*

Given the almost entirely informal nature of this chain, government initiatives, laws and regulations around labour standards, work conditions, and food safety and hygiene standards have also not yet had a discernible effect on this fishery. The only exceptions were some smoked-fish family businesses reporting accessing government health insurance for small traders, and some provision of training to smoked-fish retailers from the local government.

Health and food safety issues in the local Ambon Market require local and provincial-level government action to improve market conditions, yet there appears to have been little action in recent years. Smoked-fish processors in Galala/Hative Kecil have been provided with purpose-built stalls in the past, and this attention from local authorities is reported by Hayward and Mosse (2012) to be due to the rising popularity of the tourist trade in smoked-fish products. Yet action on the main local market, which provides the bulk of fresh seafood to Ambon City, appears to be minimal and safety standards generally not policed. Improving direct connections and communications between local traders and local government may be one aspect of developing better health and food safety conditions in the market over time, with benefits for consumers and traders alike.

## Influence of end markets and business operations on community wellbeing

Due to its largely informal nature, the governance of this fishery mostly operates via preferences and dynamics in local markets, and business arrangements affecting fishing operations.

The relations between larger FAD-owning companies and smaller FAD-accessing vessels affect the fishery through mediating basic access to fisheries resources for HL/TL vessels. Where positive relations and clear access arrangements exist for HL/TL vessels, resource access and the benefits flowing from these fisheries is relatively secure. As Table 12 indicates, co-operative relationships between FAD owners and HL vessels are widespread, yet transactional relations and relations of potential conflict also exist. While specific episodes of conflict were not discussed in detail in interviews, the effects of increased fishing effort and deployment of FADs leading to resource-user conflicts in the last two decades are commonly reported in Indonesian tuna fisheries (McClean, 2017). In this case such conflicts may negatively influence relations between FAD owners and HL fishing vessels, especially the development of co-operative arrangements with SS HL vessels. Where fishers cannot

secure access arrangements, the largely domestic benefits from this fishery are potentially at risk in the medium term, and the likelihood of illegal use of FADs is increased.

Through being connected to a low-value local market rather than a high-value export or large-scale processing chain, this chain is primarily informal labour with few effective regulations or standards in place. The lack of effective standards influences the working conditions and the food safety and hygiene standards of this chain. As a result, fishers operating under catch-share models, and processors and retailers in Arumbai Market under casual work arrangements, are exposed to regular income insecurity. Moreover, the relatively low food safety and hygiene standards and the lack of effective cold storage facilities in Arumbai Market potentially reduce the value of fish products in the local chain.

**The influence of socioeconomic status and migration on distribution of wellbeing benefits**

Most of the roles in this fishery provide a consistent source of work for casual fishers, labourers and small-scale processors/retailers operating out of the Ambon Market. This work is highly accessible relative to participation in the yellowfin handline chain, as these roles can be entered and exited at short notice, and individuals do not require access to credit via a patron in order to participate in the fishery. Entry-level jobs as crew on vessels or as retailers in the market require no prior knowledge or equipment. This chain therefore provides readily accessible livelihood benefits to a sector of Ambonese society from lower socio-economic backgrounds, in many cases with little social capital and business networks to draw on (Hayward and Mosse, 2012). It is not clear the extent to which such workers have ready access to alternative sources of income. Hayward and Mosse (2012) connect this pattern to issues around migration, with the lower socio-economic position of migrant fishers from Sulawesi providing a “push” factor to enter lower-paid casual roles, and to an extent this was reflected in our data from some fishers we interviewed originally from Kendari in southeast Sulawesi. Clearer patterns around socio-economic status and migrant status may emerge with further detailed research on this chain.

**Gendered division of labour**

The roles of men and women in the HL/TL fish chain to a large extent mirror dynamics in the export yellowfin chain. Fishing is generally done by men, as are unloading and processing jobs. In the case of Ambon Market, loining and preparing larger fish for sale is often done by men, while for smoked fish men take care of unloading, transporting and processing of fish.

Women participate principally in retailing and trading roles – either employed by a trader in Ambon Market, selling smoked fish their husbands have processed as part of a family business, or in some cases selling smoked fish on the street outside Ambon Market. While most of these roles are relatively insecure, they provide certain important benefits to women. As part of a family business, female retailers exercise a degree of independence by not being under a “boss”, and tend to manage the business, including finances, payment for services and supplies (Interview #32). For causal workers in Ambon Market, the flexibility of these roles can provide some benefits to women who need to balance family and professional obligations (Interview #38).

Some traders in the Ambon Market employing networks of processors and retailers are women. By virtue of their role these female entrepreneurs have substantial influence in the “trading floor” culture of the dock and attached market, and are actively involved in financing fishing trips and negotiating prices at the dock. It is not clear the precise numbers of traders based out of Ambon Market, or the numbers of those traders by gender. However, in the course of observations over four visits to Ambon Market, both male and female traders engaged in negotiations over skipjack catch. This mirrors wider patterns in Indonesian tuna fisheries, as documented in our case studies in Bitung and Maluku, where women may occupy positions of considerable influence in tuna fisheries.

## Summary of key factors influencing wellbeing

This fishery provides important local food supply benefits through providing a plentiful and affordable supply of fresh and smoked fish to urban populations, and provides employment benefits to a range of workers from low socio-economic backgrounds. Given that family financial stresses are reported to be a common driver influencing entry into the fishery for young men in similar fisheries in Sulawesi, it is likely that crew wages play a poverty alleviation function for some crew, by maintaining a basic standard of living. However, income insecurity is common, and food safety and hygiene standards are sub-optimal in Arumbai Market. This may influence the value of product and the safety of the fish for consumers.

### *Government*

- Government regulations regarding FAD management (with some minor exceptions) and labour and safety standards have not had a major influence on these fisheries as yet.
- Local chains such as this are not well connected to management processes that will likely affect them in the future. This is particularly important in relation to FAD management regulations, while any improvements in the health and safety standards in the Arumbai Market stand to impact positively on the wellbeing of consumers as well as traders.
- There remains a lack of understanding about how implementation of FAD management would affect wellbeing contributions coming from the fishery.
- Contributions to low income and potentially vulnerable groups likely flow from this fishery. Regulation has to be carefully planned in order not to exacerbate poverty or food insecurity among those groups of people.

### *Non-government influences*

- Wellbeing is significantly affected by relations between actors in the fish chain. In particular, access arrangements for FADs between FAD owners and handline vessels are a critical aspect of ensuring that resource access, and therefore wellbeing benefits, can be maintained for this chain.
- Being focused on domestic and low-value markets, this fish chain is almost entirely informal. As a result, residents of Ambon with little income or education can participate, however this also means there are issues regarding food safety and work conditions, and a lack of security of income/employment.

## 2.2 Bitung purse seine and pole-and-line fishery

Bitung is the principal tuna landing port and has the largest concentration of tuna processing infrastructure in Eastern Indonesia, preparing fresh, whole frozen, prepared, smoked and canned forms of tuna. These are distributed directly to export, to major processing and export hubs in Bali, Surabaya, Jakarta and occasionally to other ports in Eastern Indonesia, which then onsell to both export and domestic urban markets. A substantial though lesser amount of fish in fresh and smoked forms also enters local market chains in North Sulawesi.

A wide range of boat and gear types fish for tuna out of Bitung primarily, principally small and medium-sized handline and purse seine gears. There are also a limited number of longline, purse seine and pole-and-line vessels in the 30–100 GT range. Prior to enforcement of IUU and ex-foreign vessel regulations in 2014, a range of large purse seine and longline vessels, both foreign and domestically owned, operated out of Bitung, including oceanic vessels of well over of 150 GT. At the present time carrier vessels of up to 150 GT are the only large-scale vessels operating out of Bitung.

**Figure 22. A larger purse seine vessel in Bitung Harbour (>80 GT). Many of the larger purse seine boats over 30 GT that previously operated out of Bitung have yet to receive licences since the licensing moratorium of 2014 (Photo: Nick McClean).**

**Figure 23. Mini purse seiners (15–30 GT) tied up in Bitung Harbour (Photo: Dedi S. Adhuri).**

**Figure 24. A large carrier vessel (132GT) moored on Bitung dock. (Photo Dedi S. Adhuri).**

Processing capacity in Bitung across sectors as reported by Indonesian government economists for 2017 is displayed in the following table, and totals 53 units producing up to

1,414 tons of tuna products per day. In addition, USAID Oceans (2017) reports total cold storage capacity of 17,756 tons.

**Table 15. Processing capacity in Bitung, 2017.**

| Facility | Number | Species | Production per day |
|---|---|---|---|
| **Tuna canning units** | 7 | Skipjack and juvenile yellowfin | 620 tons |
| **Katsuoboshi processing units** | 5 | Skipjack and juvenile yellowfin | 270 tons |
| **Fresh tuna processing units** | 12 | Large yellowfin | 175 tons |
| **Air blast freezing units** | 29 | Skipjack, juvenile yellowfin, large yellowfin, small pelagics | 349 tons |

Source: CSF and FPIK (2017).

Based on current estimates of fishing and processing capacity, utilised fishing capacity was reported as being 10% of total installed processing capacity for 2017 and, if fully utilised, fishing capacity is only capable of meeting 50% of installed processing capacity (CSF and FPIK, 2017). CSF and FPIK report this as a "structural supply gap", and to meet processing capacity fish would either have to be imported from outside Indonesia, from other ports and FMAs in Indonesia, or fleet capacity would have to be expanded (CSF and FPIK, 2017), or installed production capacity reduced to align with fleet capacity at current or sustainable levels.

Our case study focuses on the industrial cannery chain, which principally sources supply from medium-sized purse seine vessels and pole-and-line vessels, as well as from some larger purse seine vessels. While some handline and longline catch also enters canneries, for the purposes of the case study we have focused our efforts on the core of this chain, which is skipjack from purse seine and pole-and-line vessels.

This chain supplies a wide variety of export markets, with a total of 34 destination countries recorded from Bitung across all chains between 2011–2015, and skipjack tuna making up 77% of these exports (USAID, 2017). Principal markets for canned and prepared tuna include the EU, US, Thailand, the Middle East and Australia. The main products are canned tuna (chunk and flake), and prepared loins that are exported frozen to have the final mechanised canning stage completed in the US or EU. USAID Oceans (2017) provides a comprehensive survey of tuna export markets across all sectors, which is a valuable overview of activities in Bitung.

Fish processing infrastructure was developed in the 1980s under the Soeharto government's priority to develop it as the principal centre of fisheries production in Indonesia (Witular, 2016). Historically the tuna fishery in Bitung has been heavily influenced by its proximity to the Philippines. Interviewees reported that during the 1990s and early 2000s a large number of companies were established, often based on investment, crew, labour and vessels from the Southern Philippines and Sangihe Archipelago, where tuna fishing was already well established (Interview #43, Satrioajie at al., 2018). It is well acknowledged in interviews with business owners and fishers in Bitung that as well Filipino interests being involved in fishing and processing sectors in Bitung, trans-shipment of fish to the Southern Philippines commonly occurred from Indonesian waters prior to 2014. General Santos City in South Cotabato Province is commonly referred to as the "tuna capital" of the Philippines. Since 2014 Bitung has been designated as a Special Economic Zone, enabling provision of government tax breaks to private investments of over 500 billion IDR (CSF and FPIK, 2017).

The declaration of the national ministry's fisheries acceleration program in 2016 has further focused on Bitung as a site of potential domestic fisheries production expansion (CSF and FPIK, 2017).

Figures 26 and 29 and Table 15 document the fish chain for this fishery. Figure 26 is a simplified version of the whole chain focused on the formal chain supplying canneries, which supply both export and domestic markets. Figure 29 displays the informal market chain focused on supplying markets in Bitung and North Sulawesi province.


**Figure 25. Bitung whole chain simplified.**

## *Fishing strategies*

At the present time purse seine vessels target skipjack on FADs, with bycatch of small yellowfin and bigeye tunas, as well as likely bycatch of marlin, sharks and some Endangered and Threatened and Protected (ETP) species, as is typical with FAD-based purse seine fishing for tuna species (Lennert-Cody & Hall, 2000; Nurani et al., 2018). Typically purse seiners operate as part of a mini 'fleet' with light boats, capture boats and fish storage

“collector” vessels up to 150 GT operating together. Satrioajie et al. (2018) report that the average vessel size for purse seiners in Bitung at present is 27 GT, and average crew is 26.

Pole-and-line vessels also operate on FADs, while also commonly using collector vessels (McClean, 2017) to increase the efficiency of operations. Pole-and-line vessels tend to catch mostly skipjack with some catch of juvenile yellowfin and bigeye, although very little other bycatch. Pole-and-line vessels also use baitfish to attract tuna, which is spread on the surface in a process known as chumming, and helps attract schools of tuna to the surface where they can be caught. Satrioajie et al. (2018) report that the average vessel size for pole and line in Bitung is 77 GT, with an average crew of 49. In addition, some catch of skipjack is made by mini purse seine vessels which operate in coastal waters, targeting small pelagics, neritic tuna, as well as catching some skipjack, juvenile yellowfin and bigeye tuna. These most likely operate on coastal FADs close to Bitung, although clear information on the fishing tactics of these vessels was not forthcoming in this study or published literature.

Typically, FADs are located 50–100 miles from Bitung, however some purse seine vessels reported travelling as far as 398 miles to access FADs (Satrioajie et al., 2018). Pole-and-line vessels were reported to access up to 15 FADs per trip, while purse seine vessels accessed up to four FADs per trip (Nugroho et al., 2018). In some cases, FADs will have a small hut and a FAD guard who monitors the fish numbers at the FAD and communicates with vessels, or will have a geo-locator so they can be found easily by FAD owners. Many handline vessels of both Indonesian and Filipino origin also access FADs, and co-operative arrangements for FAD-guarding, as reported by Proctor et al. (2019) and described for the HL/TL skipjack fishery in Maluku, apply to FADs in the waters off Bitung.

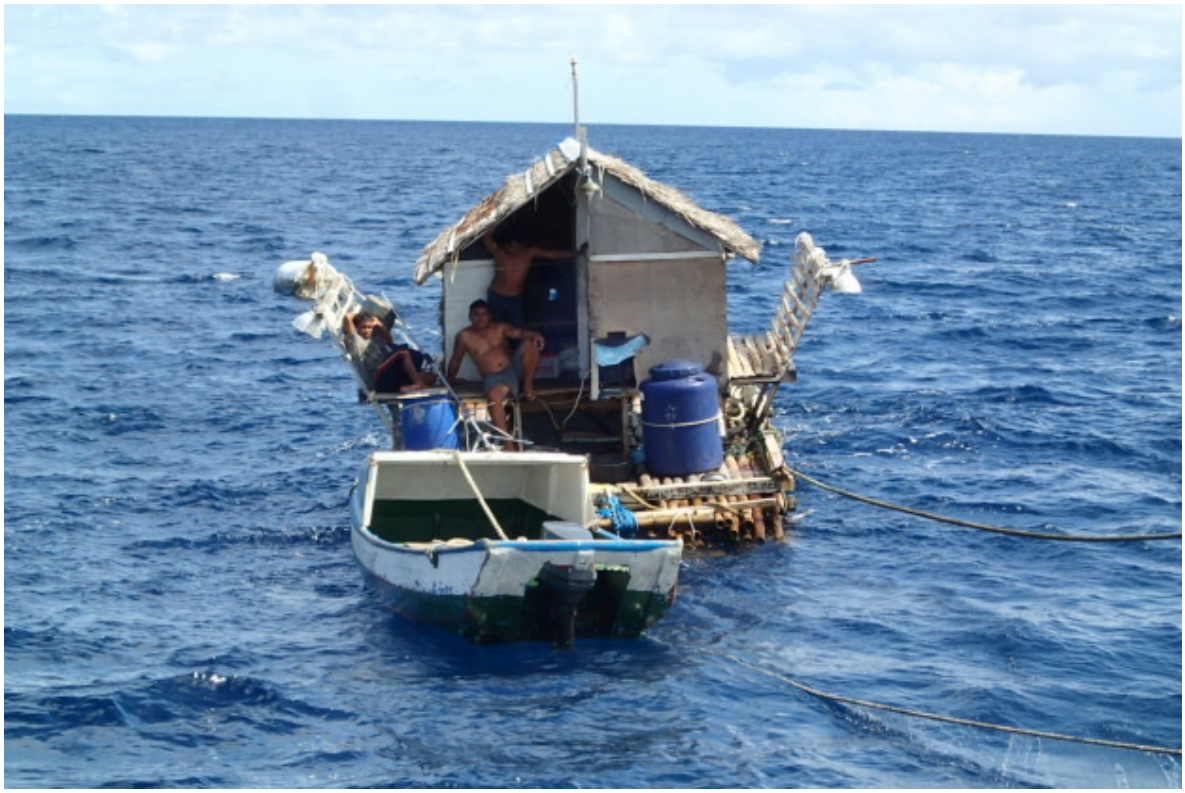

**Figure 26. A hut used to guard a sub-surface FAD, with FAD guards (Photo: Widhya Nugroho Satrioajie).**

There were substantial increases in the use of FADs since the 1990s, and associated increases in effort in the purse seine sector in Eastern Indonesia between c.2000 and 2014. This has led to a high level of FAD density in Eastern Indonesian waters, which reportedly

reduces the effectiveness and productivity of FADs (Natsir et al., 2016). Declines in fish availability and increases in effort required to find fish during this period have been reported (see e.g. McClean, 2017; Natsir et al., 2016). This is reported to have led to potentially lower returns from fishing trips and therefore reduced socio-economic outcomes for owners, captains and crew (Natsir et al., 2016), as well as increases in conflicts between fishers to access FADs, and the sabotage of FADs where these are seen as encroaching on local waters (Tri Hargiyatno et al., 2018).

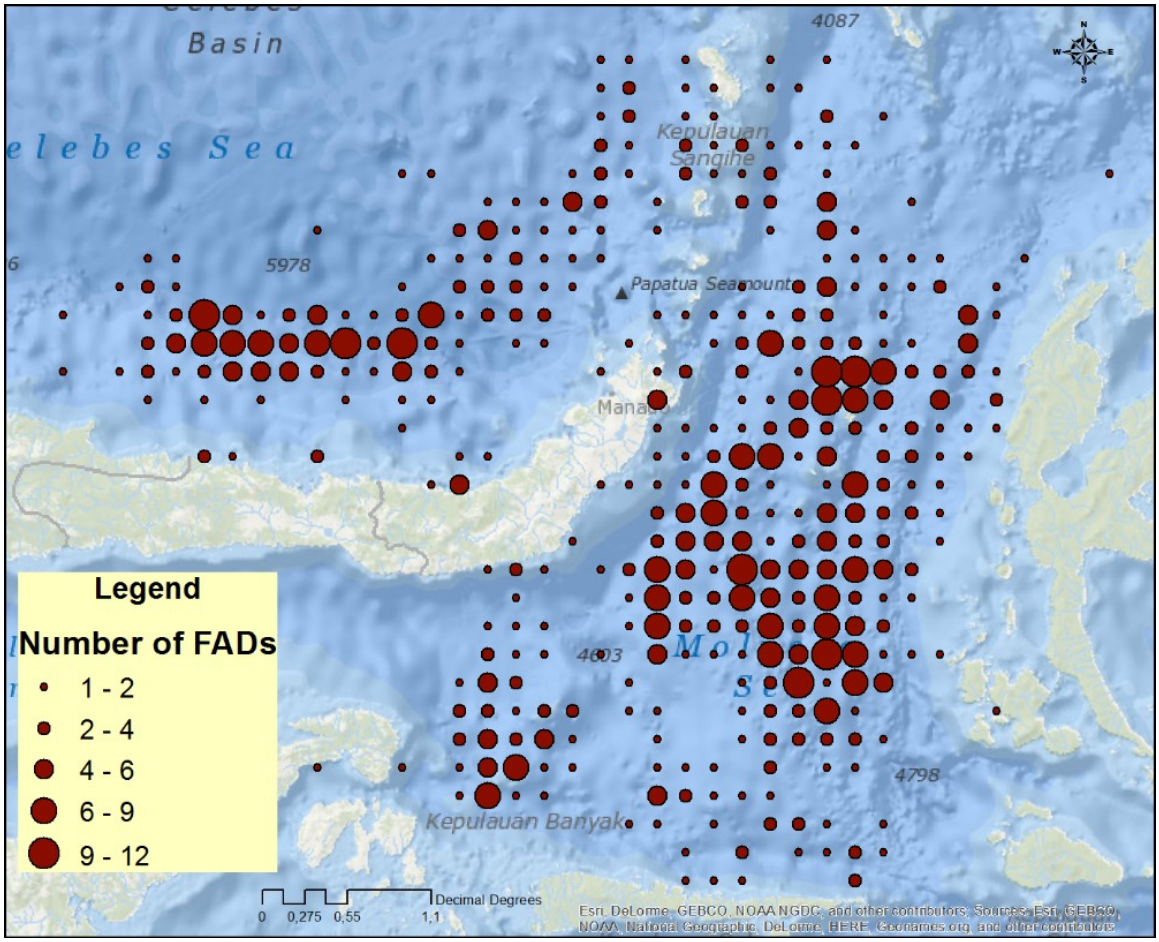


**Figure 27. FAD density in around North Sulawesi, calculated from fisher's logbooks.**

Source: Satrioajie et al. (in prep). Figure reproduced with author's permission.

Canneries source catch from either purse seine or pole-and-line vessels to varying degrees. USAID Oceans (2017) reports on two canneries in Biting, with one sourcing 90% of supply from PL and 10% from PS, while another sources 60% from PS and 40% from PL. Management from two canneries interviewed for this study reported entirely sourcing from PS for one cannery, and roughly 70% of supply from PS operations and 30% from PL for the second. Some integrated canneries have begun to diversify their fleet to include both purse seine and pole-and-line vessels, where formerly they reported using only purse seining vessels (Interviews #45, #55). This was reported as an "insurance policy" against future regulation changes and in light of some export markets' interest in sustainability. Another operational benefit of having both types of vessel reported by interviewees is that pole-and-line vessels can target schools below the surface through their practice of chumming bait, giving them an advantage over purse seiners in some conditions, or pole-and-line vessels could chum bait in co-operation with purse seiners. Seasonal availability of bait may limit this however.

### *Trading relations*

Once on land, key elements to note regarding trading from Figure 27 are that canneries or fishing vessels can either operate independently or as part of a vertically integrated business. Likewise, fishing vessels can be independent or part of an integrated operation supplying a specific cannery or a trading firm. Trading firms play an aggregation role between vessels and processing plants, typically as an independent operation but at times investing in fishing vessels to ensure supply, and are mostly focused on supplying processing plants that rely on export markets for business viability. *Tibo-tibo* are informal traders who source fish for canneries and fish-freezing/cold storage units. Like the larger trading firms *tibo-tibo* play important roles in product aggregation and transportation, particularly between independent vessels and processing/storage units.

The best way to characterise the situation in Bitung is that due to the scale of operations, fish are “going in all directions”. Thus, for example, an integrated cannery may principally aim to maintain supply through its own vessels in order to fulfil regular purchase orders, however it will also buy fish from vessels outside its own fleet, from *tibo-tibo* and traders or other canneries, and stockpile frozen fish which it may use or sell to *tibo-tibo*, trading firms and other canneries.

Figure 30 displays the informal market chain centred around *tibo-tibo*, who supply both canneries and trading firms, as well as local supply chains for markets in Bitung, Manado and rural North Sulawesi. The key point to be made here is that the local market chain in Bitung and North Sulawesi is quite extensive and, as it tends to be focused on lower-grade fish and small pelagics, has not previously been addressed in detailed studies of the Bitung value chain (e.g. USAID Oceans, 2017; CSK and FPIK, 2017). Table 16 displays the full suite of traders across both formal and informal chains.

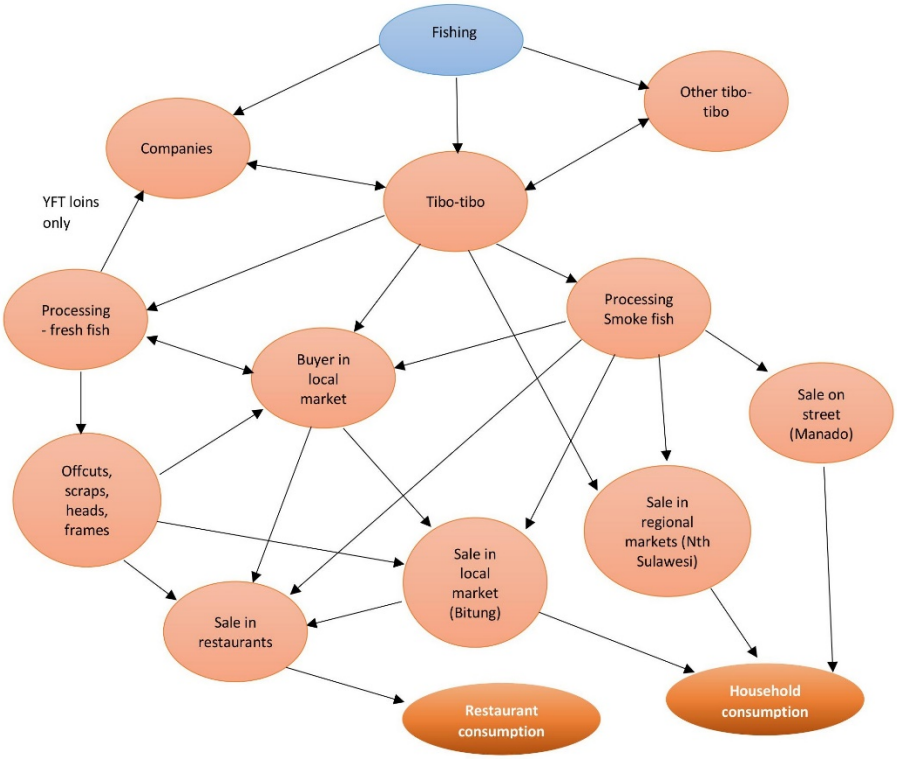


**Figure 28. Bitung informal market chain focused on *tibo-tibo*.**

**Table 16. Trading relations in the Bitung skipjack cannery chain and associated local market chains**

| Type of traders | Selling into export, domestic, or local (Bitung, Manado and rural Nth Sulawesi) markets | Gender |
|---|---|---|
| **Canneries** | Focused on sale to export markets. Also sale of canned product into domestic urban markets, and supply of some raw material to other tuna processing hubs in Jakarta, Bali or Ambon. Some direct sale of canned product into Bitung. | Managers reported as 98% male, 2% female. Cannery workers reported as majority female, precise numbers unclear. |
| **Trading firms** | Focused on supply or raw material to canneries and other processing units. | No data. |
| ***Tibo-tibo*** | Supplies raw material to canneries and trading firms. Also does substantial trade into local chains supplying fresh and smoked tuna, and fresh small pelagics to markets in Bitung, Manado and rural Nth Sulwesi. | Majority women, some men. |
| **Family smoked-fish businesses** | Supplies smoked product to markets in Bitung, Manado and Nth Sulawesi. | Mixed. |
| **Businesses aggregating offcuts, frames, heads.** | Supplies to local restaurants in Bitung and potentially Manado. | Unclear. Likely mixed. |
| **Retailers in Bitung markets** | Bitung. | Mixed. |
| **Retailers attached to *tibo-tibo*** | Bitung, Manado and rural North Sulawesi. | Women. |

Source: primary interviews, USAID Oceans (2018a).

As well as trading into the formal chain to supply canneries, cold storage units and trading firms, *tibo-tibo* also sell fresh fish direct in the market in Bitung Port, to other retailers in Bitung Port, and to family smoked-fish processing businesses in Bitung. Some *tibo-tibo* own small purse seine vessels of 15–30 GT, which they fish on FADS targeting non-tuna small pelagics, skipjack, small bigeye and yellowfin and neritic tunas *(tongkol).* In the past this catch was sold primarily in Bitung Port for local consumption, however, in recent times shortages in supply of SKJ have placed *tibo-tibo* in an advantageous bargaining position and some of this catch also goes into the cannery chain (USAID Oceans, 2017). Connected to each of these are stand-alone businesses trading in offcuts, scraps, heads and frames. During fieldwork we observed a whole small truck at Bitung docks being packed only with the heads of large mature YFT. Such small enterprises are built around a culture of “nothing going to waste” in which the entire body of the animal is used productively. Offcuts and scraps have been previously reported as providing a source of income for some local traders, particularly “the poorest of the poor” who have few other economic opportunities (McClean, 2017). Connected to some *tibo-tibo* are networks of female traders, who distribute fresh and smoked fish throughout North Sulawesi, for sale and consumption in the provincial capital Manado, and in markets in rural village and towns.

The positions of fishers, traders of all varieties and processors vis-a-vis each other shift in relation to fish price, and the relative advantages of being integrated or independent. Integration provides advantages to fishers as it provides an assured buyer at a competitive rate, which is good when fish supply is high relative to demand and fishers may be price takers. Independence is advantageous for fishers when supplies become scarce and fishers can set prices. Processors benefit from integration to secure a steady supply of fish and stockpile raw material in plentiful times to draw down on later when supplies dry up, to use for their own canning or sell at a profit to other canneries. *Tibo-tibo* are price takers when fish supply is plentiful, then when fish supplies fall *tibo-tibo* gain leverage and can increase their prices. Generally speaking *tibo-tibo* and independent fishing vessels will choose which market channel they supply based on gaining the best price.

**Figure 29. Skipjack tuna being sold on Bitung dock (Photo: Dedi S. Adhuri).**

**Figure 30. Skipjack tuna being smoked in Bitung (Photo: Nick McClean).**

**Figure 31. Small pelagics caught on mini purse seiners being traded on Bitung dock. Mini purse seiners also catch some skipjack and a range of other small tunas (Photo: Nick McClean).**

## Influences on fishing and trading practices from downstream actors

In addition to maintaining raw material supply and gaining good prices for product, fishers, traders and processors alike must address a variety of sustainability standards, food safety standards and buyer preferences when trading fish products. Similarly to the Maluku handline yellowfin case, each market has different preferences over price, quality and ethical/sustainable production. Recent efforts at implementing traceability systems for products being exported to US markets are a prominent example of this. However, this is only the most prominent of numerous independent regulatory standards, certification schemes and consumer-oriented campaigns that have an effect on vessels, trading firms and processors. USAID Oceans (2017) provides a comprehensive overview of market import specifications and consumer campaigns.

The mix of independent and integrated operations in Bitung, and the historically low levels of government intervention via fisheries management systems makes the implementation of these mechanisms particularly challenging. Bitung can be considered to be one of the most complex settings in Pacific tuna fisheries to implement formalised market-driven catch documentation, product standards and certification systems. Processors and exporters are the key focus of efforts by buyers and CSOs to implement food safety, sustainability and ethical sourcing standards along the supply chain. This is largely due to the fact that all product must be aggregated and exported via relatively few processors, and so enforcing traceability systems at the processing node represents a relatively efficient solution (Interview #60).

## Standout wellbeing contributions to coastal communities

### Economy

Because Bitung is an important tuna hub in Indonesia there has been analysis of the economic contributions of the industry, and therefore more data available for understanding how tuna fisheries contribute to community wellbeing (see Table 17). Tuna fishing in Bitung contributes 87% of agricultural revenues for North Sulawesi province, and provides jobs for over 8,000 workers in both fishing and processing sectors (CSK & PFIK, 2017; USAID Oceans, 2017). It also supports an extensive informal trade in fresh and smoked fish, which supports livelihoods and food security throughout North Sulawesi. The following table details current data on economic contributions.

**Table 17. Economic contributions from the Bitung purse seine/pole-and-line cannery fish chain**

| Type of economic contribution | Indicator(s) | Data |
|---|---|---|
| **Generating revenue** | Gross Value of Production (GVP). | Value of TCT* landed in Bitung in 2015 estimated to be 2,118 billion IDR (CSK & PFIK, 2017).[+] |
| | Regional and national contributions to gross domestic product, balance of payments and foreign exchange. | Bitung's fishery revenue was 892 billion IDR for 2015, equivalent to 87% of total agricultural revenues from North Sulawesi province (CSK & PFIK, 2017). |
| | Revenue to provincial governments from licence fees for boats 10–30 GT. | No public data available. |
| | Revenue to national government from licence fees for boats over 30 GT. | No public data available. |

| Type of economic contribution | Indicator(s) | Data |
|---|---|---|
| **Employment** | Numbers of jobs. | 13,850 in Bitung for the year 2014 and 8,563 for 2015 for fishing and processing sectors combined (CSK & PFIK, 2017). Not specified whether these positions FTE. |
| | Income to fishers, captains and boat owners (by vessel type, gross, and as a % of GVP). | Medium purse seine vessel crew receive 3,066,666 IDR per month (22% above the provincial minimum wage).<br>Small purse seine vessel crew receive 1,965,278 IDR per month (22% below the minimum wage).<br>Pole-and-line vessel crew receive 2,408,654 IDR per month (0.40% above the provincial minimum wage).<br>Source: USAID Oceans (2017).<br>No public data available on gross income or as a % of GVP. |
| | Fish for wages. | 5–6% of total reported catch in Bitung Port distributed to crew for on board or home consumption (Yuniarta, 2017). |
| | Fisheries dependency – Fishing-related earnings as % of household income to fishers/captain/boat owners. | 100% of survey respondents in PL and PS sectors in Bitung had full-time dependency on fishing jobs for income (n=34). Source: USAID Oceans (2017). |
| **Indirect economic contributions along the fish chain** | Income to local communities and Bagan fishers supplying bait to PL vessels. | No data available. |
| | Income to coastal traders and retailers, including tibo-tibo, smoked-fish traders and heads/frames/offcuts traders. | No data available. |
| | Income to local chain processing workers, including fresh and smoked-fish processors. | No data available. |
| | Income to distribution and transportation workers. | No data available. |
| | Profits to business owners and income to individuals working in upstream services and supply businesses (fuel, ice, gear, engines, supplies and repair services, coconut producers for ikan fufu). | No data available. |
| | Income to individuals in downstream processing, marketing, export businesses in Bitung. | No data available. |

Notes:

* TCT: *tuna* (yellowfin tuna), *cakalang* (skipjack tuna) and *tongkol* (an Indonesian term for up to six species of neritic tuna).

+ This is a valuation of direct contributions (gross value of production minus some costs) with employment estimates based on available statistical data and a fisheries system model for *tuna*, *cakalang* and *tongkol* (TCT) landed in Bitung. This model included both fresh fish sold in the local market (further detail not provided) and material supplying processing plants (CSK & PFIK, 2017). Our focus is on the cannery chain which principally uses SKJ with some YFT. This figure has not been disaggregated to separate YFT production for fresh and frozen product.

### *Livelihoods for fishers and others down the fish chain*

Bitung is a major source of employment in both the fishing and processing sectors, but also through a wide variety of land-based aggregation, supply and service industries including vessel building and maintenance, and a range of small-scale fish processors, traders and retailers who supply fresh and preserved fish throughout the districts of North Sulawesi province.

There is some information about the level of remuneration in fisheries jobs, however there are no publicly available studies or data on wages along the value chain. USAID Oceans (2017) provides information on differential wages for crew on different types of vessels based on a survey of 56 fishers across all sectors, including 34 in the PS and PL vessels. Mini purse seine vessels such as those owned by tibo-tibo have the lowest earnings, and are below the provincial minimum wage by 22%. Pole-and-line and purse seine crew each have earnings above the minimum wage on average, with medium purse seine 22% above the minimum wage and pole and line 0.4% above the minimum wage. The same study found that 100% of PL and PS fishers in Bitung were fully dependent on fishing for livelihoods.

Yuniarta et al. (2017) report that as much as five to six percent of total reported catch in Bitung Port is paid as a form of “fish for wages,” being consumed by crew on board vessels or at home. They view this as a “subsistence strategy of fishers with limited access to other jobs”. This indicates that fishing wages may not be sufficient to support basic needs or improvements in standard of living by vessel crew. This suggests that an important poverty alleviation function may be present for low-paid workers in this chain, where fishing livelihoods support a basic standard of living where few alternatives exist.

Interviews with cannery workers and managers at two facilities indicated that wages in canneries were at or above minimum wages. Jones et al. (2019), however, report that incidents of wage underpayment have been documented in Bitung despite contractual and legal obligations to pay cannery workers at the minimum wage. For many workers jobs in the canneries can be their first experience of a full-time wage employment, and competition between canneries is strong for available labour, leading to issues of absenteeism and high turnover (Interview #60). In order to support a committed workforce, some companies offer support for accessing credit for the purchase of housing and motorcycles. This can provide benefits beyond wage remuneration for employees, while companies reported that such arrangements established an incentive to remain in paid employment, and reduced absenteeism (Interview #60). Prior to the IUU and ex-foreign vessel moratorium, being able to provide regular work hours also provided an incentive to reduce absenteeism. However, with staff lay-offs and reduced certainty around processing volumes, cannery managers reported difficulties in retaining staff (Interviews #60, #45).

As many as 70% of cannery workers are women (Interviews #60, #45), providing a critical source of work in an economy in which women typically occupy positions in the informal sector and household-related work.

### *Working conditions*

Employment constitutes less of a contribution to wellbeing where it involves significant safety risks, or economic insecurity. See Table 18 for an overview of the relative safety and security involved with the livelihoods in the Bitung fish chain. Overall, the formal cannery processing sector has better labour standards than the fishing sector and informal processing and trading roles supplying markets in Bitung, Manado and North Sulawesi. However in the canning factories improvements can still be made (Jones et al., 2019).

The anti-IUU regulations implemented in 2014 increased the insecurity of workers in all sectors in Bitung (USAID, 2018b). Workers on boats impounded in the docks under the

licensing moratorium were considered at particular risk (USAID, 2018), with substantial flow-on socio-economic impacts. One informant reported:

> Indeed, the moratorium is so impactful. Maybe in some other provinces, no, but the most impact is in Maluku and in Bitung. Some cold stores until now are still closed, which means many lay-offs. The fishing boats, the fishermen, were all laid off. They had their children going to school, they came asking for money from the employees [to cover school fees]. Because they've lost their livelihood.
>
> Informant, Trade Ministry, Interview #22

Some processors reported in interviews having to lay off more than 50% of staff, while others reported that in order to minimise lay-offs, they reduced the number of shifts per day from three to one, while others report shifting people from being regular employees to day labourers (Jones et al., 2019). So while some people maintained employment despite the downturns, their positions were far less financially secure than previously.

Discussions of the benefits of the anti-IUU and ex-foreign vessel regulations have pointed out that reducing IUU reduces labour abuses due to the high prevalence of labour abuse on IUU vessels (Cabral et al., 2018). However, the impoundment of Indonesian flagged ex-foreign vessels operating in breach of licences (and therefore illegally) also increased the vulnerability of crew on these vessels to labour abuse, due to increasing their economic insecurity (see USAID, 2018b).

Fisheries Regulation (PP) No. 35/2015 on a System for Certifying Human Rights in the Fisheries Sector represents regulatory progress on these aspects. It appears that specific efforts and attention to fishing operations is likely required to ensure implementation is feasible and effective, while the processing sector requires some improvements, yet appears already to be in a position to effectively comply with regulatory requirements. Of critical importance, however, is that government efforts must support increased compliance with regulations of firms without increasing vulnerability to labour abuse among crew and employees.

**Table 18. Working conditions in the Bitung cannery chain and associated local market chains**

| Position | Security of work | Work Health and Safety conditions |
|---|---|---|
| **Crew on fishing vessels and FAD guards** | **Insecure**<br>Entirely reliant on catch-share payments with little ability to ride out low periods. Often young men or internal migrants with little formal education or alternative livelihood options. Major job losses occurred following IUU regulations.<br>Exposure to some labour-abuse risk factors reported: vulnerability due to increased work insecurity following anti-IUU regulations, exposure to unsafe work conditions, unchecked work hours at sea/excessive overtime (USAID, 2018). | **High-risk work environment with few safeguards**<br>Fishers operate in a high-risk setting on the open seas, with regular use of mechanical equipment and complicated gear capable of entanglement. FAD guards are in a particularly vulnerable position, often spending many weeks isolated on small FAD platforms. Access to safety equipment and formal health care varies, likely to be higher for vessels operating under integrated fishing/canning operations, likely to be lower for independent and particularly smaller vessels. Some companies provide BJPS insurance, though only 12.9% of fishers reported as having a *Kartu Nelayan*, required for accessing BJPS insurance (USAID, 2017). |
| **Crew on collectors vessels** | **Somewhat insecure**<br>Wages are based on an annual salary plus catch-share payments, and boats service multiple ports so are able to move around to where fishing is viable at any given time. Often crew on are Javanese and engaged by a parent company in Jakarta or Bali. Despite more security than fishing vessel crew, many trans-shipment vessels were impounded and major job losses occurred following IUU regulations.<br>Exposure to some labour-abuse risk factors reported: vulnerability due to increased work insecurity following anti-IUU regulations, exposure to unsafe work conditions, unchecked work hours at sea/excessive overtime (USAID, 2018). | **High-risk work environment with some safeguards**<br>Fishers operate in a high-risk setting on the open seas, though with less interaction with mechanical and fishing equipment. Access to safety equipment and formal health care likely at the higher end, relative to other Indonesian vessels. Fishers interviewed reported BJPS insurance provided by employers. |
| ***Tibo-tibo*** | **Somewhat secure.**<br>Buyers are subject to the fluctuations in fish availability over time, but *some tibo-tibo* have been able to position themselves advantageously when fish supply shortages have occurred, and have access to small pelagic catch to make up income shortfalls. | **Lower-risk work environment with some safeguards**<br>Traders tend not to be subject to major safety risks. Some are financially well off enough to afford health care. Unclear to what extent insurance cover exists. |
| **Individual traders/retailers in Bitung and rural markets throughout Sulawesi** | **Relatively insecure**<br>Local chains are entirely informal with no contracts and are subject to fluctuations in fish supply. Unless a trader is able to work their way up to play a more central role in the chain, such as by participating in the network of a successful *tibo-tibo* or becoming a *tibo-tibo* themselves, their position remains insecure. | **Lower-risk work environment with few safeguards**<br>Local chain roles tend not to be subject to major safety risks, although hygiene standards low in local markets. No formal health care or insurance cover reported. At time of interviews a new local fish market was under construction, which may improve conditions. |
| **Family fish-smoking businesses** | **Relatively Insecure**<br>Subject to fluctuations in supply, and businesses are small-scale and family based with little back-up capital. Reported heavy downturn in businesses following IUU regulations. | **Medium-risk work environment with few safeguards**<br>Retailing roles have few safety risks, processing roles have long-term health risks associated with exposure to smoke. No reports of insurance or health care provided. |

| Position | Security of work | Work Health and Safety conditions |
|---|---|---|
| **Transport and logistics workers** | **Relatively Insecure**<br>Local chains are entirely informal with few contracts and are subject to fluctuations in fish supply. Connection to a processing plant or trading firm likely to increase the security of employment. | **Low-risk work environment with few safeguards**<br>Transport roles have relatively few safety risks. Few safeguards due to informal nature of work. |
| **Cannery workers in Bitung** | **Relatively insecure**<br>Workers do have contracts at the minimum wage that include insurance and health care. However these are typically monthly or three-monthly, and with regulatory changes large fluctuations in numbers of workers hired have occurred. Huge job losses occurred following IUU regulations, and remaining workers shifted to day labour or reduced hours, increasing work insecurity. Some reports of payment below minimum wages despite contractual obligations.<br>Exposure to some labour-abuse risk factors reported: vulnerability due to increased work insecurity following IUU regulations, exposure to unsafe work conditions. See USAID (2018). | **Medium-risk work environment with some safeguards in place**<br>Canneries have exposure to sharp objects, hot cooking equipment, chemicals for cleaning and heavy loads, but with some training and safety procedures in place that can be regularly monitored. Some safety incidents still reported to occur. |

Sources: Primary interviews, Jones et al. (2019), USAID Oceans (2018b).

### Food and nutrition security

Bitung is best known as a tuna processing hub for export, and the majority of food supply benefits would appear to accrue overseas. Due to the inter-relationships between export and domestic markets, however, a significant portion of the catch remains in Indonesia, even though export markets remain the main focus of the industry in Bitung. The complexity of trading arrangements obscures how much of the tuna that goes through Bitung remains in Indonesia. Presently a large number of companies in Bitung report selling tuna to companies in Benoa (Bali), Maura Baru (Jakarta) and Surabaya without knowing the ultimate destination of tuna. According to national statistics only 13% of tuna caught in 2015 was exported (USAID Oceans, 2017), with similar figures reported for the period 2000–2015 (CEA, 2018). Tuna thus plays a likely substantial role in domestic food supply in Indonesia, with over one million tonnes of tuna caught staying in the country. There are no published statistics on the proportion of tuna consumed as a part of Indonesian diets, though 53% of animal-derived protein is sourced from fish, making Indonesia the ninth-most fisheries-dependent nation in the world (CEA, 2018).

Combined, these figures suggest that the role of tuna in domestic food security at a national scale is an under-researched area, and that the high level of focus on exports in tuna fisheries statistics, research and public discourse may not be reflective of the role tuna plays in domestic economic and food supply systems.

At a provincial level, North Sulawesi is heavily reliant on fish consumption, at just under twice the national average for percentage of protein sourced from fish (McClean, 2017). Tuna and small pelagic production in Bitung plays a key role in this fish protein supply, with substantial networks of tuna trade centred on Bitung that extend out to rural areas of North Sulawesi. There are several main “pathways” for tunas to enter local diets, shown in Table 19.

Due to the sustained presence of the tuna fishery in Bitung, a local food culture has grown up around the consumption of various types of tuna. This leads not only to the sale of fresh whole fish on the local market, but also to the development of businesses that serve specific products to the market. Small pelagics and *tongkol* are typically sold fresh and are grilled or fried whole, then served alongside rice, sambal and *lalapan* (simple salad) or made into soups. These simple, nutritious meals are made in homes and are common in suburban *rumah makan* (basic restaurants) in Bitung. Smoked fish in Bitung is produced with coconut shells (wood is used in Ambon), making a locally distinct version of *ikan fufu* that is eaten at home and in *rumah makan* throughout North Sulawesi. It is also sold in high-end hotel restaurants in the capital Manado, some 50 km away. Smoked-fish operations are clustered in a suburban area of Bitung with approximately nine producers operating in this precinct. *Cakalang* is also commonly fired in chunks and served with rice and sambal, or cooked into curries with coconut milk. Heads and frames are used to make a coconut milk-based curry, with the heads considered to be rich in sweet and nutritional meat, and the frames providing flavour and depth to the sauce. These are a favourite in celebration meals.

**Table 19. Pathways to increased consumption of food as a result of skipjack tuna fisheries in Bitung**

| Pathway | Details |
|---|---|
| **Direct consumption** | Consumption by fishing crews and traders. 5–6% of total reported catch in Bitung is consumed either on board vessels or in homes by fishers (Yuniarta, 2017). |
| **Local consumption of fresh tuna in Bitung and North Sulawesi** | *Tibo-tibo* sell fresh fish directly into the local market in Bitung, and into rural markets across North Sulawesi via networks of small-scale traders. |
| **Local consumption of smoked tuna in Bitung and North Sulawesi** | Family-run businesses sell smoked fish into the local market in Bitung, and into rural markets across North Sulawesi via networks of small-scale traders. |
| **Local consumption of heads, frames and offcuts in Bitung and North Sulawesi** | Small-scale processors and traders aggregate offcuts and discarded parts of tuna and sell direct to restaurants and in local markets in Bitung. Unclear if further distribution regionally occurs though highly likely given that entire small business operations are established around trade in a single product, e.g. heads. |
| **Increased cash income potentially leads to consumption of better quality foods** | Tuna livelihoods leads to increases in cash income for vessels crew, and a range of casual traders and processing workers in informal chains, and processing workers in factories in Bitung. Literature (e.g. Fabinyi et al., 2017; Allison et al., 2015) indicates that increases in cash income to fishers, traders, processing workers and retailers lead to an increase in consumption of higher-quality foods (fresh fish, fresh meat, fresh vegetables etc.). |
| **Direct sale of canned fish into Bitung and North Sulawesi** | Direct sale by canneries via factory shopfronts and through independent retail outlets. |
| **Sale of fish into domestic urban markets in Indonesia** | Sale of raw materials to processors in Jakarta, Bali, Surabaya and occasionally other tuna processing hubs (e.g. Ambon) for processing and on-sale in domestic market. |

Sources: primary interviews unless stated in the text.

## Environmentally sustainable fisheries

Indonesia historically has been viewed as a nation that has high levels of tuna catch, but little engagement in the shared management of regional stocks (Hanich et al., 2009). It has also been viewed as “the hole in the donut” when it comes to data on fisheries – with

neighbouring countries (with the exception of the Philippines) having relatively high levels of data available, and Indonesia having relatively little (Cabral et al., 2018).

While other aspects of our case describe the negative impacts on wellbeing of these regulatory shifts, engagement with RFMOs since 2007 and policy initiatives since 2014 have begun to lay the foundations for the future sustainability of the fishery: in particular, by increasing participation in regional management processes, and addressing the need to have catch levels actively managed. These aspects do represent an improved contribution to the sustainable management of regional tuna stocks. Nonetheless the longer-term process of constructing an effective fisheries management system, and particularly the structural capacity of the current governance system to achieve management outcomes, remains a priority that requires attention (see e.g. Hatfield, 2018). The success of this long-term process, exemplified by the current tuna Harvest Strategy development process, will have a critical long-term impact on the ability of the government and the sector as a whole to maintain sustainable catch levels, and thereby contribute to the health of the ecosystems and stocks that support social and economic benefits.

A good example of why this is important lies in former fisheries minister Susi's policy to replace the large-scale foreign and ex-foreign vessels banned under anti-IUU regulations with 3,325 new small-scale vessels to be built and distributed to Indonesian fishers by 2019. By building smaller-scale vessels under 30 GT, a lesser environmental impact than that from larger-scale vessels is intended. There are currently no published accounts of policy-relevant analysis undertaken for this proposal that examine the validity of these assumptions. However Cabral et al. (2018) point out that while a 40% reduction in fishing effort has occurred following IUU regulation implementation in 2014, domestic effort has already begun to replace this, and numerous accounts note that overall catch levels of tuna in Indonesia are returning to their pre-2014 levels (e.g. CEA, 2018; Cabral et al., 2018). Meanwhile FAD regulations remain unimplemented, which would tend to support increases in effort to replace large-scale effort. In light of the current stock status for SKJ tuna, Cabral et al. (2018) report that a modest increase in domestic capacity is likely possible without breaching environmentally safe fishing levels, however the risk of overfishing from domestic overcapacity remains.

The situation regarding tuna is therefore reminiscent of the historical experience of the Java Sea trawl ban during the 1980s. In this case, small-scale fishing effort effectively replaced large-scale fishing effort within a decade, as small-scale farmers in Java entered the fishery as a means of ameliorating economic hardship arising from landlessness and a lack of opportunities in the agricultural and industrial sectors (Bailey, 1997). While the fishery represented a new economic opportunity that provided plentiful employment, and acted as a "safety valve/labour buffer" to absorb excess labour in the economy, the longer-term result has been that ecological gains from the ban have not been realised. For Buchary, "the major conclusion is that the trawl ban has not been able to provide enough opportunity for most of the heavily fished groups to recover. The failure to recover is partly due to the concurrent and continual increase of fishing pressure from purse seiners and small scale gears" (Buchary, 1999). For Bailey, the implications of this are not solely ecological; "The end result is likely to be resource depletion and declining incomes – in short, conditions that existed prior to 1980" (Bailey, 1997).

The gains made through implementing IUU regulations may be eroded by resource pressure arising from future increases in fishing effort simply replacing the historical effort of foreign and ex-foreign vessels. A key challenge for the future of tuna fisheries in Eastern Indonesian therefore is to design an effective system of managing catch and effort between sectors, such that overall catch levels do not exceed sustainable thresholds.

## Integrated discussion of governance and wellbeing

In contrast to smaller-scale fisheries in Maluku, successive changes in national government policies regarding IUU and ex-foreign vessels have had a profound impact on the operations of the tuna sector in Bitung, and particularly the cannery chain supplied from pole-and-line and purse seine fisheries. As a result of the scale of operations in Bitung it has been the focus of intensified efforts since 2014 to improve fisheries management in terms of preventing overfishing and improve economic benefit sharing with small-scale sectors, both via national-level policy and market-based efforts. Social relations around labour migration for tuna jobs, soci0-economic status and gender also influence the distribution of benefits.

### Government regulation and wellbeing

The main government influence on tuna fisheries in Bitung has historically been longstanding national policies to support the growth of both domestic and foreign fleets operating within AW and the EEZ, and increasing domestic processing capacity (Sunoko and Huang, 2014; CSF and PFIK, 2017; CEA, 2018; PSHK, 2019). Since 2014, however, two new governance influences have been: 1) reducing IUU; and 2) reducing foreign involvement in capture fisheries. This new policy landscape is evident in the reported landed catch for Bitung from 2012–2016 (see Figure 34).

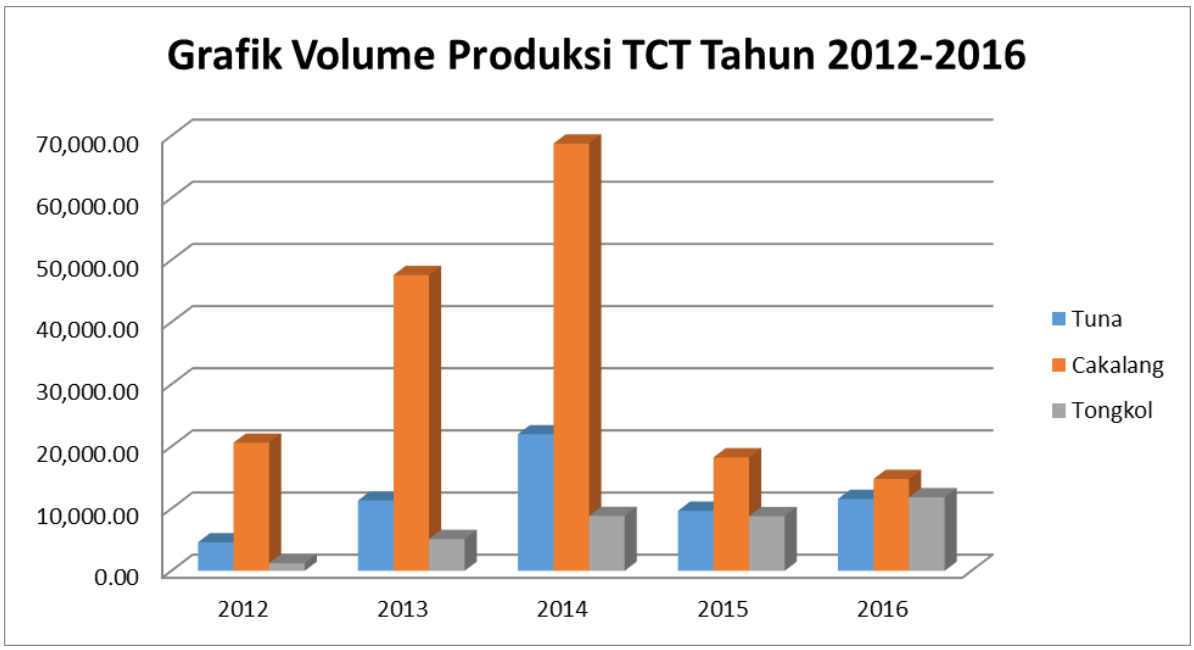


**Figure 32. Production volumes of Tuna, Skipjack and Little Tuna in Bitung Oceanic Fishing Port 2012–2016**

Source: Pelabuhan Perikanan Samudera Bitung/Bitung Port Authority (PPS Bitung, 2017).

The increase in landed catch in 2012–2014 may be attributed to incentives under the Yudhoyono administration (2004–2014) for foreign-made and foreign-owned vessels to be given fisheries access in the EEZ and AW areas, on the condition that they land and process catch at domestic ports such as Bitung (PSHK, 2019). However, at the same time, a large amount of catch was also being exported directly via trans-shipment, in many cases being landed at ports in the Southern Philippines. A recent review of Indonesia's legal framework for fisheries management characterised the situation under the 2012 regulations as follows:

> In reality, the requirement to invest in processing units did not prevent license holders from flouting rules on landing, reporting, and processing fish at designated ports in Indonesia, and on use of domestic crews. Vessels that had been re-flagged in Indonesia were found to be interchangeably using more than one vessel flag (or, “double-flagging”) to facilitate the direct export of fish
>
> (PSHK, 2019).

The 2014 regulations (see Table 7) aimed to address this situation. In doing so they did have a profound impact on IUU fishing, however they also had a profound impact on the canned tuna industry and related fish chains in Bitung. The skipjack fishery recorded a total reduction in fishing effort of 40% by boat weight due in part to large-scale fleets from China, Thailand, Taiwan and South Korea having to leave the Indonesian fishery (Cabral et al., 2018). Another major reason for the decline in skipjack catches was that 1,132 Indonesian flagged ex-foreign vessels were confined to port under a 12-month licensing moratorium while a compliance audit was undertaken of all licensing conditions (Cabral, 2018; CSF and PFIK, 2017; CEA, 2018). This has since been extended indefinitely. Given almost all these vessels were found to be in breach of licence conditions, this has led to, in effect, a ban on all ex-foreign vessels (PSHK, 2019). Meanwhile the ban on trans-shipment meant that many operations in Eastern Indonesia, including Bitung, were unable to operate smaller catching vessels at a level of efficiency that supported existing landing levels (Interview #45; McClean, 2017).

Cabral et al. (2018) view that the benefits of reducing IUU catch on overall sustainability of the fishery outweigh what they characterise as short-term costs to skipjack fisheries in Eastern Indonesia. They state that as these costs were felt only in the foreign fleet and illegal operating vessels, they were acceptable in the context of wider policy objectives (Cabral et al., 2018). According to the Indonesian government, the impacts of the 2014 policies on domestic operations have been overstated by some industry sources, and are mainly restricted to only one or two major ports, such as Bitung (Witular, 2016).

Other literature (CSF and PFIK, 2017; USAID Oceans, 2017 and 2018b) and our interviews display that the sharp drop in landings had immediate impacts on the wellbeing contributions from the fishery. Bitung experienced a 70% drop in skipjack landings between 2014 and 2015, leading to major job losses. Some reports suggested this amounted to as many as 10,000 jobs, while the official government figure places losses at 1,700 (Witular, 2016). Indonesian government economists calculated a total loss of 5,287 jobs, or 38% of total employment in the fishing and processing sectors (CSF and PFIK, 2017).

Major impacts of this drop in catch were felt not only by businesses and investors, but particularly by low-paid fishers and processing workers, as well as a range of small independent businesses in the local chain supplying markets in North Sulawesi. Specifically, the fish shortage following the 2014 regulations led to substantial livelihood insecurity and a consequent increase in vulnerability to labour-abuse risks across sectors (USAID, 2018b). The raw materials shortage also led to an increase in skipjack prices, leading to reduced production and business viability challenges for businesses supplying fresh and smoked fish to domestic markets, which would likely have reduced fish supply in Manado and rural areas of North Sulawesi supplied from Bitung.

The policy changes regarding IUU and foreign vessels did have positive wellbeing effects for some people however. Due to the lack of supply and increased competition among buyers, domestic fishing vessels still operating out of Bitung, and the *tibo-tibo* trading with them, became price setters, receiving better prices for the fish they caught, even though there was an overall decline in catch.

> A few years ago the price was different compared now. At that time … prices were just over a million. Now it's four million, sir. That's what the material difference is … during the season that Susi made a regulation. So when I have that money from harvest, I tell you, I am profit sharing with the fishermen.
>
> Female *tibo-tibo*, Bitung (Interview # 57)

> On the one hand we are happy with the moratorium, but obviously our production has decreased. Previously before the moratorium the boats would sell their catch to us. Now they can't catch as much … When the fish were booming, it was sometimes difficult to sell … because then there was also still many foreign companies. There were so many fish in Bitung, that it was difficult to sell your catch.
>
> Manager of a processing plant (Interview #55)

### *Evidence-based decision-making*

Both the 2012 and 2014 policy changes were rendered less effective in meeting their objectives to improve the economic wellbeing of Indonesians, because a lack of information about the social and economic aspects of the fisheries was used to inform an evidence-based planning process.

Under the 2012 regulations considerable leakage occurred out of the legal, reported system, and in particular substantial amounts of catch were being trans-shipped and exported directly. Regulations appeared to have been designed without sufficient regard being given to the capacity of authorities to effectively monitor and enforce restrictions on catch, and the economic incentives to export catch to ports in the southern Philippines, particularly given historic ties between fisheries in the Sulawesi and Maluku Seas, and the Philippines.

The 2014 changes then sought to address this issue of IUU, and implement more effective systems of management. However, the high catches of 2012–2014 were also supporting large increases in landings in Bitung, and this was also supporting substantial economic benefits in ports like Bitung, as policies intended. Indonesian people and businesses, who are arguably the intended beneficiaries of policies aimed at reducing IUU and increasing domestic fisheries production, were in fact disadvantaged by the policies. In particular, large numbers of low-paid fishing crew and processing workers were impacted by anti-IUU policies.

A strong example can be found in the trans-shipment bans under Ministerial Regulation (PP) No. 57/2014. Domestic processing units in the Bitung chain utilising PS and PL vessels rely on trans-shipment to make PS and PL fishing operations economically viable. Unsurprisingly these operations were hit hard by the trans-shipment ban, which impacted on both ex-foreign vessels and vessels built in Indonesia that had reportedly never been involved in IUU fishing (Witular, 2016). These vessels were frequently used to trans-ship catch into Bitung to service operations that in many cases were Indonesian-owned and employed substantial numbers of Indonesian citizens (Witular, 2016; McClean, 2017).

Acknowledgement of the importance of trans-shipment to local Indonesian businesses and low-paid employees at the time of the design of the regulation may have allowed for development of more sensitive regulations, e.g. regulations that eliminated trans-shipment facilitating illegal direct export of catch and utilised ex-foreign vessels, while maintaining legitimate forms of trans-shipment that support domestic policy objectives. Moreover, a transition solution may have been identifiable so that catch trans-shipped using ex-foreign

vessels may be replaced by catch using more acceptable vessels for trans-shipment. This may have avoided some of the more acute negative employment impacts in Bitung, rather than sudden implementation of a blanket ban. Some 12 months after trans-shipment bans were put in place, the regulation was altered to allow trans-shipment to occur by legal vessels to Indonesian-owned companies supplying processing plants in Indonesian ports (CEA, 2019), acknowledging the importance of trans-shipment for any viable tuna canning industry in Bitung.

Two future potential government influences on wellbeing contributions from the Bitung cannery fish chain are the Harvest Strategy and the FAD Management Plan. Similar to the Maluku cases, these policies have yet to make a substantial impact in the cannery fish chain in Bitung. The Harvest Strategy is still in a planning phase. The 2014 FAD regulation is yet to be implemented effectively, and is currently under review (Proctor et al., 2019). Assuming that both the tuna Harvest Strategy and the FAD Management Plan are implemented in the next few years, there are useful lessons to be learned from implementation of the regulations against foreign vessels and anti-IUU. Specifically, if these measures are implemented without thorough understanding of how they will affect fishing operations and the downstream activities using those fish, there is a risk of doing damage to the economies and food security of coastal communities.

Collecting data on and monitoring the social and economic aspects of fisheries and downstream activities is one way to gain an understanding of fish chain operations and the likely effectiveness of management systems as a basis for evidence-based policy. Another way is through effective consultation between fisheries management decision- and policy-makers and industry representatives. Through discussion and negotiation it is possible for government and industry to collaborate on developing policies that will protect fish stocks from overfishing, while minimising damage to existing wellbeing contributions from fisheries, or even opening up new economic, livelihood and food supply possibilities.

In Bitung, however, the effects of the 2014 anti-IUU, anti-foreign vessels trans-shipment regulations have created a substantial erosion of trust of government on the part of industry, so effective consultation may take time to establish. Informants in Bitung cited a lack of data in the decision-making process as undermining co-operative relationships between industry and government. One processing company manager reflected on both the need for good data, and the need for effective collaborative relationships based on trust between government and industry.

> When you have bad data going to the regulation maker, it will come out as something that doesn't work for everybody. So who is the victim? It would be us… the industry is the victim… It used to be they took the data from us for 2014 and 2015. Actually there is a decline in production from 2014 to 2015. So we decline about sixty percent in total volume. [But] in the media reports I hear the local company is gaining from the moratorium. They are rocketing about seventy percent. I was like WHAT? Who told you that? Where did you get data from? They [released] only the January data. While I give them the whole year's worth of data.
>
> Processing company manager, Bitung, Interview #45

More broadly in the Indonesian tuna industry the emergence of industry associations is a positive step towards effective collaboration on policy design. The Indonesian Pole and Line and Handline Fisheries Association (AP2HI) has played a key role in the establishment of a stakeholder-inclusive process for the tuna Harvest Strategy. Longline and purse seine associations are also reportedly becoming engaged in FAD management processes.

In the context of Indonesian tuna fisheries, the concept of co-management presents a potentially valuable approach to tuna fisheries governance that can structure these emerging relationships to foster better collaboration between industry and government. Co-management in practice exists on a continuum that begins with information exchange and consultation, and develops into a situation where industry and managers can, under the right conditions, share responsibilities and formal delegation of management functions. Co-management is a way of achieving efficient regulatory practice, not a means for industry to avoid being scrutinised or required to operate under legal requirements. The value of co-management approaches lie in fostering partnership rather than a top–down relationship. Co-management can augment the sense of ownership over decisions, embed contextual and historical sensitivities into policies, and increase the use of expert knowledge held within industry and local communities. Successful examples of industry co-management of fisheries exist in Australia (see PIRSA, 2013), which can be used as an initial reference point for considering how this might work in Indonesian tuna fisheries (see also Hatfield, 2019).

### *Business relations and markets*

As discussed, preferences in end markets and formal market access requirements are a significant influence on fish trading operations for both export and between firms. Food safety standards for entry into US and EU markets are already a substantial influence on the basic practices of business. It also seems reasonable to conclude that the increased attention to IUU globally as a result of the EU Yellow Card system since 2012 influenced the Indonesian Ministry's efforts to curb IUU, even though a Yellow Card was never issued to Indonesia.

In the wake of these efforts, formalisation of end market preferences through sustainability and ethical sourcing standards and certification is becoming increasingly prominent. In particular, traceability schemes for entry into the US market are the most prominent example (see USAID, 2017). Major Fisheries Improvement Projects in Eastern Indonesia including operations likely to be landing fish in Bitung have been established since 2014, and processors in the cannery chain also reported entering into pre-certification for Fair Trade certification. These represent both CSO and market-based efforts to transform fisheries – USAID has been the main driver of traceability efforts (USAID, 2017), while the International Pole and Line Foundation and the Assosiasi Pole and Line dan Handline play key roles in establishing FIPs and Fair Trade initiatives in Bitung. From the perspective of companies, these are primarily efforts to maintain market share and profitability in a competitive global market (Interview #54).

The complexity of trading relationships within Bitung, however, makes implementation challenging. In particular, the diverse mix of integrated and independent fishing/canning operations, and diverse end-market preferences and requirements, interact to dilute incentives to enter into certification schemes (USAID, 2017). This is particularly so when price premiums for certified product are modest, and in conditions where fish supply is low and fishers are price setters (Interview #54). On the whole, Bitung can be considered a particularly challenging environment in which to implement such schemes with a high level of coverage across the sector, relative to other ports in the Indo-Pacific region.

While this does not pose problems where fishing and processing operations are integrated, for independent processors seeking to meet market and buyer requirements, developing regular suppliers willing to take on the burden of compliance with traceability systems in a price-competitive market is a key challenge.

> Food safety, sustainability, IUU tracking, social ethics, environmental, all these things. And who is the object for all these? The processor. But we cannot dictate to suppliers. They have the fish, so they say, "You don't want my fish

> with this price, I will sell it to someone else. You're asking too much, you're asking for catch certificates, you're asking this document and that document. I can sell it to those processors who are exporting to Middle East who doesn't need anything, any documents. Your price is only the same, maybe five hundred rupiahs higher, difference. I would rather give it to them." So what choice do you have? A processor like us who really wants to comply with this, comply with that, all of these things.
>
> Cannery manager (non-integrated), Bitung (Interview #60)

This complexity impacts on wellbeing in two ways. Firstly, on the effectiveness of traceability and certification schemes that aim to develop management systems necessary for the wider sustainability of the fishery. Without a sustainable level of catch and effective catch documentation systems, then the wellbeing benefits flowing from the tuna fishery in Bitung are placed at risk, through the heightened risk of unmanaged fishing levels and potential overfishing.[7]

Secondly, initiatives such as Fair Trade certification are capable of delivering wellbeing benefits themselves, by driving improvements in standards and practices within the cannery chain at both fishing and processing nodes that benefit workers, and by providing premiums to fishers with which to improve their safety and working conditions, and the conditions of communities they live in. Where such standards as Fair Trade cannot be implemented, then fishers and processing workers may remain in substandard conditions, and communities and fishers may not benefit from legitimate and ethical practices they already maintain.

One result of this complexity is that in the context of current efforts to extend traceability and certification to US market products, it is highly likely that such systems will not encompass the full suite of tuna fishing operations occurring in Bitung. Like Fair Trade certification in small handline fisheries, the mix of situations facing fishers, traders and processors alike means that a comprehensive traceability or certification system being driven by market-based initiatives in unlikely to create a "one size fits all" solution. Instead, such schemes are seen as being "pioneer" programs, which act as a model and incentivise adoption of more transparent supply chain practices (Interview #44; see also USAID, 2017).

However, it is also clear that where a higher level of integration exists between fishers, collecting vessels and processors, the practicality of implementing traceability is increased. CSF and PFIK (2017) recommend strengthening the integration between collector boats and fishing vessels for the purposes of improving the capacity of the fleet in Bitung, "as long as the large collecting vessels meet all government requirements for reporting catch, install cameras and observers on board, and do not commit illegal trans-shipment to or from other countries".

We suggest that exploring ways to strengthen operational integration between fishing vessels, collector vessels and canneries may also deliver benefits regarding the practicality of implementing formalised end-market standards and certification practices. Such standards and practices have an important role to play in ensuring the ethical and sustainable conduct of the tuna fishery, alongside government fisheries management.

### Labour standards – disparity across fishing/processing sectors

The disparity in conditions between fishing and processing operations is a key influence on the distribution of wellbeing benefits. Crew and processing workers alike have been subjected to work insecurity and heightened risks related to labour abuse as a result of regulatory change. However, the processing sector has greater levels of formal contracting,

[7] A comprehensive analysis of barriers to implementing traceability systems in Bitung is provided in USAID (2017).

which include guarantees of minimum wages, access to health care, and systematic health and safety procedures. In contrast, fishing crews typically rely on insecure catch share models, and experience a lack of formal contracting and benefits of health insurance attached to these, and experience exposure to unsafe working conditions with variable levels of mitigation in place. Integrated firms appear to be better able to ensure the security and health and safety of their fishing crew than independent vessels, due to the higher engagement of processing firms in ethical sourcing standards. Similarly, crew on collector vessels attached to processing/trading firms appear to be in a stronger position as regards these issues.

The lack of attention to labour standards on fishing vessels in particular is well displayed in the results of a recent survey of labour risks in Indonesian fisheries supply chains, which concluded:

> Buyer internal systems do not seem to be picking up on serious labour issues in the Indonesian fishing sector, particularly at a vessel level. This is impacted by how information is collected and by whom. Buyer respondents … reported that most internal information on supplier workplace conditions come via technical audits and food safety and health checks, and with limited government oversight. Working conditions are not always probed, and the typical approach is to seek input directly from the employer.
>
> At the vessel level, government oversight of conditions is largely not practiced, particularly for smaller vessels. The external and third-party audits and certification schemes most commonly engaged for on-shore seafood processing in Indonesia … are not found at the vessel level, and social/labour components are not safely validated by workers. Although worker-led organisations and unions provide some support to fishermen who are members, their range is limited. Processing employees may be supported by internal or external unions, but these are often politicized or reportedly viewed by workers as ineffective.
>
> (Taylor et al., 2019)

While this disparity between standards in the processing and fishing sectors is clearly evident in the tuna canning chain, at least one advantage of catch-share models is that they have the ability to provide greater wages per trip for crew when prices increase. While there is no specific research on this, our interviews indicate that some independent and smaller-scale vessel owners were able to benefit from the reduced competition by gaining increased bargaining power, and therefore increased prices, when supply reduced following IUU regulations.

Longer-term tracking of socio-economic data in both processing and fishing sectors would likely be able to establish the extent to which benefits from increased domestic fish landings in Bitung and similar ports under fisheries acceleration policies flow through to workers at different points in the chain. The extent to which contract-based or catch-share based arrangements advantage or disadvantage workers under different conditions is a potentially important consideration in assessing policy initiatives.

**The influence of socio-economic status and migration on distribution of wellbeing benefits**

The tuna fishery in Bitung provides a readily accessible source of work for a wide variety of low-paid workers from across Indonesia, and a number of points support the notion that

these roles provide a ready source of work for people from lower socio-economic backgrounds.

Many crew positions, particularly in the small purse seine sector, provide wages below the provincial minimum wage, and crew on PS and PL vessels supplement wages with fish for consumption on board and at home. This amounts to as much as 5–6% of total landed catch, which is viewed as a “subsistence strategy where few alternative incomes exist” (Yuniarta et al., 2017). 54% of fishing crew reported only finishing elementary or junior high school (USAID Oceans, 2017). Interviews suggest that, similar to the 5–8GT handline sector in Maluku, workers often leave school to enter the fishery due to family financial pressures. As there is a high level of turnover in positions within the processing sector (Interviews #45, #60), and chains supplying markets in Bitung and North Sulawesi are almost entirely informal (Interviews #57, #64), low-paid employment is highly accessible. These points combined suggest that a relatively high proportion of positions as crew, in factory processing roles and in the informal sector are likely to be accessible to groups with lower socio-economic status, and that some of these roles may already perform a poverty alleviation function by supporting a basic standard of living where few alternatives exist. Further research into the economic functions of low-paid roles would be highly beneficial in future projects.

There is a high level of participation in the industry by internal migrants, with crew from all over Eastern Indonesia participating in fishing operations, and large numbers of Javanese crew working on larger carrier vessels particularly. An increasing number of residents from rural North Sulawesi have become involved in the industry, particularly in processing roles, since the regulatory changes of 2014. Given the scale and complexity of the fishery in Bitung and the many changes that have occurred since 2014, clear patterns of participation in specific roles, and consequent patterns in the distribution of benefits are not clear, in contrast for example to the Maluku handline yellowfin fishery.

However, remittances to home villages throughout Eastern Indonesia and Java mean the livelihood benefits from the fish chain are spread beyond Bitung and the surrounding province. The strong participation of migrant labour in this fishery is also significant in light of the fact that fisheries in Indonesia are well recognised as playing a “safety valve/labour buffer” function in the economy, providing an outlet for surplus labour. In particular, marine fisheries have played a key role historically in providing employment in Java, in regions where overcrowding means that landlessness is common, and in regions where agricultural and industrial opportunities are limited (see Bailey, 1987). More broadly this surplus labour function of fisheries is commonly regarded as playing a role in alleviating poverty and economic hardship (Bailey, 1997; Béné et al., 2010; Jul-Larsen et al., 2003). This could potentially explain the high level of involvement of internal migrants from Java but also from other parts of Eastern Indonesia, given the generally lower socio-economic status of the region and the limited economic opportunities available (World Bank, 2018). These points combine to suggest that jobs in tuna fisheries may address issues of economic marginality or financial hardship in home villages across Java and Eastern Indonesia.

A possible example of this “safety valve/labour buffer” function of tuna fisheries are the participants in the fishery from the Sangihe archipelago in the Philippines–Indonesia maritime border zone (USAID, 2018b). This is a region with few alternative economic options, and with a high degree of remoteness from government services. The Sangihe archipelago is a key link in the tuna fishery chain for handline fisheries in particular (USAID, 2018b), and many Sangihe people also live in Manado and Bitung as participants in the fishing and processing sectors. This includes people who are part of a group of 6,000 “stateless residents” who live in Bitung, often considered as undocumented migrants but many of whom originate from Sangihe archipelago, with occasional arrivals on fishing vessels adding to this number (Jakarta Post, 2016). It is highly likely that contributions to communities in and from the Sangihe archipelago from tuna fishing are therefore highly economically significant, and that remittances from tuna fishing play a major role in local

economies. Tracking economic contributions to remote and economically marginal communities via remittances, and the economic functions of fisheries for internal migrants presents as a future research topic of potentially high value to the assessment of tuna fisheries.

In addition to internal migrants, the Bitung skipjack fishery has historically also involved high numbers of migrants from the Southern Philippines, with Filipino fishermen regularly employed on boats supplying processing plants in Bitung, and in factory processing roles. Filipino fishers played a key role in establishing the fishery, and were seen in the industry as reliable crew with a high level of knowledge about techniques and conditions in the areas around Northern Sulawesi and Northern Maluku (Interview #54). Since IUU regulations came into force in 2014 there has been a reported decline in the participation of Filipino and Sangihe fishers in both fishing and processing sector roles (Interview #54), and some formerly Filipino-owned companies have been transferred to Indonesian ownership (Interviews #42, #45). Filipino citizens who were living in Bitung and working in the Indonesian tuna sector were forced to relocate back to the Philippines. However, there remains substantial participation of Filipino fishers in small-scale handline vessels (Nugroho et al., 2018), which were much less affected by IUU and foreign involvement regulations.

While the changes since 2014 have led to higher proportions of local crew and workers being engaged in the cannery chain, the exit of Filipino workers has also led to a substantial loss of knowledge of effective fishing techniques and operational productivity (Interviews #45, #55). Company managers as well as fishers and traders interviewed noted that Sangihe and Filipino communities had become adept at effectively finding and catching fish. In some cases business owners reported that the shift to the new regulations had impacted on the effective running of businesses due to employees now having less direct experience and knowledge of fishing, and due to higher absenteeism (Interview #45). This represents a loss of benefits from the fishery generally, in so far as these workers supported the overall viability of the fishery, and the economic and food supply opportunities associated with it. Moreoverreduction in Filipino participation also represents a loss of income and livelihoods for those Filipino crew and factory workers, and families via remittances.

**Gendered division of labour**

According to processing-company managers and worker interviewees, 100% of fishing crew on PL and PS boats are men, while 70 percent or more of the work in cannery processing plants is done by women. While some processing-plant managers interviewed reported that they had women in managerial roles, and that policies for advancement of women existed and were a priority for further action, a survey of the fisheries sector in Bitung overall found that as few as two percent of roles in company management were taken up by women (USAID, 2018a). USAID (2018a) provides a valuable overview of gender in tuna value chains operating in Bitung.

Where women are clustered around lower-paid roles, due to their generally less powerful position within society, the possibility exists that they are more vulnerable to labour abuses. For example, the Bumi Menara Internusa (BMI) tuna cannery in Lampung (Sumatra) has reportedly been engaging in labour abuses, including resisting the enrolment of female processing workers in the BJPS health insurance scheme. The company is accused of having arranged the arrest of a union official who has been helping female employees enrol (UIF 2018). Further research is needed for a fuller understanding of the ways gender relations affect the distribution of wellbeing benefits from fisheries.

As in Ambon, in Bitung women's role in fishing families to take care of all the "on the land" aspects of fishing leads to involvement in small-scale processing and trading businesses. This has led to the trader group of *tibo-tibo* being almost entirely women. Some of these have moved on from trading to substantial integrated fishing and trading operations. Their success relies on strong negotiating skills and a "can do" attitude. Many *tibo-tibo* are

successful business women who own small purse seine vessels, hiring fishing crew and making good money trading a range of small pelagics, coastal and SKJ tunas into local markets, and into canneries. These female *tibo-tibo* will also hire networks of female retailers who distribute and sell both smoked and fresh forms of fish in rural markets throughout North Sulawesi and Gorontalo. This part of the fish chain provides an important source of income for rural women and supports the local supply of tuna.

One *tibo-tibo* who owns seven purse seine boats, and trades in small pelagics and tunas in the domestic chain as well as to canneries for the export chain, described the gender dynamics of the business as follows:

> Women, they are not shy to sell. But men, it is the nature of ignorance, they don't want to get involved in money. They are shy about this, right. But women in the way they work for a living are not so shy … So, we are good negotiators. So sometimes in the company, if there are a lot of fish or something … we must still make money, right … So if others have come first, if our ship is left behind and we don't go to the factory then where to go? So we must force [the sale] anyway … You know that the company … sometimes if their factory is not full yet, they will just say its full, then lower the price. Then like it or not, I must negotiate [to make a sale].
>
> Female *tibo-tibo*, Bitung

The gendered division of labour at the community and port level has implications for the governance of the fishery to promote community wellbeing. As with Maluku HL fisheries, including women in stakeholder discussions and as participants in any training or other extension work is a key means of including their knowledge in fisheries discussions. The fisheries sector tends to consist of exclusively or mainly men in such activities. However, data collection interventions for recording landings or auditing supply chains, particularly to capture information about fish entering local market chains, are likely to benefit from involvement of women. This is due to the fact that women have a high involvement in activities once fish is landed and in local market chains.

## Summary of key factors influencing wellbeing

*Government influences*

- National-level policy and regulation (anti-IUU, ex-foreign vessel and trans-shipment regulations) have had a profound impact on the fleet operating out of Bitung, and consequently on tuna production levels in the processing sector. This had a flow-on effect to sustained reductions in employment in processing plants of sometimes over 50% of staff, increases in work insecurity and vulnerability to labour abuses, and an increase in fish prices. This impacted on the viability of some trading operations in the local chain, particularly fish-smoking businesses supplying the local trade. However, there are anecdotal reports of increased resource availability for small-scale operators, and some well positioned local fish traders and fishing vessels have benefited from increases in fish prices following reductions in supply.
- Historical lack of evidence-based planning processes: since 2012, successive major policy shifts have been enacted that have substantially impacted on wellbeing of coastal communities in unintended ways, and in ways that run counter to the overall objectives of fisheries policy in Indonesia. This is in part due to a lack of formalised, evidence-based planning and policy development

processes, and a lack of knowledge of the likely social and economic impacts of policy.

- Historical lack of stakeholder inclusive decision-making: while tackling entrenched problems such as IUU requires a commitment to action from the government, developing effective fisheries management systems that underpin the longer-term viability of the social and economic benefits flowing to communities requires co-operative efforts between industry, communities and government. Moreover, forecasting the likely impacts of policy may have been achievable with existing knowledge of the industry among stakeholder networks. Part of the legacy of the 2014 regulatory changes has been a lack of trust in government from industry. Re-establishing co-operative relationships between industry and government while achieving stock sustainability stands to benefit community wellbeing over the long term.

*Non-government influences*

- Business relations and markets: the complexity of trading relations along the chain makes implementation of effective regulation, and formalised standards related to supply chain transparency, sustainability and ethical practices challenging to implement. This potentially undermines the longer-term sustainability of the fishery, subjects lower-paid workers to risks, and potentially restricts access to benefits in chains that are implementing good practices.
- Labour standards disparity between processing and fishing sectors: there is a substantial disparity of income security and working conditions between the processing and fishing sectors. While all sectors are vulnerable to wider shocks and regulatory changes, workers engaged as fishing crew are most commonly uncontracted, on insecure catch-share models, have little health insurance coverage, and are subjected to unsafe work conditions to a greater extent than processing sector workers.
- Socio-economic status and migrant status impacts wellbeing benefits: Bitung's tuna fisheries provide an accessible source of work for people from lower socio-economic backgrounds in both the fishing and processing sectors, and people from all over Eastern Indonesia. It is also likely to provide important contributions to economically marginal communities through poverty alleviation functions for some workers and families. Since 2014 Filipino workers who previously occupied many roles as vessel crew and processing workers have left the fishery, which has increased Indonesian involvement in the fish chain, but has also led to a loss of knowledge that supported the growth and viable operation of the fishery.
- Gender relations impact wellbeing benefits: these structure participation in the fishery in terms of which roles men and women occupy. While men tend to be associated with fishing and roles that focus on trading higher quality fish (associated with greater wealth accumulation), women have a key role in managing household income and local trading. As a result, some women have been able to leverage their financial and business literacy to achieve upward mobility and become successful traders.

## 2.3 Recommendations – Indonesia

**Government**

*Management and planning*

- Ensure that small and medium scale tuna fisheries continue to be viable through protecting tuna stocks from overfishing by:
    - Continuing to develop effective overall fisheries planning, management, monitoring and enforcement systems.
    - Implementing effective management of catch/effort across all sectors. This includes ensuring catch levels do not exceed sustainable thresholds in the medium to longer term as a result of replacement of effort from foreign and ex-foreign vessels.
- Ensure management objectives related to the wellbeing/welfare of coastal communities are incorporated into the current tuna Harvest Strategy, alongside those related to biological sustainability, and prosperity/wealth generation.
- Continue engagement with provincial-level government and Fisheries Co-Management Committees, to include engagement around social and economic impacts of policy. This includes facilitating data collection and storage, as well as assisting to develop feasible regulations and management processes, that are capable of accounting for local variations in how fisheries operate, and the contributions tuna fisheries make to coastal community wellbeing across different ports/provinces.
- Establish social and economic data collection processes appropriate for tracking sub-national contributions of tuna fisheries to coastal communities.
- Support and undertake focused socio-economic studies to determine the dependency of communities in Eastern Indonesia on tuna fisheries for poverty alleviation and food security.
- Ensure traceability and management processes, including data collection, surveillance, enforcement and licensing systems, do not unfairly penalise or create unreasonable barriers to participation for fishers with low levels of schooling and limited financial and technological capabilities.
- Investigate adopting a co-management model which devolves some agreed aspects of decision-making to industry over the longer term.

Specifically in relation to the management of FADs

- Ensure implementation of the existing FAD regulations or policy revision is based on solid information and consultation about the FAD-based handline/troll line fisheries, so as not to risk causing possibly severe livelihood problems for already low-income groups of fishers and downstream workers.
- Ensure national policies and plans account for the uses of FADs by non-FAD owners, particularly for non-FAD owning vessels that deliver raw materials to provincial and local markets.

*Improving working conditions*

- Advancing implementation of Fisheries Regulation (PP) No. 35/2015 on a System for Certifying Human Rights in the Fisheries Sector.
- Extend social insurance schemes to all small-scale fishers and vessel crew.
- Investigate the possibility of providing safety equipment for small-scale fishers, such as Ocean Safety "grab bags" and better navigational equipment, such as GPS units.[8]
- Investigate ways to address income security issues, including but not limited to making existing small-scale financing schemes more accessible to independent tuna fishers, and providing financial planning and household budgeting training to fishing families, which include both men and women in the delivery of this training.
- Investigate the barriers and opportunities for greater compliance with national labour laws regarding contracting and payment, particularly for vessel crew and casual traders in local market chains.
- Investigate options for crews to move away from a pure catch-share model to a mix of day wage/catch share, to improve income security.
- Investigate barriers and opportunities for retailers, and particularly female traders and retailers, to move away from casual engagement to more permanent roles in fish trading businesses.
- Investigate feasibility of redevelopment of fish markets focused primarily on supplying provincial/local markets, to improve standards and facilities available for fishers and traders.

**Civil society organisations, certifying organisations and buyer companies**

*Certification systems*

- Ensure certification auditing systems are inclusive of fishers with low levels of schooling, small vessels, and limited financial and technological capabilities.
- Design incentives such as the Fair Trade Premium Fund in ways that enable migrant fishers to participate, and address social equity issues facing fishers regarding persistent debt.
- Further improve access to safety equipment and GPS under Fair Trade schemes, and looking at ways to extend these initiatives beyond Fair Trade communities.
- CSOs investigate ways to play a greater role in brokering relationships between fishers, communities, processors/exporters and buyers in end markets, to allow greater entry in Fair Trade certification.
- CSOs and companies investigate ways to play a greater role in brokering local trading relations that address power and income distribution inequalities between fishers and traders in the export chain, and also support greater participation of women traders in the export chain.
- Investigate ways to address income security issues, including but not limited to providing financial planning and household budgeting training to fishing families, that include both men and women in the delivery of this training.

[8] A useful reference document for this may be found in the FAO "Safety at Sea for Small Scale Fishers" manual. http://www.fao.org/documents/card/en/c/ca5772en

# 3 Solomon Islands

Solomon Islands contains some of the world's richest tuna grounds, and tuna plays an important role in the economic and social life of the country. Skipjack, yellowfin and bigeye tunas are economically valuable, while skipjack and coastal tunas are also valued as a source of food, and some consumption of yellowfin also occurs. In earlier times, coastal tuna in and near lagoons and inshore waters were caught with hooks made from oyster shell, turtle shell and hand-spun string, trolled from dugout canoes. In recent decades people use synthetic handlines and steel hooks, some still using dugout canoes. Others use fibreglass canoes powered by outboard motor in coastal and offshore waters. The development of extensive offshore industrial fisheries since the 1970s has underpinned development progress as a mainstay of the economy.

Currently the Solomon Islands is classified as a lower middle-income country by the World Bank, having recently progressed from low-income status in 2018.[9] It remains heavily reliant on natural resources for economic development, with forestry, fisheries, agriculture and services currently the largest contributors to GDP. Eighty-three percent of the population live outside the principal urban centre of Honiara with variable access to basic services such as power, sanitation, health care, education and transport. Almost the entire rural population maintain some involvement in small-scale subsistence farming and/or fishing activities, while 51% of rural incomes are derived from small-scale agriculture and fisheries.

Structural constraints on government service delivery and inclusive economic growth include a population widely dispersed across an archipelagic and mountainous geography, its location on the periphery of global economic and political systems, and the lack of a workforce and infrastructure suitable for many contemporary business activities. Beyond economic geography and socio-economic development, state fragility remains the critical factor likely to influence the nation's prospects in the short to medium term. Social unrest between 1998–2003 caused major upheavals in many parts of the economy and society, and led to state failure. The state is still considered to be fragile and uneven in capacity, and the economy vulnerable to shocks.

In this broad context it has been well recognised that tuna fisheries represent a sector capable of contributing to a stable economy, inclusive development and state revenue (World Bank, 2018). At the same time the tuna fisheries as a whole are well recognised as providing substantial sources of subsistence for rural populations to supplement more traditional fishing and farming activities, and a pathway into the cash economy (see e.g. Aquorau, 2001; Barclay et al., 2015; Barclay & Cartwright, 2008). Tuna is the single largest fishery in the Solomon Islands both in terms of value and volume (Aqorau, 2007; Gillett, 2016). For the year 2016 total catch in Solomon Islands waters was reported as 179,200 tonnes for a total value of 326 million USD (FFA, 2016). According to recent media reports citing the World Bank, the industrial tuna fishing industry amounts to as much as 18% of GDP and 10% of formal employment (IFC, 2018).

Currently, a domestic fleet of purse seine and pole-and-line vessels operates out of Noro, the country's second largest port and base of the domestic tuna fishing sector. These vessels have exclusive access to the archipelagic waters and target mostly skipjack tuna for provision to the country's sole cannery. Additionally an extensive fleet of 193 foreign vessels operates in the EEZ, principally purse seine, longline vessels, and a small fleet of pole-and-line vessels (MFMR, 2017). Catch estimates across these gear types for the years 2013–2017 are shown in Figure 36.

[9] All information in this and the following paragraph summarised from World Bank (2018).

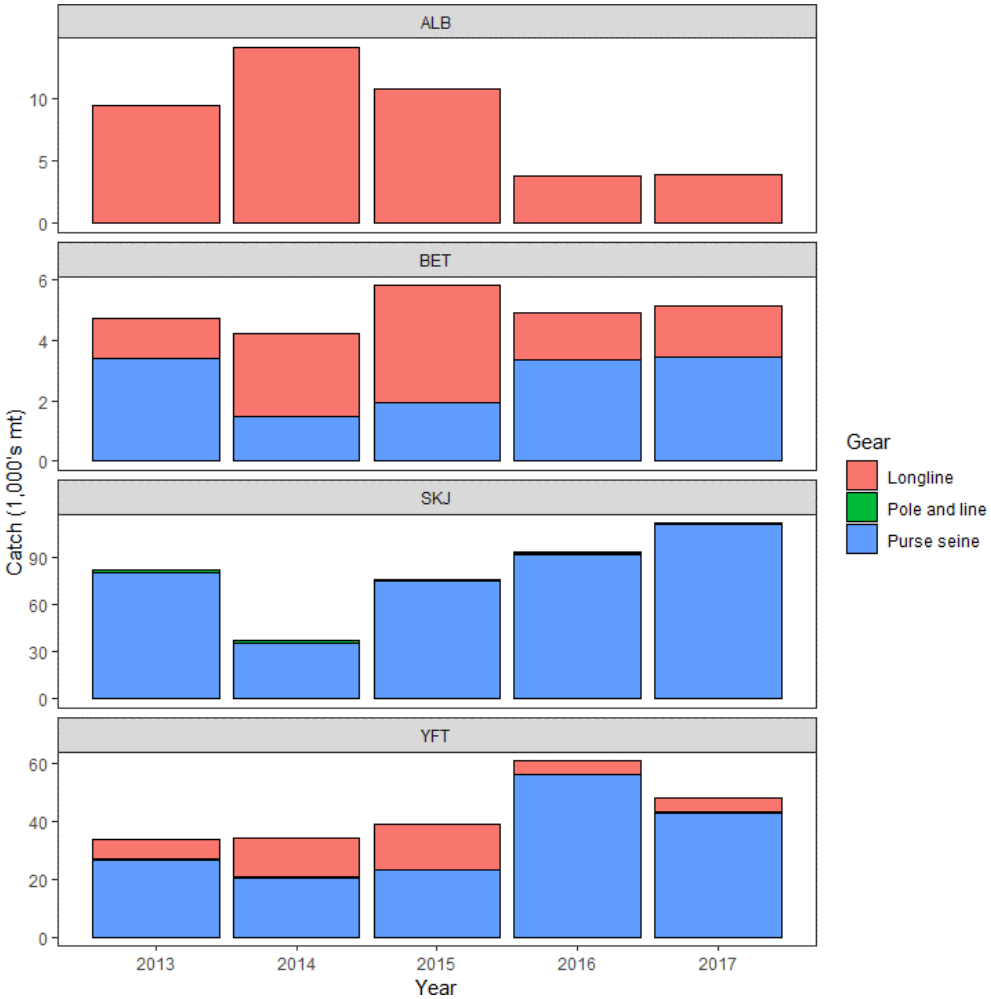


**Figure 33. Annual catch estimates in the Solomon Islands waters for 2013–2017 for the main tuna species. From top to bottom: albacore, bigeye, skipjack and yellowfin, for the three gear types operating in the Solomon Islands.**

Source: SPC data published in Solomon Islands National Fisheries Policy 2019–2029

Catch of pelagic coastal tunas played a role in the customary economic and social life across the SI (e.g. Hocart, 1935), supplementing regular catches of reef species (Cooper, 1971) and, in more recent times, small pelagics (Roeger et al., 2016) as basic sources of subsistence alongside small-scale agriculture. Catch of *bonito* (skipjack tuna) was regularly undertaken both in lagoons and outside of reefs with handmade *kastom* lures being used with poles (Interview #9) or trolled behind a dugout canoe (Barclay & Cartwright, 2008), in some cases leading to as many as 50 fish being caught (Cooper, 1971). This catch was consumed directly, traded in village and provincial town markets for cash income that was considered lucrative compared to line fishing in lagoons and inshore areas, as well as being traded directly for fresh vegetables (Cooper, 1971).

Today tunas continue to play a consistent role in small-scale fishing for food, cash and trade for goods throughout the Solomon Islands, with a greater or lesser role in different places. Synthetic handlines, steel hooks, and fibreglass canoes powered by outboard motors are the typical means of accessing tuna in the village setting. Cooper (1971) reports that outboard motors first began replacing dugouts in the 1960s, when the British Solomon Islands Trading Company began extending credit to *bonito* fishers in Malaita, considerably enhancing catches. Small-scale coastal tuna fisheries today play an important role in livelihoods for relatively small groups of fishers in and around the three urban centres of Honiara, Gizo and Auki, where they sell their catch to growing urban populations as a valued source of fresh protein. In traditionally reef-dependent communities, shifting focus to pelagic species such as tunas in some parts of coastal Solomon Islands has also been shown to increase the security of food supply and livelihoods for fishers who do not have access to productive inshore fishing grounds (Albert, Beare, et al., 2014).

### Governance system for Solomon Islands tuna fisheries

Here we introduce the government institutions usually considered within fisheries management, and the market, civil-society and social relations which together make up the governing system, broadly defined, that affects the operation of fisheries, and the spread of wellbeing benefits from fisheries.

Solomon Islands tuna fisheries are managed by the Ministry for Fisheries and Marine Resources (MFMR) under the Fisheries Management Act 2015. Policy and decision-making functions, licensing, and management of maritime areas outside 12 NM including both AW and EEZ waters fall to the national offices of the ministry. Management of artisanal and small-scale fishing operations supplying local markets in the 0–3 NM zone, as well as management of small-scale industrial fishing using pole-and-line, troll and handline methods in the 3–12 NM zone are determined by villages and provincial governments (MFMR, 2014). In practice, there are some commercially significant aspects of tuna fisheries inside the 12 NM zone. In particular, bait fisheries for pole and line have historically been managed at a national level in spite of the formal devolution to provinces (Barclay & Cartwright, 2008). Currently, bait ground registers are maintained by the national government, and a national baitfish management plan is in development as an aspect of the national-level tuna management and development plan (MFMR, 2014).

### Guiding documents for fisheries policy and management in Solomon Islands

Constitutionally, and in popular understanding, Solomon Islands' natural resources belong to its people, justifying the development of fisheries based on sovereignty over tuna resources, and the equitable flow of development opportunities and associated social and economic benefits to the population (Aquorau, 2007). In relation to current fisheries policy and management in the Solomon Islands, current objectives and priorities derive from the Fisheries Management Act 2015, Solomon Islands National Fisheries Policy 2019–2029 (nested under the National Development Plan 2015–2036), the Regional Roadmap for Sustainable Pacific Fisheries 2015, and the National Tuna Management and Development Plan 2014. Those national documents of specific relevance to social and economic aspects of tuna fisheries management are summarised in the following table.

**Table 20. Key principles and objectives for Solomon Islands tuna fisheries**

| Legal/policy instrument | Relevant aspects for social and economic analysis |
|---|---|
| **Solomon Islands Fisheries Management Act 2015** | Provides the legal framework for management of fisheries resources and identifies an overarching objective and principles of management.<br>Objective:<br>• To ensure the long-term management, conservation, development and sustainable use of Solomon Islands fisheries and marine ecosystems for the benefit of the people of Solomon Islands<br>Principles directly relevant to social and economic benefits:<br>• Sustainable use so as to achieve benefits including economic growth, human resource development, employment creation and sound ecological balance<br>• Management measures shall be based on the best scientific evidence including relevant economic information<br>• An understanding of and participation of stakeholders shall be promoted to the extent practicable |
| **Solomon Islands National Fisheries Policy 2019–2029** | Identifies policy areas and broad objectives, nested under the wider objectives of the SI National Development Strategy 2016–2035, including:<br>• Inshore and inland fisheries: Safeguard inshore and inland fisheries and associated ecosystems and ecosystem services, for good nutrition and increased social and economic benefits<br>• Offshore fisheries: Increase, improve and diversify the benefits that the nation receives from its offshore fisheries resources |
| **Regional Roadmap for Sustainable Pacific Fisheries 2015** | Identifies four key goals for regional tuna fisheries management with specific targets associated, focused on:<br>1. Sustainability – Includes implementation of Target Reference Points, ETP measures and IUU reduction<br>2. Value – The region's tuna catch in 2024 will be worth double what it is in 2014, by increasing value rather than volume<br>3. Employment – 18,000 new jobs created in the tuna industry within 10 years, primarily through increased processing in Melanesia<br>4. Food security – The supply of tuna for domestic consumption in the region will increase by 40,000 tonnes per year by 2024 |
| **National Tuna Management and Development Plan** | Identifies six specific objectives for tuna fisheries management, and identifies actions and indicators for progress.<br>1. Ensure fish stocks are sustainable and at levels that support profitable fisheries<br>2. Manage fisheries within recognised principles of ecosystem approach to management<br>3. Maximise employment opportunities for Solomon Islanders, use resource access to promote maximum national participation<br>4. Increase investment in fisheries and SIG income from the tuna fishery sector<br>5. Enhance food security and livelihoods, and minimise adverse social, cultural, gender and environmental impacts<br>6. Ensure good governance, management and compliance systems are in place |

Currently there is accessible high-level economic reporting for tuna resources at the national level via the Forum Fisheries Association (FFA) economic indicators reports and report cards, and via reporting to the Western and Central Pacific Fisheries Commission (WCPFC). Periodic national statistical surveys, as well as regional studies on tuna in the economies of Pacific Island nations also have considerable value for understanding the benefits that flow from tuna fisheries (Gillett, 2016). Reporting for the most part, however, is not disaggregated for tuna in regards to food supply, consumption or employment along the value chain, and data quality is in general considered variable in quality (Gillett, 2016). Isolated studies on coastal tuna fisheries have shed light on both the social and economic dynamics of these

fisheries, however there appears to be no systematic data collection by government beyond aggregate catch and value estimates across coastal species. Currently there is no evidence that planning processes aim to explicitly project social and economic impacts of policy and management changes (positive and negative) at the sub-national level, however aggregate/national-level considerations are accounted for in sub-regional planning processes as part of the FFA and PNA processes (see e.g. FFA, 2017).

Tables 21 and 22 display the governing system for Solomon Islands tuna fisheries, considering both government (Table 21) and non-government (Table 22) elements.

**Table 21. Governing system for Solomon Islands tuna fisheries – government**

| Government | | | | |
|---|---|---|---|---|
| | **Regional and international** | **National** | **Provincial** | **Local** |
| **Both cases** | No data recorded. | Fisheries Management Act (FMA) 2015<br>National Tuna Management and Development Plan (NTMDP)<br>Fisheries Management Regulations 2017<br>Solomon Islands National Fisheries Policy 2019–2029<br>National Development Strategy 2016–2035 | Exercise of authority in provincial waters (FMA 2015). | No data recorded. |
| **Noro PS/PL** | UNCLOS and UN fish stocks agreement.<br>FAO compliance agreement.<br>FAO code of conduct for responsible fisheries.<br>Forum Fisheries Agency agreements and arrangements.<br>PNA Vessel Day Scheme.<br>Seasonal FAD closures under both PNA and WCPFC rules.<br>WCPFC rules and procedures.<br>SPC – Annual catch estimates incorporated into regional assessments.<br>Import quotas into foreign markets (e.g. Taiwanese vessels importing bigeye to Japan).<br>South Pacific Regional Fisheries Management Convention.<br>Wellington Driftnet Convention.<br>EU market access agreements under iEPA, GSP+ and EBA Initiative.<br>EU Food Safety import standards.<br>EU Yellow card system. | Vessel licensing and access arrangements under FMA 2015 and Licencing Guidelines.<br>Ministry of Health Competent Authority (CA) for export to EU.<br>Onshore fleet development, trans-shipment, and processing policies under NTMDP.<br>Delimitation of Marine Water Act 1978.<br>FAD Management Plan.<br>Baitfish Management Plan.<br>National Plan of Action on Sharks and Bycatch.<br>Sustainable Investment Guidelines.<br>Hapi Fis program including bycatch/saltfish.<br>National Gender Equality and Women's Development (GEWD) policy.<br>Fuel and non-fuel subsidies. | Provincial levies.<br>Government housing services in Noro. | Noro Town Council Local Market Vendors co-operative program. |
| **Gizo HL** | FAO SSF guidelines.<br>SPC New Song.<br>Coral Triangle Initiative. | Inshore FAD development program for fishers.<br>Development Processing Agreements for local fishers under NTMDP. | Constituent development funds.<br>Exercise of authority in provincial waters (FMA 2015). | Local market fees for vendors. |

Sources: Inception workshops/primary interviews, National Tuna Management and Development Plan (MFMR, 2014).

Notes: PS is purse seine; PL is pole and line; HL is handline.

**Table 22. Governing system for Solomon Islands tuna fisheries – non-government**

| Non-government | | | | | |
|---|---|---|---|---|---|
| | **Environmental and ecological dynamics** | **Resource production (fishing and processing)** | **Markets (trading, retail and consumption)** | **Community-level governance** | **Social relations** |
| **Both cases** | Migratory nature of tuna.<br>ENSO-related fluctuations in availability of tuna stocks.<br>Potential for tuna range shifts eastwards under climate change conditions<br>Skipjack associate with other species under FADs leading to bycatch issues. | Predominant fishing strategy around FADs. Some use of free-schools. | No data recorded. | No data recorded. | Gender – Men undertake fishing, heavy labour and roles associated with authority, with some exceptions. Women undertake processing and local trading roles, with some exceptions. |
| **Noro PS/PL** | Live bait stock uncertainty | PS and PL fishing methods.<br>Full integration of fishing and processing operations within a global trading firm.<br>High-cost operating environment (labour productivity, power, materials, freight etc.). | Presence of an export market.<br>Export market demand and market preferences.<br>Global fish price fluctuations.<br>MSC certification.<br>Fair Trade certification.<br>Domestic market for flake product helps business viability. | Co-operative social support associations in Noro. | Migration – People from across Solomons move to Noro for work<br>Socio-economic background – Jobs in fishing and processing taken up by migrants and workers from nearby villages with lower levels of schooling Managerial and technical roles taken up by middle-class workers with tertiary education. |
| **Gizo HL** | | Handline fishery<br>Growth and presence of industrial fishery leading to increased reliance on FADs.<br>Family-based businesses (integrate fishing and market sale). | Fish price fluctuations in Gizo market. | Community-based effort management by fishers. | Ethnicity/migration – Fishery exclusively Gilbertese fishers and traders. Influence of social/political marginalisation of Gilbertese communities on fishery. |

Sources: Inception workshops, primary interviews, Solomon Islands National Tuna Management and Development Plan (MFMR, 2014)

Notes: PS is purse seine; PL is pole and line; HL is handline. ENSO is El Niño Southern Oscillation, an oceanographic phenomena that changes surface fishery stock availability related to water temperature.

The Solomon Islands relies on regional co-operation via multi-lateral institutions for effective fisheries management (Hanich et al., 2010). Chief among these is the Western and Central Pacific Fisheries Commission (WCPFC), which was formed in 2004 to manage shared migratory tuna stocks among resource-owning Pacific Island nations, and distant water nations with an interest in resource access. The Solomon Islands is a founding member, and therefore national-level legislation and regulations must comply with WCPFC rules and procedures. At the sub-regional level, the Pacific Islands Forum Fisheries Agency (FFA) precedes the WCPFC, having been founded in 1979 as the first Pacific regional body dealing specifically with tuna. FFA's mission is "to support and enable Pacific Island states to achieve sustainable fisheries and maximise their social and economic benefits in harmony with the broader environment" (FFA, 2005), and as such its purpose is to support capacity building, the harmonisation of fisheries policies, and intra-regional co-operation among Pacific Island nations (Hanich et al., 2010). Unlike the WCPFC, it is not a management body whose decisions are binding, with implementation of FFA policies and decisions occurring at the national level (Hanich et al., 2010). The Secretary for the Pacific Community is the other key regional organisation in Pacific fisheries. Its Oceanic Fisheries Program plays a key technical and scientific role in supporting regional governments and the WCPFC scientific committee in monitoring and reporting on industrial tuna catches, and conducts stock assessments for Pacific tunas (Hanich et al., 2010).

A key aspect of government fisheries management impacting on social and economic outcomes in the Solomon Islands relates to the development of sub-regional co-operative effort management arrangements among nine nations under the Parties to the Nauru Agreement since 2007, known as the Vessel Day Scheme. The Vessel Day Scheme, as well as a range of other regional co-operative fisheries management initiatives, stems from the 1982 Nauru Agreement Concerning Cooperation in the Management of Fisheries of Common Interest, between nine equatorial Pacific Island nations including the Solomon Islands. Collectively they are known as the Parties to the Nauru Agreement (PNA), and their EEZs include waters that supply up to 40% of the total catch for tunas in the Pacific, a figure which the PNA claims makes it "the single most important source of raw material for the global tuna canning industry" (Pacifical, 2019).

The Solomon Islands has been a key player since the 1982 agreement in pushing to capture more of the value of the skipjack fisheries in the EEZs of resource-owning Pacific Island nations. The most prominent, and successful, initiative in this regard is the PNA Vessel Day Scheme (VDS). The Vessel Day Scheme is an effort-based management system in which a fixed "quota" of vessel days is allocated to each PNA member state, from whom fishing vessels may purchase access rights to tuna resources in the EEZ and sovereign waters of that nation (Hanich et al., 2010; Havice et al., 2007). The implementation of the VDS has resulted in access fees of 474 million USD in 2016 on the back of a 27% per annum annual increase in access fees from purse seine vessels between 2011 and 2015 (Terawasi & Reid, 2017). For the Solomon Islands the VDS has delivered increases in access fees from 18.3 million USD in 2008 to 41.6 million USD in 2016 (FFA, 2016), with the Solomon Islands reportedly the most successful of the PNA countries in leveraging access fees from foreign fleets (World Bank, 2018).

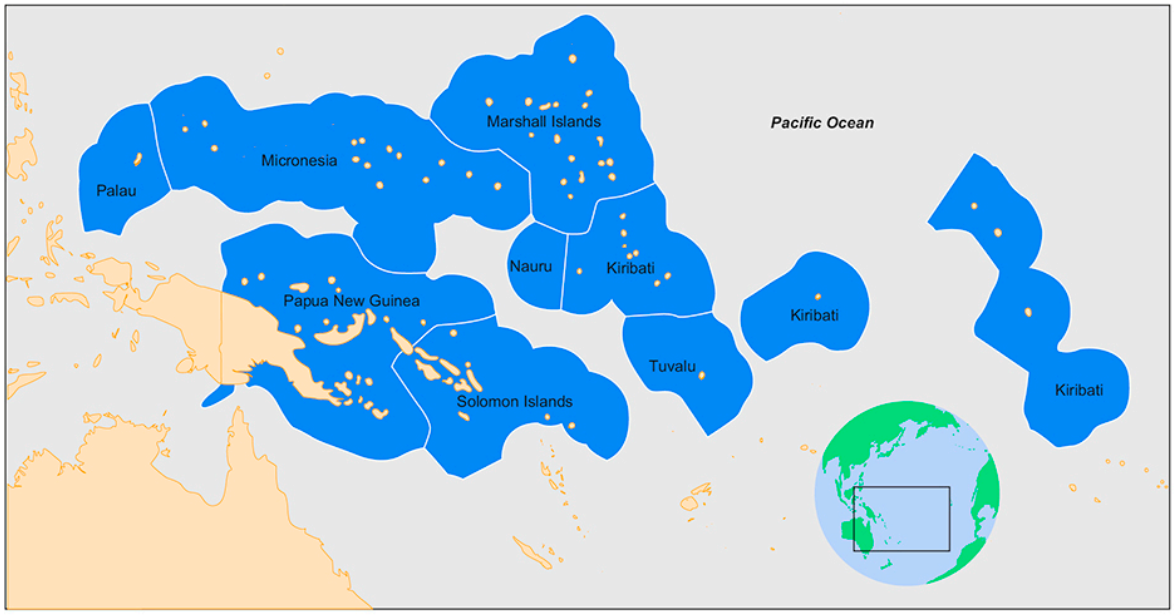


**Figure 34. Map of the Parties to the Nauru Agreement (PNA) area, in which the Vessel Day Scheme (VDS) operates.**

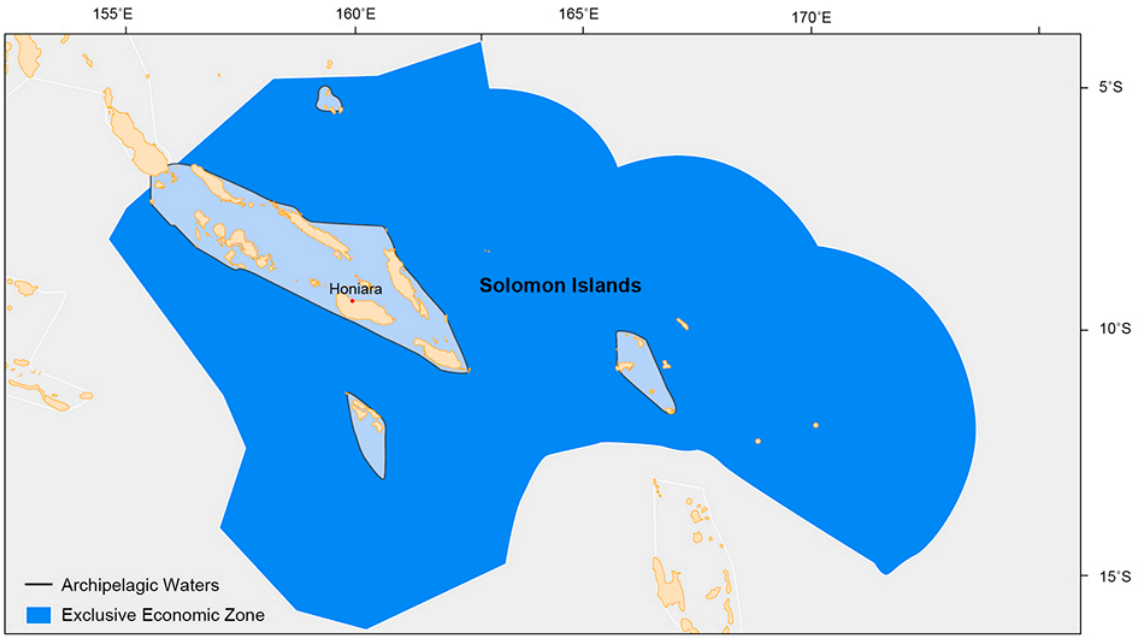


**Figure 35. Map of Solomon Islands showing Archipelagic Waters and Exclusive Economic Zone.**

In the case of Solomon Islands, the national licensing system is the mechanism via which vessel days are managed and allocated under a preferential system. Fishing access is based on a tiered system that provides preferential access based on the extent to which the catch of a vessel is committed to domestic onshore processing. These designations are laid out in Table 20.

Vessel days are allocated at a fixed rate for use in AW, which is limited to domestic fleet vessels processing catch in the Solomon Islands. Foreign-operated domestically chartered vessels, or foreign vessels offloading catch to processing facilities in Solomon Islands receive priority to purchase days at market rates. Remaining days may then be purchased on the open market by foreign vessels operating in the EEZ and directly exporting catch. A fully competitive open tender process is yet to be implemented.

**Table 23. Licensing system for Solomon Islands tuna fisheries as per Solomon Islands Tuna Management and Development Plan 2014.**

| Category of Commercial fishing operation | Priority |
|---|---|
| **Local vessel:**<br>**• Local company**<br>**• Locally registered fishing vessel**<br>**• Mostly local crew**<br>**• Catch processed onshore** | • The only category permitted to fish in archipelagic waters<br>• First priority for days under Vessel Day Scheme (VDS)<br>• Allocation according to long-term development agreement |
| **Foreign vessels chartered by local company:**<br>**• Meets minimum local crew requirements**<br>**• Fish processed in Solomon Islands** | • Tier 1 allocation<br>• Opportunity to purchase, at market rates, fishing days based on the volume of catch required for onshore processing plant<br>• Order of priority for allocations to Tier 1 companies based on order of investment<br>• Allocation according to long-term development agreement |
| **Foreign vessels fishing under bilateral agreement:**<br>**• Fish processed in Solomon Islands**<br>**• Company (or associated company) invests in relevant onshore processing and local crewing** | • Tier 1 allocation<br>• Opportunity to purchase, at market rates, fishing days based on the volume of catch required for onshore processing plant<br>• Order of priority for allocations to Tier 1 companies based on order of investment<br>• Allocation according to long-term development agreement |
| **Foreign vessels fishing under bilateral agreement:**<br>**• Fish processed in another country** | • Tier 2 allocation<br>• Only allocated where VDS days requirements for other categories met<br>• Allocation for one year only |

Sources: Solomon Islands Tuna Management and Development Plan 2014 (MFMR, 2014).

In addition to higher-level licensing systems, three further aspects of government regulation of relevance to social and economic aspects of case-study fisheries are the development of inshore FAD programs, the Fisheries Management and Development Fund under the FMA 2015, and the use of Constituency Development Funds for fisheries projects.

A key plank of coastal fisheries policy has been the development and installation of inshore anchored FADs (aFADs) which aim to increase the use of pelagic fisheries resources in coastal areas, and reduce reliance on coral reef species. As a result trials of small inshore anchored FADs across a range of communities have occurred (see Albert, Beare et al., 2014), including in tuna fishing communities in Western Province (Albert, Warren et al., 2014).

The FMA 2015 mandates the development of a Fisheries Management and Development Fund, which, among other things, may use funds accrued from fines, resource rents and other sources for, among other things, “fisheries and aquaculture management and development activities in the community and small-scale commercial fisheries and

aquaculture sectors" (FMA 2015 Article 13,4 [c]). Attendees at the culmination workshop in Honiara noted that this fund has so far not been used to fund community projects since the establishment of the FMA 2015, but that it could provide a means of directing access fees and other sources of fisheries revenue to priority projects in coastal communities.

Constituency Development Funds are another government financial mechanism, available to members of parliament to spend in their electorates (Batley, 2015), and are regularly reported as being spent on fishing equipment and the provision of small-scale fish processing/storage facilities in regional areas.

In regards to key non-government influences, the wider context of market conditions and trading relations in the global tuna sector influence the operation of fisheries substantially in the Solomon Islands, as do social relations regarding migration and gender.

Two key influences on the operation of Pacific tuna fisheries is the high level of consolidation in retail and trading sectors, and the high cost and capital-intensive nature of fishing in the Pacific. Each of these create considerable challenges for investors and a highly competitive market environment, as Hamilton (2011) notes: "The sector is a notoriously low-margin, high-volume business, characterized by a fiercely competitive international division of labour and extreme downward price pressure in retail markets." In general, low-income Pacific nations are typically not well placed to ride out the volatile nature of tuna fishing, or its highly competitive market and trading characteristics. Furthermore, relatively expensive human resources, power, freight and lack of both infrastructure and service industries can often make processing outside hubs like Thailand un-competitive. As a result the considerable barriers to profitability in fishing and processing sectors need to be overcome through economies of scale within processing and trading sectors, and long-term supply contracts of largely independent fishing operations to these traders (see Havice & Campling, 2017). Another consequence of the challenging environment facing Pacific tuna fisheries is that downstream actors in the wholesale and retail sectors are able to exert pressure on suppliers and fishing operations. This has always been exerted in an informal way through buyer preferences and direct negotiations between actors (Havice & Campling, 2017), yet formalisation of this influence is increasingly evident in certification programs, the most prominent of which are MSC and Fair Trade certification for industrial tuna fisheries in the Pacific (IntraFish, 2019; Trumble & Stocker, 2016). Since 2016, the Solomon Islands domestic sector has been certified under MSC standards, and since March 2019 under Fair Trade USA standards.

Social relations focused on internal migration in the context of economic development are also important contextual factors that influence the operation of the tuna sector in Solomon Islands. Solomon Islands is a post-colonial nation, and encompasses many culturally distinct island groups, both within the majority Melanesian population and minority Polynesian and Micronesian communities. To alleviate periodic difficulties associated with rural subsistence livelihoods, or to seek opportunities to enter the cash economy, Solomon Islanders have a long history of both internal and external migration in response to economic opportunities. National socio-economic reporting considers that there is a positive relationship between migration for work and reduced poverty indices (SINSO, 2015), and as of 2009 10% of the population over the age of five were considered to be recent migrants, meaning they were living in a different province from where they were in 2004 (Parairae, 2017). However there has been considerable friction between the island groups in general, with the social disruption leading to state failure in 1999–2003 popularly known as the 'ethnic tensions' sparked by long-term resentments related to, among other issues, inter-island economic migration. In this case Guadalcanal people perceived migrants from the neighbouring island of Malaita to be taking over jobs, government and residential areas in and around the capital Honiara on Guadalcanal (Dinnen, 2002).

In regards to gender relations, Solomon Islands tuna fisheries are in general reflective of wider gender dynamics in Indo-Pacific tuna fisheries (see Sullivan et al., 2001; USAID,

2018a). Men tend to occupy roles associated with fishing, heavy physical labour, and positions associated with authority. Women tend to participate in roles associated with processing, trade in lower-value local market chains, and tend not to occupy positions of authority (Barclay et al., 2015). While not unchangeable, this gendered division of labour is an important wider pattern that affects all cases we present here.

Case studies focused on the Industrial chain based in Noro and the HL fishery in Gizo allow us to make an initial comparison of the impact these wider trends have on coastal community benefits, and the types of connections between industrial tuna fisheries and coastal tuna fisheries.

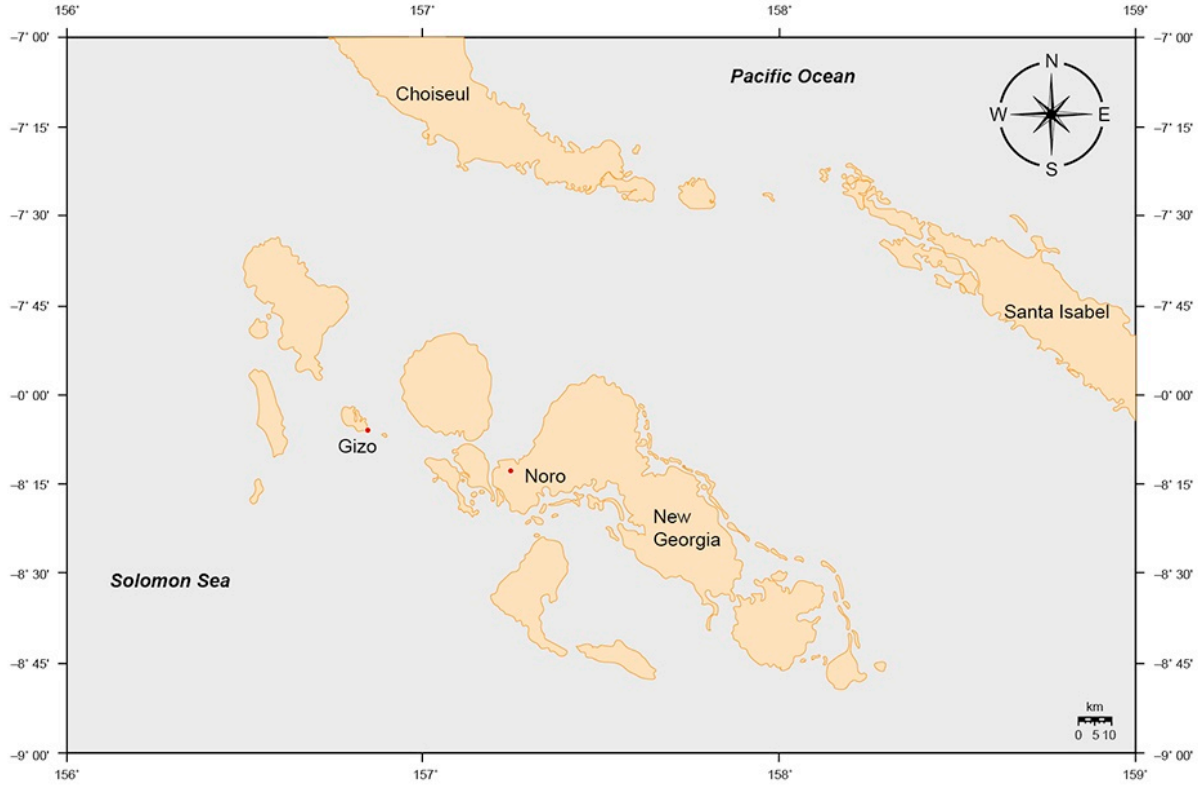


**Figure 36. Map of case study sites in Western Province, Solomon Islands.**

## 3.1 Noro purse seine and pole-and-line fishery

The development of a commercial tuna fishery in the Solomon Islands began in the early 1970s with the arrival of Japanese fishing and seafood trading giant Taiyo Gyogyo Corporation (which later changed its name to Maruha). Archival documents from the period show that Taiyo Gyogyo wanted access to fishing grounds for skipjack to export to the UK canned-fish market and the Japanese market, and they preferred the option of partnering with the Solomon Islands government to create a fishing company and onshore processing factory to paying for access fees as a foreign fishing company (Barclay, 2008). After testing the fishery for some months, the joint venture Solomon Taiyo Limited was formed in 1973. Solomon Taiyo operated a pole-and-line fleet and a cannery and katsuobushi smoking plant operating at Tulagi, near the capital Honiara. Another joint-venture pole-and-line fishing company was formed some years later between Solomon Taiyo and the Solomon Islands government, called National Fisheries Development (NFD). Between the two companies there was a fleet of around 35 pole-and-line vessels targeting skipjack to supply the cannery and smoking factory, and to export frozen whole fish. From the mid 1970s Solomon Taiyo had another smaller fishing base in Noro, in the Western Province. During the 1980s the Noro base was built up, and around 1990 Solomon Taiyo switched all operations over to Noro and left the Tulagi base. In the early 2000s NFD also moved to Noro, making it the country's centre for industrial tuna fishing and processing (Barclay & Cartwright, 2008; Aquorau, 2007).

Until the late 1990s, Solomon Islands had a fleet of up to 38 pole-and-line vessels, which fished on FADs as well as free-schools, depending on conditions. The fleet and the processing plant provided thousands of jobs to Solomon Islanders with opportunities for training and career building. Neither Solomon Taiyo nor NFD, however, were profitable (Barclay and Cartwright, 2008). NFD was privatised in 1990 and sold to Canadian company B.C. Packers Ltd. In 1997 it was bought by global canned-tuna supply-chain company Tri Marine International. After some years of trying to improve profitability in Solomon Taiyo, the Japanese investor company eventually left the joint venture in 2000 when British buyers reduced the price they were willing to pay for pole-and-line caught product and the trading business was no longer viable for Maruha. At the same time there were record low fish prices, so NFD also stopped fishing. Most of the old pole-and-line vessels were not worth reviving, so the catch from domestic fleet since the early 2000s has mainly come from NFD's purse seiners, until 2011 when NFD began using two pole-and-line vessels again. As a wholly government-owned venture the processing company struggled with viability, so entered into commercial partnership with Tri Marine, which was eventually formalised as a joint-venture agreement between the governments of Solomon Islands and Western Province, the Solomon Islands National Provident Fund and Tri Marine with the new name of SolTuna in 2010. Since then SolTuna has invested in increased cannery capacity.

Longline fisheries were established in the 1990s supplying export markets for high quality sashimi tuna markets. Today LL fisheries target albacore, bigeye and yellowfin tuna for frozen products. While this has historically been a fishery conducted by distant water fishing fleets, since 2015 NFD and other local companies have been granted allocations of licences for LL vessels to operate in domestic waters, of which NFD has 30 that it allocates to foreign-owned vessels to fish for Albacore, yellowfin and bigeye tuna. Mostly this catch is frozen, packed and shipped by NFD to export markets (World Bank, 2018), however some albacore is used for canning (Interview #73).

As of 2017 a fleet of 12 vessels (seven purse seine and five pole and line) were based out of Noro, owned and operated by National Fisheries Development (NFD). The five pole-and-line vessels are 65–100 GT and five of the purse seiners are ~350 GT, and these vessels are designed to stay largely within Solomon Islands archipelagic waters. The remaining two purse seiners are large ocean-going vessels of over 1,000 GT.


**Figure 37. NFD purse seiners tied up at Noro (Photo: Reuben Sulu).**


**Figure 38. NFD pole-and-line vessel tied up at Noro (Photo: Reuben Sulu).**

Both purse seine and pole-and-line vessels fish principally on FADs, as shown in the following table of data from 2011 for purse seine vessels.

**Table 24. Purse seine sets in the Solomon Islands Main Group Archipelago (MGA) for 2011**

| Species | FAD (Anchored and drifting) | Free-school |
|---|---|---|
| Skipjack | 89.7% | 10.3% |
| Yellowfin | 93.1% | 6.9% |

**Source: NFD (2016).**

A baitfish fishery has supported the pole-and-line fleet throughout its existence, and is an essential aspect of pole-and-line operations. In 2014 this was reported as being 32.5 MT in total, and is managed by the national government under the Baitfish Fishery Management Plan (MFMR 2018).


**Figure 39. A long-liner and pole-and-line vessel moored at Noro docks (Photo: Nick McClean).**

The NFD fleet fishes principally to supply the SolTuna cannery at Noro (Interview #73; NFD/SolTuna, 2016; McCoy, 2014), which has a capacity of 150 MT per day and a throughput as of 2016 of 110 MT per day (NFD 2016). This is relatively modest compared to large canneries globally (e.g. in Ecuador and Thailand) which can process between 250–500 MT per day (Havice & Reed, 2012). SolTuna exports roughly 70% of its product, almost entirely as cooked loins to Italian company Bolton Food, which became the sole owner of Tri Marine in July 2019 (White, 2019). In addition, SolTuna has a small but growing market into the US. The remaining 30% of product is canned, with 80% of canned fish sold domestically within the Solomon Islands, utilising primarily the flake and darker flesh of the tuna that cannot be used in the export product, but which is popular in Solomon Islands.

With Noro the sole processing centre and main base for industrial fishing operations in the country, it offers an ideal case to examine benefits flowing to coastal communities. Noro is a “tuna town”, so most of what occurs in Noro can be attributed to the tuna fishing sector in some way. Figure 41 provides an overview of the Noro pole-and-line and purse seine cannery fish chain.


**Figure 40. Noro PL/PS Fish Chain.**

While the export of prepared loins and sale of canned fish domestically are the principal drivers of production, substantial local market chains for non-canned fish also exist, with fish entering markets in Noro, Honiara, Gizo and village markets via a range of means.

Undersized and poor quality skipjack tuna that have been kept in brine in the ship's hull (known as "saltfish"), as well as bycatch species including rainbow runner, island bonito, mackerel scad and trigger fish, are sold into local market chains in Noro and Honiara (Lewis, 2014). This system principally applies to purse seine vessels including both NFD and foreign vessels that trans-ship catch at Noro, while some saltfish also enters Honiara from vessels trans-shipping in Honiara harbour.

Traditionally this was an informal trade prior to the establishment of the local sales outlet, and crew were entitled to two bags of bycatch per trip, or ~50 kg (Lewis, 2014). In 2012, Tri Marine joined the International Seafood Sustainability Foundation, which mandates 100% retention of bycatch. Since then NFD has established local sales outlets in Noro and Honiara and sale of saltfish and fresh bycatch are now for the most part regulated through this channel, however interviews suggest informal sale of bycatch from boats still exists (Interviews #75, #85).


**Figure 41. NFD local fish sales outlet (Photo: Reuben Sulu).**

A normal practice in the fishery has also been barter of fish with local fishermen, who are often allowed to take fish from purse seine nets once the best fish have been selected by the boats (Solomon Star, 2018). Interviews also suggest that local fishermen continue to actively barter with crew, providing information on which FADs have fish on them, as well as betel nut, tobacco and food, in exchange for fish, meaning they do not have to fish themselves to meet their needs (Interviews #72, #89, #91). This leads to a relatively small, but potentially locally significant source of fish entering markets in Gizo and village markets across the Solomon Islands. Some informants also reported that low wages from fishing jobs provided an incentive for crew to barter fish off the side of boats (Interview #75).

This issue has caused some public controversy in recent times, and NFD managers have appeared in the media discussing the issue. Acknowledging that regular sharing of catch with local fishermen is a normal part of the fishery, NFD managers also suggested that local fishermen were increasingly taking fish from boats prior to the purse seine boats selecting fish (Solomon Star, 2018). FADs are also reported as being sabotaged by local fishermen, and NFD managers suggest that local fishermen are increasingly intimidating crew to gain access to better fish (Solomon Star, 2018).

The main vendors of saltfish are women traders who will buy fish from the NFD local sales outlet in Noro, and principally transport saltfish to Honiara where it is sold in fishing village market. McCoy reports that approximately 500 tonnes of saltfish and bycatch are traded in Honiara market each year, a large though unknown proportion of which originates from vessels based in Noro or trans-shipping in Noro (McCoy, 2014). Traders will typically fill large eskies (ice boxes) with fish, and then transport them on cargo vessels from Noro to Honiara, and then sell in the markets.

## Standout wellbeing contributions to coastal communities

Relative to other Pacific tuna fishing nations, the Solomon Islands experience represents an unusually long-lived and successful policy of domestic fleet development and onshore processing, notwithstanding challenges over time with profitability and local socio-economic development. With the sector's revitalisation since Tri Marine's investment in 2009, employment in the processing sector is approaching the historical high of 2,500 jobs, and annual catch by the domestic fleet returning to close to roughly two-thirds of the historical highs recorded in the 1990s of 94,192 MT, averaged across the 2012–2016 period. In so doing, the industrial tuna sector as a whole contributes economically at a national level, while the national fleet and domestic processing sector specifically provides basic livelihood, food supply and food security benefits to Solomon Islanders, including those that are likely to alleviate poverty by maintaining a basic standard of living for some participants in the industry. At the same time, the industry has also implemented improvements over time in relation to working conditions, education and training for employees, and housing and community support in Noro.

### Economy

The following table provides an overview of available data on economic contributions at a range of scales, followed by analysis of some of the impacts of this economic activity on the economy in Noro.

**Table 25. Economic contributions from tuna fisheries in Noro, 2016**

| Type of economic contribution | Indicator(s) | Data |
|---|---|---|
| Generating revenue | Gross Value of Production (GVP) of domestic fleet. | 53 million USD (fishing only, landed value of catch). |
| | Value added through processing. | 8 million USD. |
| | National contributions to gross domestic product. | 62.1 million USD. |
| | Licence and access fees paid to national government (all fleets). | 41.6 million USD. |
| | Other national government revenue. | No data disaggregated for tuna. 3,186,394 SID (~$385,000 USD) including local fisheries licence fees, export permit fees, fish processing licence fees, port entry fees, fish and miscellaneous sales, trans-shipment levies, observer and services fees (Gillett 2016). |
| | Taxation revenue from industrial tuna sector. | No public data exists. |
| | Provincial government revenue. | Fees and rentals for Noro housing ~350,000 SID per month. |
| | Royalties paid to baitground owners. | No public data exists. |

| Type of economic contribution | Indicator(s) | Data |
|---|---|---|
| **Employment in fishing and processing** | Numbers of people employed. | Total employment in fishing sector approx. 300.* |
| | Household income from tuna fishing jobs as a percentage of total household income. | No public data exists. |
| | Household income/total employment earnings (fishing only). | No public data disaggregated for fishing node. |
| | Total number of jobs in fishing and processing sectors. | 2,621 (includes fishing and processing nodes) . |
| | Total employment earnings (fishing and processing). | 6.8 million USD.+ |
| **Indirect economic contributions along the fish chain** | Indirect contribution to the economy (total value of revenue, jobs, services and supplies in the value chain and remittances). | No cumulative data exists. |
| | Income to traders in domestic market chains. | McCoy (2013) estimates average daily earnings of $29–43 USD for roughly 50–60 saltfish traders in Honiara market, and totals of 500 t/560,000 USD p.a. |
| | Income to distribution and transportation workers in local market chains. | No public data exists. |
| | Revenue to business owners and income to individuals working in services and supply businsses (fuel, ice, gear, engines and repair services). | FFA reports total local purchases of 18.5 million USD. |
| | Remittances to villages by cannery workers and fishers. | No public data exists. |

Sources: Terawasi & Reid, 2017, Gillett (2016), McCoy (2013).

Notes:

* It is unclear as to how employment data is generated, and whether figures constitute a total Full Time Equivalent (FTE) figure, or the numbers of people with jobs across full-time, part-time, casual and contract labour.

+ This figure may be an underestimation of current contributions due to the fact that NFD and SolTuna report having implemented the December 2018 announcement of a doubling of the minimum wage across the Solomon Islands.

## Livelihoods in fishing, canning and domestic market chains

With a 2016 employment of 2,621 people the domestic tuna sector based in Noro is the largest single private-sector employer in the Solomon Islands.

A large proportion of employment in the sector in Noro is in vessel crew and processing roles, and a large proportion of these jobs do not require formal education or experience in order to enter the workforce. As a result, people from all over the Solomon Islands including from remote villages who migrate to Noro are able to access entry-level roles. This is in many cases the first regular/formal cash income that many workers have experienced, and thus the domestic tuna sector also provides a key pathway for people from across the

Solomon Islands to enter the cash economy. This has always been a historically important aspect of the sector (Barclay, 2008; Aqorau, 2007).

While there has been some ambivalence about the historically low level of pay, this employment opportunity has long been appreciated by the many Solomon Islanders who have worked in fishing or processing over the decades (Barclay, 2008). Moreover, both companies have since the 1990s offered opportunities for training and promotion, and pay incentives are now in place for full attendance of shifts, so moving beyond minimum wage is possible. Housing for young female workers now exists, and support for employees to return home to their villages during holidays and when major life events occur is also provided.

> The main benefit that we get from SolTuna is that it provides us employment to support ourselves, our family here in Noro, as well as our family residing in our villages. Our children, [we can] send to school because there would not be problems in fee payments. Both men and women have work to support their children going to school.
>
> Male SolTuna employee (Interview #86)

> I am from Temotu province … After I left high school, my sister called me to come to here. As I have arrived here in Noro, a vacancy post for security was given out, and I was picked. Since I started working, I can see a lot of positive changes. Like people paying school fees, and SolTuna providing charter ships for workers [to return home] during holidays and even provide daily transport for workers, and also houses for workers are available. That why I'm interested in working for the company.
>
> Female SolTuna employee (Interview #87)

**Figure 42. Vessel crew and casual net repairers on the dock at Noro in 2013 (Photo: Kate Barclay).**

In addition to direct employment in NFD or SolTuna, fresh vegetables and fruit supplies are secured from Noro and surrounding areas for roughly 1500 hot meals that are provided to cannery workers per day, and meals on the fishing boats. The majority of the fresh supplies have in recent times been sourced from villages on Kohinggo, opposite Noro, on a rotating basis. Co-operatives of village-based farmers form to supply fresh produce from family-based gardens, with each co-operative having the right to bring their produce to SolTuna once every week for sale to procurement staff. No figures exist on participation in this aspect of the chain but estimates based on discussions with SolTuna procurement staff and local co-operative members estimate around 500 farmers provide fresh vegetables to SolTuna (Interview #80, Culmination workshop Noro).

These incomes have substantial further flow-on economic effects in a number of ways. The benefits flowing from cash income in the Solomon Islands are distributed across the county via remittances from Noro workers. In addition, relatives of SolTuna workers (called *wantoks*) migrate to Noro to stay with their working relative, and to seek employment in Noro themselves, although not all end up working. A single wage of a cannery worker was reported by informants as sometimes being the main income for households of up to 10 people, and there is thought to be somewhere in the order of two to four *wantoks* living in Noro for each processing or fishing crew worker (Interviews #76, #73). Further studies of benefit sharing at the household level within Noro would be useful for contextualising these contributions and their value for communities. It should be noted that the prevalence of *wantoks* coming to stay with SolTuna or NFD employees in Noro has also been considered to be a social problem, contributing to overcrowding in housing and possibly contributing to anti-social behaviour involving alcohol, unsanctioned sexual activity and conflicts in the

community. Economic contributions from the industry through *wantok* networks in Noro should thus be understood as being a contentious social issue.

In addition to conventional economic contributions through direct fishing and processing employment, respondents raised several other kinds of contributions specific to the context of SolTuna and NFD in Noro. For example, hostel facilities have been developed by the Western Province government, and are rented by SolTuna to provide accommodation for single women. This provides 350,000 SID per month to the Western Province government (Interview #73), which has a very small revenue base.

The geographical isolation of Noro also means that a number of basic trade services are provided “in-house”, via recruitment and training of plumbers and electricians, equipment maintenance and repairs. Such services are rare or non-existent in Western Province so in-house training is more cost-effective than sourcing trade services from Honiara. This constitutes a contribution to human resources capital in the Western Province.

### Working conditions

Working conditions in the Noro industrial fish chain affect the nature of the wellbeing contributions through employment. Working conditions tend to support, rather than erode, the wellbeing benefits of employment in this case. This is due to the current stability of the industry in Noro, which reduces livelihood insecurity, and the fact that almost the entire domestic sector is covered by a single fishing and single processing entity, and is vertically integrated under Tri Marine. This means that the feasibility of implementing formalised workplace practices and standards is higher than on distant water fishing vessels that operate to a large extent independently of processing and trading entities (Havice and Campling, 2017), or in complex chains with many firms operating in ports, such as in Indonesia.

SolTuna pays minimum wage rates for entry level roles, increasing as per labour regulations and national human resources norms with experience, technical skills and relevant tertiary education, with extra payments for dangerous or undesirable tasks (Barclay et al., 2015). The company has implemented an incentive bonus system whereby workers can receive up to 35 percent of gross wages for full attendance for a month (Interview #73), and report recently matching the doubling of the minimum wage announced by the Solomon Islands government.

For fishing vessels there is very little publicly available information about working conditions in the Pacific (Kailola & WWF, 2015), though some reports on the processing sector and supply chains do provide some information. For example, a recent report describes Tri Marine as a leader in tuna supply chains as a result of its human rights policy which explicitly bans labour abuse in its supply chains (BHRRC, 2019). The report also notes that in regards to practical actions regarding due diligence processes, supply chain visibility, remedy processes and stakeholder engagement Tri Marine is “starting out”. SolTuna, working with the World Bank Group International Finance Corporation (IFC), has made specific efforts to improve working conditions in order to reduce absenteeism and improve productivity (Barclay et. al., 2015) with success in the areas of attendance bonuses and women’s financial literacy training (IFC, 2016 and 2018).

Table 26 summarises working conditions throughout the fish chain.

**Table 26. Working conditions for different roles in the Noro purse seine and pole-and-line fish chain.**

| Position | Security of work | Work Health and Safety conditions |
|---|---|---|
| **Fishers*** | **Relatively secure**<br>While fishing jobs are subject to seasonal and longer-term fluctuations in fish populations, the industry in Noro is stable. Workers are contracted to at least minimum wage as per legislative requirements, including implementation of recent minimum wage increases.+ Crew roles likely a mix of catch share and base wage payments, which reduces income insecurity associated with pure catch-share models. | **High-risk work environment with adequate safeguards**<br>Fishers operate in a high-risk setting on the open seas. In light of recent Fair Trade certification and IFC investments, major safety risks reported to be mitigated. A government clinic in Noro provides free basic health care and NFD/SolTuna were reported to cover costs of transport to Gizo if further health care is required. |
| **Workers in the cannery** | **Relatively secure**<br>While these roles are subject to long-term fluctuations of fish stocks, the industry in Noro is stable, and company employees have formal contracts that provide a basic minimum award wage, including implementation of recent minimum wage increases,+ as well as terms of engagement and severance. | **Lower-risk work environment with adequate safeguards**<br>Processing staff exposed to some safety risks, but have structured health and safety procedures to mitigate risks, access to health care via Noro Clinic. A government clinic in Noro provides free basic health care and NFD/SolTuna were reported to cover costs of transport to Gizo if further health care required. |
| **Trading, processing and retail in domestic informal chain (Noro and Honiara)** | **Relatively secure**<br>Local chains are entirely informal past the point of sale from NFD outlets. Operators are largely independent, and employees casual/informal labour often drawn from *wantok* networks. However due to strong demand for saltfish in Honiara, and the stable cash incomes associated with tuna industry in Noro, these roles are a secure, if sometimes seasonal, form of income. | **Lower-risk work environment with few safeguards**<br>Local chain roles tend not to be subject to major safety risks. While these roles have no formal health care support/insurance associated with their work, government clinics in Noro and hospital in Honiara provide free basic health care. |
| **Farmers supplying fresh produce to SolTuna** | **Relatively secure**<br>Co-operatives are entirely informal and farmers operate independently. The demand from Noro is stable and likely to remain so. | **Lower-risk work environment with few safeguards**<br>Farmers work on their own lands (customary tenure) and operate in a relatively low-risk environment in comparison to fishing roles, though little health and safety procedures in place. While these roles have no formal health care support/insurance associated with their work, government clinics in Noro provide free basic health care. |

Sources: Interviews with senior management in SolTuna and Tri Marine Pacific, SolTuna workers, traders in the domestic chain and farmers in Noro.

Notes:

* Refers only to PS and PL vessels run by NFD.

+ In December 2018 the SIG announced a doubling of the minimum wage across the Solomon Islands. Tri Marine management report NFD and SolTuna implementing this announced rise. It is not clear at time of publication whether this has led to any reductions in number of fishing and processing positions.

SolTuna provision of health care to employees is mainly through the company clinic, which has a registered nurse and two nurse aides. A doctor comes to the company to do health checks for new recruits and emergency assessments for accidents. The company provides medical trips to Gizo for workers who need to go to the hospital (Barclay et al., 2015). While no formal health care or health insurance is associated with informal roles in domestic market chains, the Solomon Islands does provide free health care to citizens via the Noro clinic and hospitals in Gizo and Honiara.

The rates of violence against women are high in Solomon Islands (WHO, 2013), so workplace support for female staff experiencing violence is important. SolTuna has a unit within its security department to deal with violence through counselling. SolTuna has also supported the multi-stakeholder initiative SafeNet, which aims to reduce violence against women in Noro by providing training on combating domestic violence, and in 2015 was planning to establish a women's refuge in Noro (Barclay et al., 2015).

Educational and training opportunities are also a key benefit of the tuna sector's presence that contribute positively to the wellbeing benefits generated by employment. In terms of school education, Solomon Islands has a secondary school participation rate of less than 40% (ADB, 2015), and as a result investments by NFD/SolTuna and Tri Marine in both primary and secondary school facilities represent an important aspect of local socio-economic development (Interview #65).


**Figure 43. School facilities at Noro High School paid for by NFD (Photo: Reuben Sulu).**

In-house training provided to NFD and SolTuna employees is also an important factor in allowing workers to progress beyond minimum wage roles. A wide range of training opportunities were reported in interviews and documented in project reports. These include:

- basic training in first aid, fire safety and identification of food safety and hygiene issues

- opportunities for staff to specialise in essential trades and services (e.g. plumbing, electrical)
- training provided of wider benefit for communities and families such as financial literacy for women, and domestic violence and sexual harassment training for all staff
- advanced opportunities for graduate degree training for staff and internship placements at Noro for university students
- training in catch documentation and food safety monitoring to support compliance with regulations and standards.

Some issues at SolTuna that impact on wellbeing and working conditions however are not solely the responsibility of the private sector. A lack of government or affordable private services for childcare, a lack of adequate housing in Noro, a lack of services such as poor water supply, toilet/sewage facilities, rubbish collection and power supplies (Interview #74), and the relatively low educational preparation of workers all contribute to problems experienced by workers (Barclay et al., 2015).

For example, it is normal in Solomon Islands for formal workplaces to pay for housing for all employees. The Western Province government is supposed to provide housing for employees, as a revenue-earning activity, but has historically never provided enough housing, and has had problems in maintaining its housing in a suitable state of repair (Barclay, 2008; Barclay et al., 2015). Currently the Western Province does provide hostel accommodation for single women. Local landowners could provide housing near Noro on their customary land, but intransigent problems in using customary land for commercial activities have prevented this happening on a large enough scale (Barclay, 2008). These issues represent persistent difficulties experienced by the sector in advancing local socio-economic conditions, and enhancing the benefits of participation in tuna jobs.

A key contribution to the economic wellbeing of coastal communities from the tuna industry based at Noro is the effect of increased cash incomes on the local economy. This is evidenced by the number of trade stores that have opened in Noro in recent years, including a new outlet for fresh meats, frozen vegetables, spirits, home wares and other goods more expensive than the basic tinned and dry items, very cheap clothing, homewares and beer that are conventionally available in Noro. The emergence of these stores has supported increased cash incomes, particularly among middle management and technical staff. The availability of higher-quality consumer goods in recent years has also been facilitated by the connection of Noro in 2017 to wider regional shipping lines with the arrival of monthly Maersk containers (Interview #76). This development has been actively negotiated by Tri Marine and investments in container-loading facilities have supported the viability of the Maersk line. It is likely that this development also has economic effects at a regional level however specific evidence of these was not recorded in interviews or documents.

The presence of regular cash incomes also boosts the Noro fresh produce market, which is known for being able to move produce at faster rates than other markets around Western Province, such as Munda and Gizo. As a result, local traders in fruit and vegetables tend to travel to sell in Noro markets reportedly from as far as Ranongga Island and Kolombangera. Despite the travel, in Noro vendors may make a similar profit for less time spent in the market, or are able to sell items that spoil easily more quickly, reducing potential losses (Interviews #74, #76).

**Food and nutrition security**

The industrial tuna sector plays a critical role in food security in the Solomon Islands. It provides ~12,000 tonnes of affordable protein per annum distributed across the nation (see Table 27), and ~500 tonnes of affordable protein in the form of saltfish to low-income urban

consumers in Honiara (McCoy, 2013). Bell et al. report that Solomon Islands' total fish consumption is 33 kg per capita per year, that domestic production amounts to 91% of total canned tuna consumed in the Solomon Islands, and that 17% of total fish consumption in the Solomon Islands is sourced from canned tuna (Bell et al., 2019). Bell et al. also note the importance of this contribution in the context of the rising incidence of non-communicable diseases, which is exacerbated by the increase in imports of highly processed food items. Replacing these with further consumption of canned fish, as well as higher quality food items based on rising wages, represents key potential strategies for mitigating these health trends (Bell et al., 2015 and 2019).

To place this food security contribution in the context of the overall viability of operations in Noro, while overall production and economic value of the operations in Noro is driven by exports, particularly the market for canned white meat in Italy, the majority of tuna processed by SolTuna is sold and consumed within the Solomon Islands. The following table displays this dynamic based on 2016 data.

**Table 27. Tuna processing, domestic and export market volumes from Noro, 2016.**

| Total volume of fish processed | Domestic market | Total exports | EU | Non-EU |
|---|---|---|---|---|
| **24,239 MT** | 14,086 MT | 10,153 MT | 6,958 MT | 3,195 MT |
| **100%** | 58% | 42% | 29% | 13% |

Source: Solomon Islands Ministry of Health tuna export data, 2016.

As a result of the majority of canned product being processed and distributed for domestic consumption, canned tuna is a widespread basic food item that can be found in almost every kiosk, in even the most remote villages throughout the country. With basic cans selling for as little as $6 SID (0.70 USD) and a long shelf life, it is a popular and affordable form of food available to even those with very little cash income, no refrigeration or limited cooking facilities. The Solomon Blue product is often consumed from the can with biscuits or rice, and is also used an ingredient in a variety of prepared dishes.

**Figure 44. A small kiosk in Western Province, selling cans of SolTuna product, circled in blue (Photo: Nick McClean).**

Another substantial food security benefit reported in interviews was that canned tuna plays a key role in immediate disaster relief in the Solomon Islands. The long shelf life, ready-made eating and the possibility to use the oil for cooking means that in many cases the first supplies sent to remote areas after cyclones or extreme weather events are bags of rice and cans of tuna (Interview #73).

The second principal food supply benefit that the industrial chain provides is through the entry of saltfish and bycatch into the local chain. McCoy (2013) estimates that the saltfish trade results in 500 tonnes p.a. of affordable protein being available to consumers, largely in Honiara, where it is sold in the Honiara Central Market and at Fishing Village. Demand is considered strong, and while it is a popular food source for urban populations across the socio-economic spectrum via home consumption and sale in the street as fish and chips, its affordability means it has led to “the reliance of lower income sectors on it for basic protein needs” (Lewis, 2014).

The key issue related to the saltfish trade is food safety. Trans-shipped fish entering Noro directly by distant water vessels can be held in ship hulls for months at a time, while saltfish from NFD purse seiners tends to be in hulls for only weeks, meaning that the NFD fish is preferred by consumers to that sourced from foreign vessels. Market conditions in Honiara, particularly at Fishing Village, are also sometimes poor, and vendors typically do not ice fish. As a result, periodic outbreaks of hives from high antihistamine levels in saltfish occur, the fishing village market faces occasional calls to be closed down, or relocated and facilities upgraded (Solomon Star, 2015), as does Honiara Central Market. In view of the importance of the trade as a readily available source of protein for low-income consumers, improving facilities and the quality of fish supplied from vessels to saltfish traders, and improving market conditions, rather than eradicating the sale of saltfish is by far the preferable option.

**Figure 45. Female fish and chip vendors in Noro market (Photo: Kate Barclay).**

**Table 28. Pathways via which consumption of tuna from Noro, or increased consumption of food as a result of tuna jobs in Noro, occurs.**

| Pathway | Details |
|---|---|
| **Home, street food and restaurant consumption of tuna in Noro and Honiara** | Sale of small/lower-quality SKJ and bycatch via NFD sales outlets in Noro and Honiara and subsequent sale in Honiara markets leading to household consumption.<br>Sale of small/lower-quality SKJ and bycatch via NFD sales outlets in Noro and Honiara and subsequent sale in Honiara markets leading to sale on street and in kai bars (restaurants) as fish and chips.<br>Donations of saltfish and bycatch to community events in Noro, leading to home-based consumption.<br>Sale of small/lower-quality SKJ and bycatch via NFD sales outlet, and subsequent sale in local market, leading to household consumption.<br>Consumption by fishing families, as well as gifting and sale of bartered bycatch and saltfish in Noro by traders/crew. |
| **Consumption of canned tuna in households and restaurants across SI** | Processing of lower-grade tuna meat into cans, widespread distribution and local sales across SI, leading to household and restaurant consumption. |
| **Increased cash income leads to consumption of food** | Tuna livelihoods lead to increases in cash income for vessel crew, and a range of casual traders and processing workers in informal chains, and processing workers in the SolTuna cannery. Primary interviews indicate that increases in cash income has lead to an increase in consumption of higher-quality foods in Noro (Interview #76). |

Sources: Primary Interviews, McCoy (2013).

**Environmentally sustainable fisheries**

Contributions to community wellbeing through developing environmentally sustainable fisheries relate at a broad level to the sound management of fish stocks and ecosystems, which fishing companies contribute to. This includes contributing to national reporting and participation in regional fisheries management under the WCPFC and PNA. In addition, NFD goes beyond participation in mandatory government regulation of the purse seine and pole-and-line fishery, through voluntary certification with the Marine Stewardship Council.

Historically, industrial tuna fisheries, and the bait fishery associated with the pole-and-line fishery, have been accused of being environmentally unsustainable by sections of the public in Solomon Islands (Barclay, 2010). The fishing companies based at Noro, however, have generally been considered on the more ecologically responsible end of the spectrum of industrial fisheries (Barclay, 2010 and 2014; Gay, 2009), although a lack of information about bait-fishing and bait stocks creates uncertainty around the potential sustainability of the bait fishery (NFD, 2016). Currently stocks for both yellowfin and skipjack in the WCPO are considered to be at healthy levels, however for yellowfin it is considered that the stock is currently fully exploited and cannot sustain any further increases in catch (ISSF, 2019).

As part of MSC certification, an action plan is in place to bring SI fisheries management in line with regional harvest-control rule processes (Trumble & Stocker, 2016). Offshore fisheries in Solomon Islands also abide by ETP regulations that mandate set levels for bycatch and allowable gears to minimise harmful levels of bycatch. Between 2013–2017 the EU placed an IUU Yellow Card on the Solomon Islands, which was lifted as a result of increases in management capacity and efforts to address IUU (EU, 2019). Solomon Islands' adherence to effort limits under the PNA is regarded as strong. While efforts to reduce IUU are regarded as still being open to improvements, this is mostly related to restricting access to foreign vessels registered as in 'good standing' with the FFA (World Bank, 2018), and therefore does not reflect on the domestic sector. As the domestic sector is reliant on the national government for continued resource access, progressive increases in the capacity of the state and its management systems to address sustainability issues represent a key factor in the future prospects of the domestic sector.

The use of FADs is a key concern, as fishing on FADs leads to bycatch of sharks, turtles, small tunas of other species and listed Endangered and Threatened and Protected (ETP) species. Solomon Islands does not have the same problem as Indonesia with very heavy use of FADs in close proximity to each other, but bycatch issues nevertheless remain. NFD follows FAD closures under WCPFC rules. Moreover, as a PNA member Solomon Islands is part of the MSC-certified FAD-free fishery for the brand Pacifical (Blyth-Skyrme et al., 2017).

FAD-free MSC certification in the wider PNA fishery, which covers the Solomon Islands EEZ, has been a source of considerable controversy on the basis that, since certified vessels may fish on free-schools for certified product, and then subsequently fish on FADs to supply uncertified product, the certification is not actually de-incentivising FAD fishing (MSC, 2018). The objection lodged with the MSC was that this contravenes the intent of MSC certification, and effectively subsidises vessels to fish on FADs by underpinning the viability of an overall business model reliant on both FAD-free and FAD-based fishing, and created different standards of certification for large-scale and small-scale fisheries (IPNLF, 2019). An independent adjudicator upheld certification.

NFD's PS and PL fisheries are also certified by the MSC under a standalone certification from the wider PNA/Pacifical certification, which includes product entering SolTuna's cannery (Trumble & Stocker, 2016). SolTuna managers report that this is critical for a small but growing market in the US, while also generally underpinning market access in view of the fact that domestic SI-processed fish may be high quality, but is also a high-cost operation (Interview #73). The World Bank report that the certification was a factor in the EU lifting an anti-IUU Yellow Card import restriction imposed on the country (World Bank, 2018).

Finally, local pollution due to undissolved solids in fishmeal stickwater produced by the cannery and discharged into the harbour at Noro has historically been reported as an issue (Mani, 1994; Barclay, 2010). This discharge leads to increased nutrient levels being recorded in Noro Harbour. Interviews noted that treated wastewater is still released into Noro Harbour. Purchase of a waste heat evaporator with IFC financial support was reported as aiming to better address this issue by turning increased amounts of waste product into fish meal (Interview #73).

## Integrated discussion of governance and wellbeing

The industrial tuna sector based in Noro provides substantial wellbeing benefits to the Solomon Islands in the form of jobs and income for a wide variety of workers, stimulation of the local and regional economy, government revenues at provincial and national levels, and basic food supply and food security to both urban and rural communities across the Solomon Islands. It is also likely that entry-level jobs contribute to longer-term poverty reduction aims of the country, and may alleviate poverty in the short term for some workers.

Our analysis shows that the various contributions industrial tuna fishing and processing at Noro make to community wellbeing, and the longevity of the domestic sector in the Solomon Islands, have been enabled and influenced by a complex suite of factors over time.

These are: regional and bilateral co-operation; national government policy and management; provincial government involvement in infrastructure and service provision; geographical and historical factors; private sector investment; market preferences and requirements; labour migration for entry-level jobs; and the gendered division of labour.

### Government influences on wellbeing

#### *Regional and bi-lateral co-operation*

Regional co-operation on fisheries management is a critical factor underpinning the long-term environmental and economic sustainability of the fishery. This has led to co-operation between regional governments that has thus far prevented overfishing of skipjack and yellowfin tuna stocks, and sub-regional co-operation within the PNA that has doubled resource access fees to the Solomon Islands since 2008, including access fees from the domestic sector for resources in the archipelagic waters zone and occasionally the EEZ. While the VDS scheme in particular is critical for the functioning of the Solomon Islands government through providing revenue from both foreign and domestic fleets, from the perspective of coastal community wellbeing there were no specific instances in which these access fees could be tied to a specific benefit in Noro or other coastal communities, with VDS revenue typically going into consolidated revenue. The use of a small percentage of access fees on specific projects in communities by the SIG could be a way in which wider governance structures which support the sector could be more directly tied to wellbeing in communities that are reliant on or impacted by tuna fisheries.

Of equal importance to the development and long-term sustainability of the domestic sector, however, has been the bi-lateral influence of governments who regulate access to foreign markets, and particularly the EU. Firstly, the Solomon Islands enjoys exemptions on 24% import tariffs into the EU under the GSP Everything But Arms (EBA) agreement. This comes with strict Rules of Origin controls limiting product entering the EU market to EU or Solomon Islands flagged vessels (Hamilton et al., 2011). With the EU being the principal export and revenue base for the cannery in Noro since at least 1999, this has been a significant factor in the development of the domestic fleet (Interview #73; MFMR, 2014). This has also tied the development of that fleet in recent times to the presence of a domestic processing sector, so as to provide a sufficiently high-quality product to meet EU buyer demands, and has driven progressive investments in pole-and-line vessels and processing capacity since 2011. In this

regard the nation's progression to a lower middle-income country is reported to be resulting in the EU withdrawing the exemptions on import tariffs in coming years, and SolTuna management reported this as a key source of business uncertainty on the horizon for business operations (Interview #73).[10]

Secondly, the reliance of the Solomon Islands domestic sector on EU market access has granted significant leverage to the EU, which it utilised when it issued an IUU Yellow Card to the Solomon Islands in 2014. This led to improvements in catch documentation and fisheries management systems, and the lifting of the Yellow Card in 2017 was recognition of the substantive improvements made in fisheries management capacity and systems. Given the fact that the domestic sector is highly reliant on the Solomon Islands government's fisheries management capacity to ensure co-operation at a regional and sub-regional level, and to maintain EU market access, the improvements in response to the EU Yellow Card represent a substantial contribution to the longer-term sustainability of the sector.

Finally, a range of foreign aid projects also supports the domestic sector, ranging from capital investments to support for improved planning and management processes, human resources and capacity development. Long-term donors have included the EU, Japan, New Zealand, Taiwan, Australia and the FAO, while a range of civil society bodies, such as the WorldBank/IFC, the Overseas Fishery Cooperation Foundation, and some nature conservation NGOs also provide periodic aid (FAO, 2009; IFC, 2018).

### *National government policy and regulation*

Most Pacific Islands nations have had aspirations for onshore development for several decades (Barclay, 2005; Barclay & Cartwright, 2008; Havice & Reed, 2013), yet their main role has been as suppliers of raw material to foreign fishing fleets that offload to low-cost processing hubs in Thailand and the Philippines (Havice & Reed, 2013). While Pacific Islands states have in the last decade been able to command higher prices for fishing access through consolidation of resource ownership under the PNA Vessel Day Scheme (FFA, 2017; Hanich et al., 2010), onshore development remains an elusive policy goal of many PICs. Solomon Islands, Fiji and more recently Papua New Guinea are the only independent Pacific Islands countries that have realised this dream (see e.g. Havice & Reed, 2013 for experiences in PNG).

Solomon Islands government policies since the early 1970s have therefore been a critical influence enabling the flow of benefits from tuna fisheries to flow to coastal communities, through the government's long championing of domestic sector development, and establishment of policy and regulation in support of this. The government has encouraged companies to remain invested in domestic fishing and processing through careful use of incentives to offset the higher production costs. Preferential licensing provides NFD with virtually exclusive access to tuna resources within the AW, reducing competition and delivering substantial fuel savings (World Bank, 2018). The addition of the VDS adds to this dynamic. Through the VDS the Solomon Islands government may "trade off access fees for domestic employment". (World Bank, 2018). The Solomon Islands government does this by allocating roughly one third of vessel days to NFD to support local employment, while access fees from foreign fleets provide a substantial form of revenue for the national government (World Bank, 2018). Subsidies for tuna fisheries, and the use of foreign aid to support fisheries development over many decades – for example, through the development

[10] Campling et al. (2007) provide a comprehensive overview of the EU's Generalised System of Preferences including EPAs, GSP+ and the EBA initiative.

of municipal infrastructure in Noro – likely further favour the economic viability of domestic operations.[11]

### *Provincial government involvement in infrastructure and service provision*

The provincial government plays a substantial local role in enabling the domestic sector and the wellbeing of commutes connected to it, principally through provision of housing.

The provincial government is also responsible for providing basic services such as power, water, sanitation and basic municipal services, but the provision of these services remains an ongoing concern for local residents, and many residents remain in informal dwellings without adequate water, electricity and sanitation. Reports suggested also that the provincial government does not provide the appropriate allocated funds to the Noro Town Council to be able to deliver basic municipal services such as rubbish collection (Interview #74). The low level of socio-economic development in Noro may not be unique to the Solomon Islands, but it does detract from the wellbeing benefits delivered to workers from the tuna fishing sector, particularly those in low-paid roles who may be supporting extended family networks.

## Non-government influences on wellbeing

### *Geographical and historical factors*

The Solomon Islands, relative to other Pacific Island nations, has a relative abundance of land that can, in theory, be used for industrial development, and the ready availability of infrastructure in the form of ports with fuel and electricity, and support services needed for industrial fishing and processing sectors. This has enabled the development of a domestic fishing and processing sector to a much greater degree than many other Pacific Island nations, particularly those with extremely limited landmass and capacity to support industry (Barclay & Cartwright, 2008; Barclay, 2010). While there are substantial challenges relating to high input costs (MFMR, 2014) and long-term profitability (as discussed below), the basic geographic and infrastructure conditions to enable onshore development exist in the Solomon Islands to a much greater degree than in many other Pacific Island nations.

This has not necessarily meant that the process of development and expansion of the domestic sector has been smooth, or that it would be readily replicable in the Solomon Islands or elsewhere. That customary disputes appear to be hampering development of an alternative tuna processing hub for longline catch in Bima Harbour, Malaita Province (Solomon Star, 2018), for example, highlights that historical factors unique to Noro also enabled the development of the domestic sector. In particular, Noro was the site of previous industrial activity in the form of copra plantations owned and operated by the Lever Brothers Corporation (Interview #74). As a result, the land had been excised from customary ownership by the state during the late 1800s, facilitating the development of the port and industrial facilities, and was a key factor in the site being identified as a potential second industrial hub and port facility for the country.

### *Private-sector investment*

Private-sector support for onshore development has also been significant in enabling domestic tuna fishing and processing to continue, and generate wellbeing contributions for Solomon Islanders.

From the early 1970s private investment in the fishery was a fundamental plank in the strategy of the Solomon Islands government to develop its domestic sector, and while the pole-and-line fleet itself was never particularly profitable, Taiyo Gyogyo was able to make

[11] Sumaila et al. (2014) report that in the Solomon Islands 2.38 million USD in non-fuel subsidies and 0.53 million USD in fuel subsidies were provided for the year 2011, however the percentage of these provided to the domestic sector is not specified.

money trading the canned and smoked product into UK and Japanese markets, and so underwrite the viability of the overall operation. With the withdrawal of Tokyo Gyogyo in 1999 and the re-establishment of the domestic sector in the early 2000s, the government found it very difficult to make a profit, yet maintained the sector so as to protect the employment benefits associated with the fleet and cannery. The integration of NFD and SolTuna within the global trading network of the private firm Tri Marine in 2010 has thus been one of the most significant changes in the governance of the fishery, and can be seen as underpinning the longer-term viability of the sector and the benefits it delivers.

This investment can be viewed as a response by Tri Marine to intensified competition and consolidation in the branded tuna supply and retail sectors on the one hand, and to resource volatility on the other. Embedding their operations in fishing and processing sectors allows Tri Marine to increase its bargaining power with lead retail firms, while also ensuring a continuous supply of a high-quality product to its network of buyers (Havice and Campling, 2016). Moreover, by back-investing into domestic fleets and onshore processing facilities, Tri Marine gains preferential resource access in a region of the WCPO with healthy tuna stocks, rather than investing in vessel days via a competitive open market.

Many Solomon Islanders are of the view that domestic wellbeing contributions would be stronger if the fishing vessels and canning factory were fully nationalised (Barclay, 2012). However, the historical experience of the sector as a whole, and of government ownership of the domestic sector between 2000 and 2009 and in earlier joint ventures prior to privatisation of NFD in the 1990s, suggests this is not a long-term profitable solution. Firstly, capital investment in industrial tuna fisheries is cost intensive and the Solomon Islands government has an insufficient revenue base to support ongoing operational costs. New cold-storage facilities, new fishing vessels and upgrades to wharves all run into tens of millions of dollars. Furthermore, market connections necessary to be able to trade with buyers in the most lucrative markets, and to meet the private and government standards required in those markets, are critical for business viability. The contacts and capability to meet the various requirements do not currently exist domestically in Solomon Islands (Barclay, 2013; Barclay & Cartwright, 2008).

Private-sector investment therefore underpins the long-term existence of the domestic sector and the benefits that it brings coastal communities (McCoy, 2014; World Bank, 2018), and the broader global trading strategy of Tri Marine thus aligns with Solomon Islands government interests for a domestically based industrial tuna fishing fleet and onshore processing factory (World Bank, 2018; McCoy, 2014). Recognition of this dynamic is now registered in the SI National Fisheries Policy, which nominates private–public partnerships as the most appropriate means of furthering tuna fisheries development outside of Noro (MFMR, 2018). Furthermore, NFD is a full partner with Ministry of Fisheries and Marine Resources in implementing the Tuna Management and Development Plan (NFD, 2016), which again recognises the role of the private sector in maintaining sustainable tuna fisheries in Solomon Islands.

### *Market preferences and requirements*

Buyer preferences have always had an informal influence on operations in Noro, including food safety standards for key EU and US markets, and other long-term buyer concerns about dolphin mortality, environmental sustainability and human rights in labour (Barclay, 2008). However, these are becoming ever more formalised with the advent of certification schemes, and many of these are having a clear impact on wellbeing benefits.

The most recent examples of this are MSC and Fair Trade certifications, and adoption of standards under International Sustainable Seafood Foundation, and the Seafood Taskforce

Vessel Auditable Standards (VAS).[12] These certifications can be necessary to maintain market access, and also to gain access to new markets. SolTuna management report, for example, that their MSC certification has already enabled access to a new niche-but-growing US market.

Fair Trade and Seafood Taskforce Vessel Auditable Standards have both been implemented subsequent to fieldwork for this project in June 2018, so clear information on their benefits is not yet documented. However, based on available information, clear impacts on working conditions and safety at sea for crew are likely to have been delivered in order to comply with these standards. Further documentation of these benefits in the long term would be worthwhile to assess the impacts on wellbeing of such standards.

MCS and ISSF standards are important for wellbeing as they seek to address the longer-term sustainability of the resource. However the implementation of ISSF standards on bycatch documentation, leading to the sale of saltfish and bycatch from the NFD local sales outlet, appears to have had difficulties in transitioning away from the previous NFD policy of providing bycatch to crew for local informal sale. This continues to be a source of controversy in the media (Solomon Star, 2018), and informants reported that continued sale of bycatch still occurs. This practice is likely fuelled by persistent low wages among entry level-fishing crew (Interviews #75, #85). Lewis reports that proceeds from the Noro and Honiara sales outlets were intended to be distributed amongst the company and crew, via the Tuna Credit Union which was established in 2014/2015 in the wake of the implementation of the new bycatch policy in line with the ISSF policy (Lewis, 2014). The extent to which benefit sharing from sales via the NFD outlet occurs, and the extent to which the policy shift has impacted on the wellbeing of entry-level crew, are issues that would benefit from public clarification.

In regards to implementing formalised buyer standards and entering certification schemes, the integration of NFD and SolTuna under Tri Marine is also a noteworthy influence that affects wellbeing. With all domestic fishing and processing operations integrated under the ownership of a single global trading firm in tuna, the relationships between vessels, the processor and downstream traders is much simpler than for fish chains with multiple firms operating in the fishing and processing sectors, and with various levels of integration, such as in Bitung in Indonesia. Implementation of certification or meeting other market requirements is therefore comparatively achievable, assuming wider systems of management by government and RFMOs are in place.

### *The influence of socio-economic status and labour migration on distribution of wellbeing benefits*

Labour migration is a key feature of the domestic tuna industry in SI, and people migrate to Noro from across the archipelago to seek work, or to live with *Wantoks* who are working in the industry. Reports indicate that 99% of roles are taken by Solomon Islanders, the majority of these being entry-level processing and fishing roles which are highly accessible to people without a high school education (Blaha, 2014). As a result, the benefits of tuna jobs are distributed to people across the Solomon Islands diverse ethnic and cultural groups, and to people across all strata of society, including the poorest members of communities. While it is important to note that wages associated with fishing and processing jobs in Noro are generally at the lower end of the wage spectrum, starting at minimum wage and going up with experience and training (see e.g. Barclay et al., 2015), national statistical reporting contextualises this contribution.

Based on national household socio-economic studies, three key factors are associated with reductions in the poverty headcount rate: participation in the cash economy (i.e. having a

[12]Seafood Taskforce Vessel Auditable Standards is an independent standard for on-vessel human rights which Tri Marine has been implementing across its fleet and Pacific tuna supply chains (Tri Marine manager, pers.comm. July 9th 2019).

paid job); at least one parent/head of household having a primary school education; the ability to migrate to access economic opportunities (SINSO, 2015).

> The big economic divide in the Solomon Islands is between those households with access to wage incomes (especially from the public sector) and those without … people living in households where the household head earns wages have significantly lower poverty rates than other Solomon Islanders. In total, the people living in wage-earner households account for 30 percent of the population but their share of headcount poverty ranges from just nine percent at the food poverty line to 19 percent at the upper poverty line.
>
> Solomon Islands Poverty Profile based on the 2012/12 Household Income and Expenditure Survey (SINSO, 2015, p.21)

The domestic tuna sector is the largest private sector employer in SI, as previously discussed, and a key use of earnings by workers is on school fees. It is therefore highly likely that the ability to access work in Noro contributes to the overall reduction of poverty rates in the Solomon Islands, over the longer term, by increasing participation in the cash economy, and increasing the resources available for families to access education.

However it is important to note that not all families migrating to Noro, and perhaps not a majority, would themselves deriving a direct poverty alleviation benefit. This is due to the fact that the customary economy, with its reliance on gardening and fishing, is itself a form of protection against poverty that is not often visible in economic studies that focus on the financial attributes of communities and families as measures of socio-economic status. For many workers, the ability to move in and out of small-scale agriculture provides as much of an economic and social opportunity as does the tuna sector, and many women who enter cannery work, for example, do so not to alleviate economic hardship but to engage in modern forms of living and potentially seek upward social mobility. The fact that historically women have turned to selling vegetables in the Noro market to earn money when wages from tuna jobs cannot cover their needs bears this out (see IFC 2016, Barclay et al., 2015). However, where other economic options are not available, direct poverty alleviation is likely to be occurring - key areas for future investigation in this regard include people who do not have access to customary gardens, or urban migrants.

Links to the role of internal labour migration in the Solomon Islands economy are also significant, in the context of the macro-economic functions fisheries can play. National statistical reporting notes that there are clear links between migration and poverty reduction in the Solomon Islands through accessing new economic opportunities (SINSO, 2015). Labour migration is usually associated with the well-recognised function fisheries can play as a macro-economic safety valve/labour buffer, by absorbing excess labour, including where surplus agricultural labour may exist (Bailey, 1997), or where economic shocks lead to reductions in livelihood opportunities in the wider economy (Jul-Larsen, 2003; Bene, 2010). There have been no specific studies undertaken as to the “push” factors leading to migration to Noro for fishing work. This would be a valuable research focus, particularly in light of increasing populations placing pressure on customary economic systems (World Bank, 2018), and the long-term declines of logging and mining as sources of private sector economic activity in the Solomon Islands (World Bank, 2018; Interview #67).

In summary, it is likely that due to the prevalence of lower-paid migrant workers in the domestic tuna sector, entry-level jobs already play poverty alleviation functions for some workers at the micro-economic level, and at the macro-economic level, through absorbing excess labour, and through providing resources to families to support education.

These positive contributions to community wellbeing must also be understood in light of the fact that internal migration has historically created tensions between local Western Province residents and migrant workers (Barclay, 2010). For example, some Western Province residents have challenged the legitimacy of people from other parts of the country taking up work at Noro, and there have been widespread suspicions that *wantok* groups within the tuna companies look after their relatives at the expense of people from other parts of the country (Barclay 2004). Moreover, there are strong norms in SI society that local job opportunities belong to local groups. These norms fuelled tensions that led to ethnic conflicts between 1999-2003 that led to widespread social disruption and state collapse (World Bank 2018). In this case, internal labour migration to the capital Honiara from Malaita was a key source of tension for local Guadalcanal residents, who perceived that migrant groups were wielding increasing economic and political influence, to the detriment of local residents.

In Noro, companies have historically sought to address these concerns, for example by actively prevented *wantok* groups consolidating via human resources policies (Barclay, 2004). Community leaders also work at trying to encourage good relations between different groups. For example, the Noro Town Council is unique among town councils in that it includes nine representatives, each representing a province of the Solomon Islands (Interviews #94, #77). Community support groups based on home provinces also exist, and these allow internal migrant workers from across Solomon Islands to maintain a legitimate support network, connections with home regions and a voice in local council (Interviews #74, #77). Another potentially positive development in this regard is the establishment of a Fishers Association (FA) as a part of recent Fair Trade certification. Under Fair Trade the FA receives a premium of $40 per tonne of fish exported to the US under the Fair Trade label, and the association must spend premium funds on projects and investments seen as being of value to the communities in which they live. In this case, the FA may be in a position to invest in projects that are of mutual benefit to both participants in the industry, and local communities who may perceive less benefit from the presence of migrant labour in Noro.

Notwithstanding the recent emergence of these Fishers Associations, the long-term perception that the tuna industry's encouragement of migration within Solomon Islands brings negative social impacts is a factor complicating values around work offered by the tuna companies as an unambiguous social good. Historical experiences of tensions related to internal migration in both Noro and Honiara therefore provide both a lesson in the risks of internal labour migration, and a source of possible learnings for ensuring that migration can provide economic opportunities for people across the country, without causing conflicts and undermining social cohesion.

### *Gendered division of labour*

A clear gendered division of labour exists in the industrial tuna sector. Women make up two thirds of the SolTuna workforce, particularly in lower-paid processing line roles, and the majority of saltfish traders in Noro and Honiara are women. Meanwhile men occupy almost all fishing roles, most of the higher-paid and managerial roles, and most roles associated with heavy lifting and machinery. There are a number of aspects of this division of labour that are important to note. These pertain to how the benefits of participation in the industry flow, how these affect overall community wellbeing, and notable exceptions to these general trends.

Firstly, SolTuna employment is an important opportunity for rural women with low levels of schooling to enter the formal economy, while the saltfish trade also offers a steady and profitable source of income for mostly female traders. The importance of these opportunities is heightened by the fact that:

- rural employment sits at only 13% on average with rural women's employment rates much lower than this (World Bank, 2019)

- while paid employment opportunities are rising across the economy, opportunities for women remain ‘particularly scarce’ (World Bank, 2019), and
- women undertake 50% more unpaid work than men in the Solomon Islands (ADB, 2015).

Literature from elsewhere in the Solomon Islands suggests that women are more likely to spend income on family needs such as school fees and better-quality foods than men (Barclay et al., 2018; Fidali-Hickie & Whippy-Morris, 2005; see also Chaaban & Cunningham, 2011). It is therefore likely that increasing women’s participation in the workforce in better-paid jobs, and their ability to plan and budget household finances, is likely to have flow-on socio-economic benefits for families and communities as a whole.

This substantial contribution to women’s wellbeing, and to that of their families and communities is qualified by the fact that:

- Many entry-level jobs occupied by women have historically provided very low income, creating incentives towards absenteeism, and as a result many women could in the past achieve similar or better returns from home-based small businesses, while maintaining independence (Barclay et al., 2015).
- A lack of government and private health care services prevents women from maintaining consistent involvement in paid work and supports increased absenteeism (IFC, 2016; Barclay et al., 2015).
- Men disproportionately occupy positions of authority (ADB, 2015; World Bank, 2015; Barclay et al., 2015), higher-paid jobs (Barclay et al., 2015) and have access to a wider variety of alternative sources of income than lower-paid work across the Solomon Islands.

In light of the importance of this source of work for rural women in particular, and the longstanding barriers and challenges qualifying this contribution, SolTuna and IFC have worked to improve a number of aspects of women’s working lives as part of reducing absenteeism and improving worker productivity. This has been done by opening up non-traditional roles, and by uncovering and addressing problems with household budgeting and incomes leading to absenteeism.

In recent years, women are increasingly having the opportunity to undertake non-traditional roles, such as forklift driving and trades such as plumbing and electrical repairs. A focus group with six female SolTuna workers noted that for many of these women, having the opportunity to undertake these new roles builds confidence and self-esteem. They view their own experience as potentially opening new social dynamics and possibilities for men and women that did not exist in village and subsistence lifestyles, and providing a positive example to their children (Focus Group Discussion, Interview #87).

A key example of how focusing on women’s wellbeing can provide benefits to the whole community was reported through financial literacy training being offered to women. Responding to high rates of absenteeism reported by SolTuna, IFC consultants found that workers were experiencing financial pressure at the end of fortnightly pay periods. Instead of going to work on the final day or two of a fortnight, in order to raise cash quickly they took things to sell in the market, such as vegetables from their gardens. In so doing workers missed the substantial bonuses that accrue for perfect attendance over a month. A targeted program of financial literacy for household budgeting was subsequently delivered to female workers at SolTuna. This resulted in a drop in absenteeism of six percent and has also reportedly led to reduced levels of family conflict, with a reduction in disputes arising from financial pressures that families were experiencing.

## Summary of key factors influencing wellbeing

Noro provides an example of strong alignment between some of the key wider drivers of tuna fisheries governance, and the flow of substantial benefits to coastal communities. While not all of its conditions are replicable, and some local challenges regarding socio-economic development and food safety in local market chains exist, overall the development of a domestic industrial fleet and processing sector in Noro has been successful in delivering wellbeing benefits to coastal communities. The principle benefits are:

- jobs and income, which in turn support the functioning of the local and provincial economy
- providing a ready source of employment for citizens across the socio-economic spectrum, and potentially performing a poverty alleviation function for some workers
- providing rural women with formal employment opportunities
- providing an important source of food nationally.

Domestic-sector development remains a central policy aim of many PICs, and some commentators view national government policy intervention as the primary factor influencing the flow of benefits to PICs from tuna fisheries (e.g. Parris & Grafton, 2006 see also Stephens, 2007; Havice and Reed, 2013). Such analyses have been variously used to support development of investments in domestic fleets and onshore processing (see Havice & Reed, 2013), or arguments that adoption of such policies is the central reason why PICs do not derive maximum economic benefits from tuna resources (e.g. Stephens, 2007). Our analysis shows, however, that the various contributions industrial tuna fishing and processing at Noro make to community wellbeing, and the longevity of the domestic sector in the Solomon Islands, have been enabled and influenced by a complex suite of factors over time.

In summary, we can conclude that asserting state sovereignty over resources within the EEZ and implementing policy prescriptions for domestic sector development has been central to ensuring wellbeing benefits flow to Solomon Islanders, and to coastal communities in particular, from tuna fisheries. Yet this is not sufficient in and of itself. Geographical and historical factors have influenced the basic feasibility of onshore development, regional co-operation for sustainability underpins the viability of the entire sector, and national government policies have, over time, been carefully calibrated with private sector interests given the volatile and competitive nature of tuna fisheries.

The Solomon Islands experience shows that a range of political-economic, market and geographical factors have combined with national policy commitments and regional inter-governmental co-operation to produce and maintain these benefits at the national and sub-national level. This is a broad experience mirrored in PNG (Havice & Reed, 2013), and Fiji (Barclay & Cartwright, 2008), the two other “success stories” of domestic sector development in the Pacific. “Turning on the tap” so that benefits may flow from tuna fisheries to coastal communities, and maintaining the flow over time, is a complex process that requires careful, context-specific planning, and consideration of multiple factors at local, national and global scales.

There is no guarantee that the experience of the Solomon Islands can be replicated elsewhere. However, the need for active, co-operative planning and co-ordination of effort among government, private-sector and regional institutional actors is a transferable principle that is likely to underpin the successful development of tuna fisheries to enable wellbeing benefits to flow to coastal communities.

## 3.2 Gizo handline fishery

In Western Province, a small commercial handline tuna fishery targets skipjack and yellowfin, mainly on anchored FADs owned by the industrial fishery, as well as some free-school catch. This fishery supplies fresh fish to the growing urban population in Gizo, a town of 6,000 residents and the country's third-largest urban centre. Similar fisheries exist in Honiara, the national capital, and Auki, the capital of Malaita province, where the demand for fresh fish, including tuna, is strong (McCoy, 2013). Figure 45 depicts the Gizo handline tuna fishery.

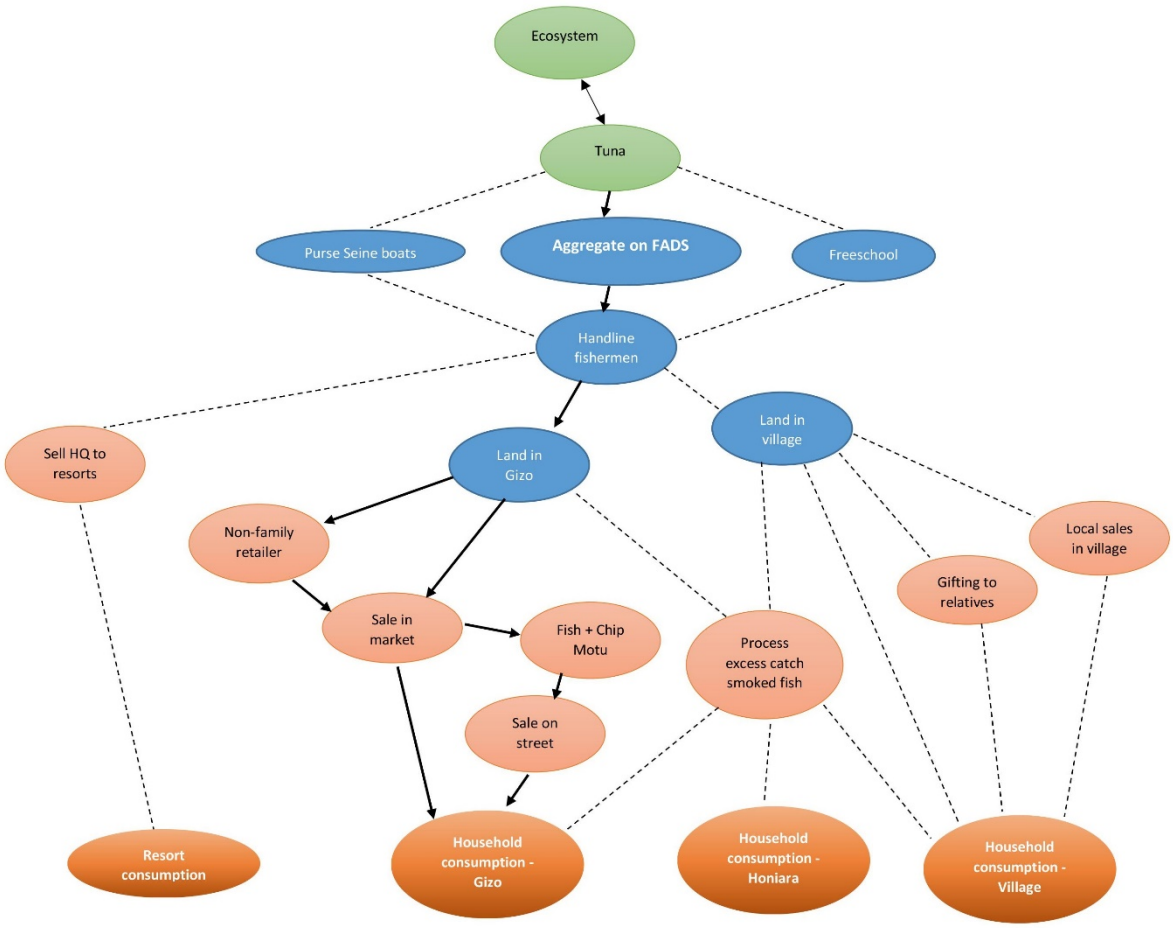


**Figure 46. Gizo handline tuna fishery.**

Note: Arrows indicate the main flow of fish, dotted lines indicate secondary (i.e.lesser) flows for fish.

The fishery in Gizo is undertaken by approximately 20 *iKiribati* fishers from two villages, Titiana and Babanga.[13] Most of the people in these villages arrived as migrants two generations ago, between the 1950s and the early '70s, while Solomon Islands was a British protectorate. According to written sources the British were looking to relocate people from another protectorate, the Gilbert and Ellis Islands (now Kiribati and Tuvalu respectively), due to perceived overcrowding, as well as drought and poor soils (Lieber, 1977; Maude, 1952). Fishers in Titiana, however, indicated that the oral history of their community was that due to nuclear testing in the Phoenix Islands, an extremely remote set of atolls in south-eastern

[13] Albert, Warren et al. (2014, unpublished data) reported 14 boats in the fishery (six in Titiana and eight in Babanga). Our interviews/meetings engaged with 16 fishers and reported up to 20 boats in total (Interview #91). The exact amount of participants at any one time fluctuates depending on vessel repairs, availability of alternative incomes and family needs (Interviews #84, #72, #89).

Kiribati, people had been relocated to reduce exposure to nuclear fallout (FGD Interview #89).

*iKiribati*, commonly known in Solomon Islands as Gilbertese, make up a significant minority ethnic group in some parts of the Solomon Islands, particularly Western Province. Three villages are known as Gilbertese settlements in and around Gizo – Titiana, Babanga and Nusabaruku. As migrants Gilbertese people do not hold the customary land entitlements locals can use for food gardening. Although they have been granted land in and around Titiana and Babanga this is low-lying and sandy, making for poor agriculture and vulnerability to natural hazards such as tsunamis. In 2009, Titiana and Babanga were hit hard by a tsunami that destroyed many homes.

Gilbertese in the Solomons and Kiribati have historically relied heavily on the sea for food, including the open sea beyond the reef. As one fisherman put it, “we are born to be a fisherman, we are not born to be a gardener – the sea is our office.” Many Gilbertese families have fished offshore for tuna in oceanic waters since their arrival in Gizo, while others have fished on reefs. Today all tuna fishers live in Titiana and Babanga, while Nusabaruku relies primarily on fishing for reef species. Most indigenous Solomon Islanders have typically focused more on nearshore fishing and food gardening, and with pelagic resources an occasional part of the customary economy (Albert, Beare et al., 2014).

## Fishing strategies

Fishers report that originally their grandfathers targeted free-schools of tuna while fishing from canoes. Following the establishment of the industrial tuna fishery in the 1970s, FADs began to be used in the Solomon Islands from the 1980s. Gilbertese informants stated that fish availability has declined since the 1980s, and as a result they began targeting tuna in both free-schools and FADs.

Today fishers principally fish on NFD FADs off the coast of Gizo, while also opportunistically fishing free-schools. The Gilbertese fishers use small ~1 GT fibreglass canoes with 15 hp engines. They target skipjack and yellowfin and also land and sell silky sharks, rainbow runners and the occasional dolphin fish. Usually up to 60 fish of varying sizes may be landed in a day (Interview #72). Based on observation and personal accounts from fishermen in the markets, these fish vary from small 1–2 kg skipjack and juvenile yellowfin, to yellowfin of up to 40 kg, and silky shark of over 50 kg. Fish are usually stored whole on the floor of the canoe, protected from the sun by coconut leaves and kept moist with water. Currently no ice is used to preserve catch either on board or in the market.

**Figure 47. A typical vessel with a 15 hp engine used for handline tuna fishing in oceanic waters (Photo: Nick McClean).**

**Figure 48. Boats used for tuna fishing moored at Gizo Market (Photo: Nick McClean).**


**Figure 49. Fishermen from Titiana, and a non-family retailer (centre) selling skipjack and small yellowfin tuna in Gizo Market (Photo: Nick McClean).**

**Figure 50. Yellowfin (front) and skipjack tuna being sold at Gizo Market (Photo: Nick McClean).**

**Figure 51. Shark (likely silky shark) being sold in Gizo Market, alongside skipjack tuna and a medium-sized yellowfin (Photo: Nick McClean).**

As well as catching and selling fish from the FADs and occasional free-schools, co-operative arrangements with crew members on NFD vessels also exist. In these cases fishers will

provide information on which FADs have fish in them, as well as betel nut and tobacco, in exchange for filling their canoe with fish (Focus Group Discussion, Interview #89). This saves considerable time as fishermen are able to go directly to the boat, fill up with fish and then return to the market, however the quality of the fish is not as good from the purse seine boats and does not attract as high a price.

> We have been fishing here in these waters long before there were any FADs installed … The seas are where we generate money. So when we get to the FADs, we all work really well together and they [the purse seine boats] also give us fish.
> One time, we were given a huge catch of rainbow runners [by the purse seiners], that filled up the canoe. When we arrived at the village, I went around sharing the fish with the community for their lunch and dinners and then I went to sell at the market.
>
> Tuna fisherman (Interview #73)

> Respondent: It's alright. They [purse seiners] give us fish from their nets. They haven't stopped us from using their rafters. Just sometimes, [they ask] don't fish at that rafter in the morning … because you will disturb them catching the fish.
>
> Interviewer: What about the net boat, will they call up and say "Hey, which rafter [FAD] has the fish?"
>
> Respondent: Yes … they'll tell us that we will net somewhere here tomorrow, and the request is if you can bring us betel nut or top-up [phone credit]. And we will give you fish.
>
> FGD, Titiana (Interview #89)

It should also be noted, however, that while fishers have good relations with crew, they overall perceive the existence of FAD-based purse seine fisheries as having negatively impacted on fish availability. This was a strong sentiment expressed in culmination workshops at both villages. It was suggested by fishers that these impacts lead to buoys from FADs sometimes being sabotaged, as fishers consider that they have as legitimate a claim to the resource as others (Interview #73). The national Tuna Management and Development plan acknowledges conflicts between industrial and small-scale fisheries (MFMR, 2014), and NFD also recognises this dynamic of co-operation and conflict, both in official documents and in media statements (Solomon Star, 2018).

> Some NFD FADs are used by local fishing communities, usually in cooperation with NFD (i.e. local fishermen report damage to FAD so that NFD will repair it, and maintain its presence to local fishermen's benefit). However, NFD also reports some damage to FADs through community use.
>
> NFD Tuna Sustainability and Supply Report (NFD, 2016, p. 15)

This fishery is extremely dangerous for fishers, due to the fact that industrial FADs are located in oceanic waters to the south of Gizo, with fishers operating small outboard motor-powered canoes to access these FADs between 20 km and 70 km offshore. Fishers use the

smallest outboard available, usually 15 hp in order to save fuel. Experiences of engine failure and drifting at sea for multiple days were reported. In one case, two fishermen from Babanga drifted for two to three weeks before being rescued in PNG waters.

> Respondent: It was two years ago … [after many days drifting] he came across a longline from a ship. [He knew] the fishing vessel will have to come back to pick up the catch and then see them … So he decided to stay with the longline. When the ship came, it took them and dropped them off at land in Papua New Guinea. He's lucky.
>
> Interviewer: I can just imagine the emotions their families have gone through at that time.
>
> Respondent: Yes, the families had a get-together, to hear that someone's died. It was like a funeral because they have not heard from them … and then about two weeks or three weeks later, the boys manage to phone home from PNG, and so the families here answered the call, even though they do not recognise the number. They were very happy hearing the news that the fishermen are in PNG, found alive and well.
>
> Fisherman, Babanga village (Interview #82)

### Trading

The principal market for this fishery is Gizo, where approximately 200 tonnes of fresh fish per year are sold by tuna fishers (Albert, Warren et al., 2014 [unpublished data]).[14] As well as sale in the market, some fish is taken back to the village for direct consumption, gifting or sale direct to neighbours. When excess catch cannot be sold, it is sometimes smoked and consumed in the village, sold to residents in and around Gizo, or occasionally a special order for smoked fish to be sent to Honiara may be received. Tuna fishers also intermittently sell large yellowfin to restaurants in Gizo or at surrounding resorts, to use for sashimi or tuna steaks.

In Gizo tuna is a popular option to take home to cook for the household, and is also sold in paper packets of fish and chips as street food. Around 100 fish and chip vendors (Interview #83), almost exclusively women, buy tuna from the Titiana and Babanga fishers as a raw material for their trade.

[14] It is important to note that these calculations were based on extrapolating 6 months of landings data from Babanga fishers, and that the total calculation was based on a series of assumptions. These figures should therefore be taken as an approximation wherever cited in this report.


**Figure 52. A customer taking fish home to cook and eat, Gizo Market (Photo: Nick McClean).**

**Figure 53. A fish and chip vendor preparing dolphin fish and skipjack fillets, later to be cooked and sold on the street (Photo: Nick McClean).**

In the Gizo Market, fish is sold either by male fishers or their wives, with roughly six stalls set up alongside the docks next to the reef fish stalls. In one case a longstanding arrangement between some fishers and a non-family male retailer existed, with this retailer selling fish on behalf of a number of fishers and taking a commission from sales at the end of each day.

Local fishers have long held aspirations for an export connection for this fishery (see e.g. MFMR, 2014), but this has not eventuated, despite regular catches of mature yellowfin and the fact that the export hub at Noro is only two hours by canoe from Gizo. It is not clear whether export of HQ yellowfin from Noro would be more profitable than domestic sale. At the present time however, fishers do not have the cold storage equipment or fish handling experience to deliver export quality fish, or the market connections, digital connectedness or business experience to develop such an endeavour alone.

> We have been asking the government for assistance to connect with a company, or improve our fishery, for 20 years. But we have not heard any reply. Not even a single word. We think it's better to have a new company, someone in from outside and deal directly with us. We have had reef fish exports in the past and it was very good for our fishermen. But again we never heard anything about why it shut down. We want to see this sort of thing come back.
>
> Joint statement by seven fishermen,
> Babanga Culmination Workshop

This fishery has generally not been the focus of efforts to improve practices or livelihoods through the provision of market-oriented support. However, some fishers reported receiving support from Constituency Development Funds to buy outboard motors and for a village-based freezer unit in Titiana, which was non-functional at the time of the interview (Interview #89). Implementation of catch and economic monitoring of the fishery during 2014 resulted in increased skills in financial literacy and household financial planning for some fishers in Babanga (Interview #91).

A major feature of the fish chain is that fishers from Titiana and Babanga have established a voluntary co-operative arrangement whereby each village sells tuna in the market on alternate days, with Sundays a shared day. Fishers in Titiana reported that this practice began shortly after the tsunami of 2009 (Interview #89), due to the fact that oversupply into the Gizo market was leading to losses for fishermen. Since its institutionalisation, fishers report that the economic returns from fishing increased, and this arrangement also led to a reduction in exposure to safety risks due to effectively limiting fishing days (FGD Interview #82; Interview #73; Culmination workshops (Titiana and Babanga); Albert, Warren et al., 2014 [unpublished data]).

> It was so bad [before the arrangement], because when you (go) to sell the fish, you have to sell the fish at the cheaper price because 20 canoes are also selling their fish at the market. At the end of the day, the day's taking is small, but enough to only cover the cost of expenses and once that is left, you just have limited funds to buy grocery ... So the fishermen see this, and decided to make a change … The fishermen had a discussion ... They tried again and went fishing separately again this time. Then we fished separately during the week with Titiana and slowly noticed the change. It was grand. The number of canoes that went out fishing in a day dropped! There were fewer canoes from Titiana! After we fished and came to town to sell, we noticed the day's income was plenty, enough for everything and everyone.
>
> Fisher, Babanga (Interview #91)

This co-operative effort management is sustained due to two factors. Firstly, the concrete economic and safety-related benefits it delivers (Interview #73, FGD Interview #82). A less prominent, but also important factor is village-level dispute resolution mechanisms that fishers view as being grounded in iKiribati cultural values and institutions. These act as a disincentive for fishers to break the agreement and fish on days not allocated to their village.

> We inherited this from our ancestors: when we make decisions for our village, we have a big house and elders represent each family to discuss that. It's a democratic way of governance, and [the co-operative arrangement between villages] is an agreement made that's beneficial for everyone. So when the fishermen's group, which includes elders, makes a decision like this, then everyone follows it.
>
> Through this way, there is always a solution. In the traditional way, to break the agreement is a shameful thing, and will reflect on your family. So that way, there's always a solution and a way of being accountable first to your family, and then to your community.
>
> Fisher (Culmination workshop, Titiana)

## Standout wellbeing contributions to coastal communities

### Economy

The tuna fishery in Gizo represents the principal source of income for around 20 fishing families across the two villages, and for approximately 100 fish and chip vendors in Gizo.

**Table 29. Economic contributions to the local economy from tuna fishing in Gizo**

| Type of economic contribution | Indicator(s) | Data |
|---|---|---|
| **Generating revenue** | Gross Value of Production (GVP). | ~2,000,000 SID/~243,000 USD p.a. (~200 tonnes of annual catch at average 10 SID per kg). |
| **Employment fishing and processing** | Numbers employed in the fishery and selling fish. | Up to 20 fishing families participating across two villages. |
| | Household income. | $20,000 (minimal) – $46,000 (maximal) p.a. per fishing family.<br>Total earnings: 400,000 SID/~48,000 USD p.a. – 920,000 SID/~$110,000 USD p.a. across all fishers/villages.<br>Average provincial wage for 2006 was 23,000 SID. |
| | Household income from tuna fishing work as a % of total household income. | No public data exists. Interviewees from fishing families report supplementary incomes from reef fishing, small retail business (e.g. village kiosk) and wage labour in Gizo. |
| | Numbers of people selling fish and chips from this fishery, or smoked fish. | No data exists. |
| **Service and supply businesses** | Revenue to businesses and employment in vessel construction, fuel, gear, engines and repair services. | No data exists. Albert et al. (2014) estimates average cost per trip of approximately 657 SID. |

Sources: Albert, Warren et al. (2014 [unpublished data]), primary interviews.

Notes: Albert, Warren et al. (2014 [unpublished data]) undertook an economic analysis of the fishery with Babanga fishers, which calculated market value over a six-month period based on catch reported by 4 fishing families, as well as fishing costs and household income. Additional information is required to understand the indirect value of the fishery, such as for gear/boat purchases and downstream fish and chip sellers, so as to assess the full range of economic contributions to community wellbeing from this fishery. Figures cited should also be understood as an approximation due to the limited nature of the dataset and the use of assumptions to extrapolate figures.

#### *Livelihoods for fishers and others downstream*

The principal economic benefits derived from this fishery are for fishing families. Each fishing family works three to four days per week, sufficient to earn a steady and periodically lucrative livelihood for their family. This may be supplemented with reef fishing, small retail businesses or wage labour. With strong demand in Gizo and community-based effort management in place, prices can be maintained at a viable level and the fishery can provide a year-round source of income. During certain periods, such as during poor weather when supply is further lowered, prices can rise substantially. As a result average earnings during

2014 were above both the national minimum wage and the provincial average wage (Albert, Warren et al., 2014 [unpublished data]).

**Table 30. Fishers' wages compared to minimum wage and average provincial wage.**

| Average wage per annum of fishers in Babanga (2014) | Minimum wage per annum for agricultural workers, Solomon Islands (2008–2018) | Minimum wage per annum for agricultural workers, Solomon Islands (2019- present) | Average provincial wage per annum, Western Province (2006) |
|---|---|---|---|
| Approx. $20,000-$43,000 | $5,760 | $11,520 | $23,000 |

Sources: Albert, Warren et al. (2014 [unpublished data]), MCILM (2019)

Prior to the institution of co-operative effort management 10 years ago, it is likely that this fishery supported a basic poverty alleviation function, particularly given that Gilbertese communities are considered to be marginalised in Western Province society, and have as a result had access to relatively few alternative livelihoods (see e.g. Albert, Warren et al., 2014 [unpublished data]). Fishers typically reported having entered the fishery in early teenage years, rather than continuing with a secondary school education, due to family financial pressures (Interviews #73, #89, #91). All those who reported this began participating in the fishery prior to the institution of co-operative effort management.

However, since the co-operative arrangement has come into place, earnings have been better and some fishers may have been able to progress as a result of the fishery. With average wages for fishers above that of the provincial average (Albert, Warren et al., 2014 [unpublished data]), some fishers have been able to build better-quality housing, or invest in extra boats, small village-based kiosks and other retail businesses, to support extended family networks (Interviews #73, #89, #91).

**Figure 54. A timber house constructed in Babanga between June 2018 and April 2019. This was funded by the proceeds of tuna fishing and construction labour in Gizo, and replaced a temporary home made from bamboo poles and thatch (Photo: Nick McClean).**

The other major livelihood benefit associated with this fishery is to the roughly 100 fish and chip vendors making up to 150 SID per working day reported in interviews, almost all of whom are women (Interview #83). There is no published information on these vendors to assess the nature of this contribution. However, the Solomon Islands minimum wage between 2008–2019 was $30 per day (MCILM, 2019), and the provincial minimum wage for 2006 was $88 per day (Albert, Warren et al., 2014 [unpublished data]), meaning that fish and chip vendors have the capacity to generate a promising wage. Further research to establish frequency of work would help establish the wellbeing benefits of this livelihood to a more precise degree.

Considerable barriers still exist to maximising the benefits of this livelihood opportunity for fishers in particular, in terms of contributions to wellbeing. Firstly, offshore fishing as a livelihood is fraught with risk, and the Gizo handline fishery on industrial FADs in the open ocean is an extreme example of the unsafe working conditions that many small-scale tuna fishers endure in fisheries in the Indo-Pacific. This considerably detracts from the wellbeing contributions of the fishery to the communities of Titiana and Babanga. While many fishers view the livelihood as a valued aspect of their cultural identity, the risk of accidents and being lost at sea is everpresent, and access to functional safety equipment is low.

**Table 31. Working conditions in the Gizo handline fish chain.**

| Position | Security of work | Work Health and Safety conditions |
|---|---|---|
| **Families fishing and selling fish** | **Insecure**<br>An extremely unsafe work environment presents a constant risk to household income for fishing families, and overall wellbeing.<br>Fishers report feeling the fishery is insecure because they perceive that catches are declining. | **High-risk work environment with few safeguards**<br>Fishing offshore in small low-powered canoes and minimal safety equipment.<br>Little access to safety equipment, though fishers reported use of life jackets and GPS.<br>Access to basic universal health care in Gizo Hospital. |
| **Processing and retail roles in Gizo (fish and chip vendors).** | **Secure**<br>Strong demand for fish in Gizo means there will likely always be a source of income for the small-scale fish and chip vendors as long as there is fish available for them to use. | **Lower-risk work environment with few safeguards**<br>Local chain roles tend to be subject to few obvious/apparent safety risks, however limited interviews undertaken and further research required specific to this subject.<br>Access to basic universal health care in Gizo Hospital. |

Sources: Primary interviews.

Secondly, a lack of financial literacy in the population in general, including fishers, restricts the wellbeing benefits of the fishery. Fishers in Babanga who received financial literacy training reported that this helped them manage their fishing and living costs, and invest revenues to expand family businesses, and that this made a significant difference to their livelihood. This has also enabled some fishers to cover immediate family costs, but also the establishment of village-based businesses that now support non-fishing family members.

The lack of ice usage reduces returns in the fishery on some occasions, as fish that has been in the sun all day or has spoiled tends to get a lower price than fresh catch (Interview #72 and personal observation). While Titiana reported that some Constituency Development Funds had been used to provide a freezer unit, this had quickly broken down (FGD Interview #89).

### Food and nutrition security

This fishery provides an important supply of food to the growing urban population of Gizo, by providing approximately 200 tonnes of fresh fish annually (Albert, Warren et al., 2014 [unpublished]). This is a substantial contribution to the wellbeing of the rapidly growing urban population in Gizo, and represents almost twice the quantity of reef fish sold in Gizo Market annually (Albert, Warren et al., 2014 [unpublished data]). Tuna is therefore the principal fish being supplied to Gizo.

Consumption occurs via the following “pathways”:

- Home, street and restaurant-based consumption in Gizo. Sale in Gizo Market leads to home-based consumption. Sale in Gizo Market, processing and on-sale by vendors leads to consumption on the street and in kai bars (restaurants) of cooked product.
- Village-based consumption in Titiana and Babanga. Consumption of fresh and smoked product by fishing families, as well as gifting and local sale in villages.
- Direct sale to restaurants (Gizo Hotel, resorts surrounding Gizo) leads to restaurant-based consumption.

- Direct orders of smoked product lead to home-based consumption.

**Environmentally sustainable fisheries**

This fishery's status as a "one by one" fishery, and its restricted nature, means that the ecological impacts are comparatively low relative to the industrial tuna fisheries in Solomon Islands. While there are no official figures on fisher numbers, there are only three centres of small-scale commercial handline yellowfin fishing on FADs in the country. They operate commercially out of Gizo, Honiara and Auki. Similarly, there are no official figures on the ecological impact of handline tuna fisheries in the Solomon Islands, and this in itself indicates that the ecological impact is generally considered low.

However, as a primarily FAD-based fishery a mix of mature and juvenile tuna are caught, similar to the PS and PL fisheries. This has been identified as problematic at a regional level, yet has also been specifically addressed in recent MSC certification processes (NFD, 2016). In addition, some ETP are caught, such as silky shark which are considered as vulnerable under the IUCN Red List. Albert, Warren et al. (2014 [unpublished data]) estimate around three percent of total catch are sharks. While these bycatch issues are broadly relevant to the environmental sustainability of the fishery as a question to be addressed in fisheries research and management, the scale of catch by this very small fishery would not appear to pose any major risk to stocks.

Fishers raised two points of relevance to environmental sustainability issues in the fishery. Firstly, fishers reported a long-term decline in fish availability over recent decades. They reported observing fewer free-schools since the 1980s, and point to their increasing reliance on industrial FADs as evidence of this. They attribute this decline specifically to the use of FADs in the industrial fishery. One fisher provided the following quote, and explicit consent for it to be published in regards to this issue:

> We want to see a closure for the net boats off our village here, to help regenerate the stock and the numbers. Before the net boats were here we could follow the schools and do well. But because of the net boats the overall relationship with the NFD is not good. If they go for the pole and line, it's ok, but the purse seine is seen in a very negative light. If there's no fish, there's no future.
>
> Tuna fisherman
> (Culmination workshop, Titiana/Babanga)

It is difficult to triangulate such claims. In general, pelagic stocks are considered to be more robust to fishing pressure at the scale of local communities than reef species (Albert, Beare et al., 2014; Bell et al., 2015). In regards to industrial fisheries, however, purse seine effort and FAD usage have both increased by seven percent per annum globally since the 1990s (Scott & Lopez, 2014), and the WCPO is the area with the heaviest usage of FADs globally by total numbers and purse seine effort (Fonteneau, Chassot & Bodin, 2013). All stocks in the WCPO and the Solomon Islands specifically were not considered to be subject to overfishing in 2014 assessments (ISSF, 2019; NFD, 2016). However, yellowfin is considered to be unable to absorb any further increases in catch or effort at the regional level (ISSF, 2019). Due to a variety of complex factors it is also not possible to determine the abundance of tuna from CPUE data for FAD fisheries (Fonteneau et al., 2013).

Given the wide-ranging nature of tuna stocks and the lack of localised studies, it is difficult to draw clear conclusions about localised effects on stock abundance based on available national level assessments. Nonetheless it is a widely held view amongst Gizo tuna fishers and coastal communities historically (Barclay, 2010) that a clear relationship exists between

purse seining in the Solomon Islands and local abundance of tuna and particularly free-schools.

Secondly, fishers in Gizo have received some management attention from scientists and government in relation to catch of small fish and bycatch species, which they discussed in culmination workshops:

> It also happens that there are many doctors that come and look at the size of the fish, and many people come ask us the same questions we talk about today. Then they work through the national government, who then tell us not to take the wrong sized fish. But they never listen to the cry of the fisherman, to help us in return. So it will happen in the future. In fact already, these people go away because nothing happens. And that will continue, we can't comply if the government won't help us in return. It will keep happening with the next generation if the government can't find a different way, find a solution.
>
> Joint statement by seven fishermen from Babanga

This statement points to the significance of social and economic issues in fisheries management, and the need to consider issues of community wellbeing. Where legitimate issues of sustainability may exist, fishers are willing to participate in efforts and comply, in principle. Yet they also rely on the fishery for basic needs, and point to the fact that addressing the vulnerability of communities in the context of policy changes assists with the successful implementation of policy solutions. This is particularly so where low capacity for management by the government makes ensuring compliance with rules challenging.

Following from this, the institutionalisation of a unique voluntary effort management scheme could provide an instructive example of how catch/effort limits may be put in place in small-scale fisheries. In this case, the effort management agreement between Titiana and Babanga was developed to address issues around the economics of fishing and the need to increase returns in the fishery. However, it did so by reducing catches, and therefore restricting supply to the market, which increased prices. While it is unlikely that wider stock issues are likely to be impacted by a fishery of this scale, it is nonetheless the most significant change in the fishery so far documented, and one that does contribute to wider sustainability. It should be noted that critical factors enabling this include a restricted market, the ability for the two villages to restrict effort via effective village governance, and the lack of new entrants into the fishery. Nonetheless, this could provide a valuable learning site for other fishing communities in terms of both the economic and potential ecological benefits of voluntarily restricting effort.

## Integrated discussion of governance and wellbeing

Key insights relate to: resource management; government support for fishing businesses; the dangers of offshore fishing; market demand; voluntary effort management; growth of industrial fisheries; social-economic status and migration; and gender.

### Government influences on wellbeing

#### *Resource management*

Availability of healthy tuna stocks underpins the wellbeing benefits of the fishery. According to existing data on fished stocks the resources are being adequately managed (NFD, 2016; ISSF, 2019), however major increases in catch levels for yellowfin cannot be sustained (ISSF, 2019), and FAD-based catch of juvenile bigeye tuna in the WCPO have been cause

for concern at a regional level (NFD, 2016). While there is little to no government intervention in the local fishery in Gizo, the overall size of the fishery appears not to warrant greater management efforts. Instead, efforts to ensure that overall aggregate catch across industrial and small-scale sectors is maintained at sustainable levels appears to be sufficient.

*Lack of government support for fishing businesses*

This fishery has had very little support from national or provincial-level initiatives. Some specific initiatives through which contributions to wellbeing from the Gizo handline fishery could be improved are:

- The Fisheries Management Development Fund under the FMA 2015 could be deployed, for example, to provide safety equipment and appropriate training for fishers, or to develop iFADs that would be used by the Gizo handline fishers, saving them fuel and reducing risky trips offshore.
- Using the Constituency Development Fund to buy outboard motors, which was reportedly used by three or fours fishers to buy outboard motors. While this represents a genuine benefit for those fishers, the CDF mechanism is reliant on political affiliation and the interests of candidates in the votes of fishing communities. As such, it is an unreliable and uneven way of distributing benefits to fishing communities (see e.g. Batley, 2015).
- Fishers requested assistance in exploring opportunities for exporting their catch, to see if they can get more value. The Tuna Management and Development Plan Activity 5.2.2 encourages linkages between industrial fishers and small-scale fishers via Development Processing Agreements (MFMR, 2014, p. 15). Undertaking a feasibility study of exporting fresh yellowfin via existing infrastructure at Noro, or via the Munda Airport, would provide clarity to Gizo fishers regarding this possibility, and potentially support increased returns from the fishery if proven feasible.

**Non-government influences on wellbeing**

*Dangers of offshore fishing*

The offshore setting of this fishery and the very basic vessels and OBMs used by fishers make this an extremely hazardous fishery to operate in. This threatens the basic wellbeing and security of fishers and fishing families. Exploring the provision of safety equipment and appropriate training to fishers via the Fisheries Management Development Fund, or developing aFADs that would be used by the Gizo handline fishers, saving them fuel and reducing risky trips offshore, would be valuable initiatives for enhancing the wellbeing of fishing families and communities. Albert, Warren et al. (2014 [unpublished data]) report on initial results of trials of aFADs with Gizo fishermen, who initially stated that aFADs needed to be deployed in sufficient numbers to attract catch. Continuation of trials with the Gizo tuna fishing community may be of considerable long-term value from a safety-at-sea perspective.

*Market conditions*

Strong demand in Gizo for fresh tuna underpins the wellbeing benefits of this fishery. While some fishers reported that the influx of cheap protein in the form of fresh chicken wings in recent years may have had an effect on food buying preferences (Interview #89, Inception workshops Honiara), there is no reason to believe that market demand on the whole will not remain strong into the foreseeable future.

The relatively restricted size and geographical focus of this market also enables fishers some control over vessel entry, supply and therefore price, so as to enhance economic benefits and reduce fishing costs. However, fishers feel that a lack of connection to an

export market restricts the economic benefits of this fishery, and that with adequate support from a company or the government, they would be able to benefit further from their catch via an export market linkage. As mentioned, a feasibility study would be beneficial in clarifying the situation in this regard.

### *Voluntary effort management*

The standout influence on wellbeing in recent times has been the development of community-based effort management by fishers in Gizo and Titiana. This has increased returns from the fishery and stability of livelihoods. Financially, fishers have gone from covering their costs and earning a basic living that covers daily needs only, to being able to accrue enough income to invest in housing, extra vessels and small village-based businesses. It has also reduced fishing time from six days per week to three to four days per week per fisher, which presents a considerable reduction in safety risks for fishers.\

This represents a unique case in terms of small-scale tuna fisheries in the Indo-Pacific, and provides a potentially valuable example for other small-scale tuna fisheries elsewhere that exhibit similar conditions – in particular, similar fisheries in the Solomon Islands based out of Auki and Honiara.

### *Growth of industrial fisheries*

The growth of industrial fisheries has led to increased use of FADs by small-scale fishers, as well as increasing interactions between industrial fishing boats and small-scale fishers. In many cases these are co-operative relations, in which fishers exchange small quantities of trade goods and knowledge of fish availability for fish. The benefits of such arrangements are obvious, and appear to be rooted in personal relations among crew and fishers. However, conflicts also exist, which are acknowledged by fishers, the government, NFD and the media. Furthermore, fishers perceive that the growth of FAD-based fisheries has impacted on resource availability, and particularly the prevalence of free-schools, which they evidence by pointing to an increased reliance on FADs over time. While it is not possible to make any clear assessment on whether this is the case, it has been a common discourse in Solomon Islands tuna fisheries historically (see e.g. Barclay, 2010). In the case of Gizo, this increased FAD-dependency of small-scale fishers may have resulted in increased exposure to the risks of offshore fishing.

Further to this, implementation of actions under the Tuna Management and Development Plan (MFMR, 2014) have the ability to address these conflicts and potentially broker solutions that may reduce perceptions of impact or grievances arising from conflicts. These actions are listed in the following table. In general, it is clear from the TMDP activities and recommendations that the onus is placed on industrial fisheries to maintain access to resources for small-scale fishers, and avoid creating conflicts through abiding by appropriate licensing conditions.

**Table 32. Outcomes and activities related to interactions between small-scale and industrial tuna fisheries in Solomon Islands listed in the Tuna Management and Development Plan.**

| Outcome as listed in MFMR Tuna Management and Development Plan | Activities associated with the outcome |
|---|---|
| **Outcome 5.1 Negative impact of large-scale commercial fishing on coastal communities and small-scale fishers minimised** | • Activity 5.1.1: Liaise with artisanal and commercial (TIASI) fishers to assess any current impacts.<br>• Activity 5.1.2: Ensure licensing guidelines appropriately restrict areas that vessel types can fish. |
| **Outcome 5.2 Solomon Islands food security enhanced** | • Activity 5.2.1: Ensure coastal communities benefit from large-scale commercial tuna fisheries by allowing by-products to be landed for local markets.<br>• Activity 5.2.2: Encourage companies to support coastal communities through installation of FADs and supply of fish. |

## Factors influencing on the distribution of wellbeing benefits

### *Socio-economic and migrant status*

The social status of the Gilbertese fishers as migrants is highly relevant for understanding the wellbeing outcomes from the fishery in various ways.

Firstly, it is the reason they participate in the fishery in the first place – in part due to their ocean fishing skills, and in part due to their lack of land and expertise for gardening – the other main food and livelihood option in rural Solomon Islands. As a result, offshore tuna fishing in this case is a livelihood opportunity for a group of people who have few other economic opportunities. It is also significant, however, that local Solomon Islanders do not participate in the fishery at all despite its good returns. This can be explained in part by the linked factors of available alternative livelihoods for local Solomon Islanders (gardening on customary land), and to the dangers inherent in the fishery. Participation in the fishery, therefore, subjects Gilbertese fishers to perhaps greater risk than almost any other livelihood in Gizo.

Significantly, Gilbertese migrants are widely considered, and consider themselves, to be at the "bottom of the tree" in Solomon Islands society, and this impacts on their efforts to further develop the fishery, or receive support to minimise risks associated with offshore fishing. In the eyes of the Gilbertese, their status as an ethnic minority has the greatest impact on their long-term wellbeing, and impacts not only on the initial distribution of benefits and risks, but also their ability to influence those benefits and risks to their advantage.

Fishers reported that while the tuna fishery provided them with a relatively stable income, their situation was nonetheless precarious, and that with their position in society and marginal political status they felt they had received little support from wider society, and particularly the national government, to address the difficulties they experience in their lives. They feel this mainly in the lack of support for business, e.g. for export markets, or ways of complying with sustainability requests regarding juvenile fish while still maintaining a livelihood:

> We Gilbertese understand from when we are small, that we are the last people, for government, for companies to consider our needs. That's our concern, that we have been left out for so long. So now we have to push not just for help, but also for representation in our parliament. We are asking for a Gilbertese

> representative in parliament, so our voice can be heard. This is the only way we feel we will be listened to and we can have the support that we need to improve our lives. But whatever happens, we are not going to give up. If there is an option for us to improve our fishery, we will take it. Because you see, most tuna fishermen in the Solomon Islands, we are Gilbertese.
>
> Joint statement by seven fishermen from Babanga

### *Gendered division of labour*

Any governance interventions to monitor catches, restrict catches, improve safety at sea or enhance livelihoods will be affected by the gendered division of labour. The gendered division of labour in the Gizo handline is similar to that noted in the other cases.

In fishing families, most of the fishing is done by men, with only one woman reporting going fishing, while trading is done by both men and women. In some families men participate regularly in trading in Gizo market, whereas in other families wives will take care of the trading activities, once their husbands return with the day's catch. Both male and female interviewees said the division of labour and the control of money earned is not predetermined around social norms regarding prescribed roles for women and men, but simply that the family worked together in whatever way was required to ensure that work was done (Interviews #70, #74, #83, #84, #89).

Previous studies of fisheries in the Pacific have highlighted that divisions of labour and the control of finances have been proposed as important aspects of women's and men's differential agency, in ways that influenced livelihood outcomes (Barclay et al., 2018; Kruijssen et al., 2013). However, when asked about the influence of gender relations on wellbeing related to the fishery, Gizo interviewees generally did not elaborate on this topic or view it as an important influence. In general, interviewees were more concerned to highlight that it was a family effort, and tended more to highlight the disadvantage they experienced as a community, in regards to social marginalisation. This aligns with other livelihood studies focused on gender, land and livelihoods in Gilbertese communities in Gizo, in which equity issues around internal gender relations are occluded in favour of a focus on equity issues at a community level (e.g. Monson, 2019).

Further down the chain, all of the fish and chip traders in Gizo are women, primarily local residents, rather than Gilbertese. This means that the benefits from this node of the chain flow to women and their dependents. In the case of the fish and chip trader interviewed for this study, her husband was previously a local member of parliament who had retired, and she was supporting them both in retirement via fish and chip trading (Interview # 83).

## Summary of key factors influencing wellbeing

This chain is providing substantial wellbeing benefits to those ~20 Gilbertese fishing families who participate, to approximately 100 female fish and chip traders, and to the town of Gizo via supplying approximately 200 tonnes of fresh fish annually.

This is a relatively sustainable fishery compared to reef fishing, with regional stocks in a relatively good state, and the impacts of local fishing effort at the scale currently undertaken in Gizo not so far considered ecologically significant. The community-based management of this fishery also represents a positive example of small-scale offshore tuna fisheries development in the Solomon Islands supplying a growing urban market.

## 3.3 Recommendations – Solomon Islands

**Government**

*Economic and social data collection.*

Noting the existence of national-level reporting on economic contributions via the Forum Fisheries Agency Tuna Fishery Report Card system:

- Implement regular monitoring of contributions at the sub-national level for the domestic sector, and for handline tuna fisheries in Gizo, Honiara and Auki.
- Support or conduct research utilising existing socio-economic data and further targeted data collection into the long-term social and economic impacts of tuna fisheries development on communities.
- Support or conduct research into the social welfare functions of low-paid tuna jobs, including their interaction with both “push” and “pull" factors leading to labour migration to Noro.
- Support or conduct research into the social and economic benefits to families and coastal communities of women’s participation in the formal economy, and women’s working conditions, using Noro as a case study.

*Improving local socio-economic development in fishing communities.*

- Investigate allocating a portion of revenue raised from industrial tuna fisheries licence fees to coastal community development projects, via the Fisheries Management and Development Fund. Priority locations could include Noro and areas where local fishers are in conflict with the industrial sector.
- Invest in improved housing facilities for workers in Noro rented by SolTuna, to generate further revenue for the provincial government.
- Invest revenue from housing in municipal services for Noro.

*Food safety standards in saltfish/bycatch chain*

- Investigate low-technology strategies for improving cold chain for bycatch and saltfish in Noro, during storage transportation, and sale.
- Improve conditions for vendors in urban markets, including provision of clean water and sanitation in markets.

*Support to improve small-scale fishing businesses*

- The national government, donors and fishing companies revisit inshore FAD projects for handline tuna fishing communities, building on existing trials, with the aim that successful implementation of inshore FADs would be safer, reduce fuel use, and reduce conflicts with industrial vessels.
- Work with fishing families to explore the potential for small-scale smoked-fish businesses selling on a regular basis in Gizo and Honiara.
- Extend financial literacy training to all fishing families in Gizo, and other small-scale commercial tuna fishing communities in Fishing Village Honiara, and Auki.
- Work with fishing families to assess the feasibility of exporting fresh yellowfin tuna from utilising existing infrastructure in Noro or Munda airport and including improving fish handling practices, on-vessel iceboxes and cold storage in Gizo.

*Safety equipment for small scale fishers*

- Provide “grab bags” of safety-at-sea equipment to small-scale fishers similar to existing SPC programs.[15]
- Undertake training in the use of inflatable rafts, emergency locator beacons, handheld VHF radio and use of compasses and thermal blankets to support effective use of grab bags.

*Marginalisation of Gilbertese communities*

Noting this marginalisation leads to a lack of trust, an inability to address issues of core community concern, and a lack of awareness as to constraints and opportunities for development:

- The Solomon Islands Government could at national and provincial levels more actively support Gilbertese aspirations and advocacy, including a dedicated Gilbertese member of parliament.

**Private-sector actors**

Including tuna fishing and processing companies, traders, buyers, certifiers and donors.

*Buyer requirements.*

- Investigate low-technology strategies for improving cold chain for bycatch and saltfish in Noro.
- Investigate value-added preserved products for bycatch and saltfish, such as smoked fish.

*Improve conditions for lower-paid workers.*

Noting the importance of entry-level roles for women, and the past importance of bycatch as a source of income for lower-paid crew:

- NFD and SolTuna continue to improve conditions for women workers, increase training and mentoring opportunities for women to move into more senior or non-traditional women roles, and support for domestic violence services in Noro.
- NFD and SolTuna investigate ways to replace income from the sale of bycatch for crew with benefit sharing of proceeds from sale through local sales outlets, through use of Fair Trade Premium Funds, credit union or improved wages for crew.

*Peer learning among tuna fishers re the potential benefits of community-based effort management.*

- Civil Society Organisations with support from fisheries ministry convene peer learning between fishers in Gizo, Honiara and Auki to learn about voluntary effort management, and the opportunities and constraints it may face in other coastal fisheries supplying urban markets.

[15] See https://www.spc.int/updates/news/2015/11/emergency-grab-bags-to-promote-safety-at-sea-in-niue

# 4 Assessing the governance of tuna fisheries

Thus far, this report has addressed the question of how the governance of tuna fisheries influences coastal community wellbeing. In Section 4.1 we present a simple assessment framework that can be used to answer that question for other fisheries, to assist in identifying how interventions may affect contributions from specific fisheries to coastal community wellbeing. We show how this framework can be applied using potential interventions relevant to the cases from Indonesia and Solomon Islands analysed in this project.

We also present in Section 4.2 a framework for monitoring community wellbeing in fisheries in context, to help understand the likely impacts of governance initiatives, such as a change in fisheries policy. Monitoring can also be used to feed into an assessment of the social and/or economic performance of a fishery, or to track the outcomes of governance initiatives after they are implemented.

In presenting these frameworks, some key points need highlighting. Fisheries decisions are in many cases inherently complex “wicked problems” where a range of competing interests and stakeholder groups are at play, and where there are no clear or unproblematic solutions (Jentoft & Chuenpagdee, 2009). In many cases trade-offs between valued outcomes are in play, decision-makers must weigh a complex array of options and factors when making decisions, and stakeholders and communities must adapt to decisions in the context of this complexity. Often this must be done in the context of uncertainty about key elements of the social and ecological systems that are under consideration. Ultimately, decisions must be made based on what decision-makers view as an optimal outcome in relation to overarching objectives that decision-makers, stakeholders and communities adopt.

Our framework, therefore, does not provide policy-makers with prescriptive solutions – it is not a model that can generate decisions, or a table that once filled out will produce an obvious answer. Instead, it clarifies the key questions to ask in order to find out what the impacts of a change in fisheries management might be on the wellbeing of relevant communities, and what information can be used to answer those questions. The framework provides policy-makers with an aid to decision-making by providing a way to think through the wellbeing contributions of fisheries as they currently exist, and how they might change due to policies, changes in market conditions, environmental change and so on.

## 4.1 Assessing fisheries governance for community wellbeing

The assessment framework is a set of topics to consider sequentially. Wherever possible, including evidence to support assessments increases the robustness of the assessment.

- **The potential governance *intervention*.**
  In this section, the intended change in a fishery, or a set of options for managing a fishery or an aspect of a fishery, is listed.
- **The *fishery* affected.**
  In this section, relevant information on gear/vessel type, target species, geographical focus, destination market or any other characteristics of the fishery that are relevant to determining the scope of the intervention is included.
- **Potential *benefits* to coastal communities.**
  In this section, the intended or anticipated benefits that would arise from the initiative, as well as whether these are likely to be realised in the short, medium or long term are listed.
- ***Who* in the value chain benefits.**
  In this section, the actors, communities or stakeholders who would receive the benefit are listed. Close consideration should be paid to socio-economic status, participation of migrant communities or migrant labour, and gender.
- **Potential *lost benefits/risks* to coastal communities.**
  In this section, the benefits that may be lost as a result of the intervention (such as livelihoods if catches are restricted) are listed, with likely time frame (short, medium or long term).
- ***Who* in the value chain bears the loss/is exposed to risk?**
  In this section, the actors, communities or stakeholders who might lose benefits, or be exposed to risks, are listed. Close consideration should be paid to socio-economic status, participation of migrant communities or migrant labour, and gender.
- **Factors influencing effectiveness and the ability to mitigate risks/vulnerabilities.**
  Here, any factors which are considered likely to influence the effectiveness of an initiative, or if present may mitigate the risks of an initiative, are listed. This allows for realistic assessment of the feasibility of an initiative in the context of a specific fishery and management system.

We present examples of three governance interventions across government (FAD management), market (Fair Trade certification) and community-based resource management governance initiatives, drawing on the case study material presented in section 2.

Please note that these are offered as hypothetical examples to show how the framework might be used, drawing on factual materials from the case studies. They are not intended to be realistic assessments of actual measures for the case-study fisheries. The tables show how the framework could be used to think about potential social and economic impacts of these options on coastal communities. We do not advocate for one option over another, nor do we provide definitive evidence of the benefits, risks and contingencies of each. The examples are not comprehensive, as there are many other related management measures that are not included in our tables. Further detailed research and analysis would be necessary to turn the brief hypothetical assessments shown here into a solid basis for decision-making.

### Hypothetical example 1– FAD management options

In this example we compare two options for managing FADs for offshore tuna fisheries. We draw on published research (Holmes et al., 2019) and information from the case studies presented in this report, to explore the possible implications of two possible FAD management options: 1) seasonal FAD closures, whereby fishing on FADs is not allowed for a period of the year; and 2) a cap in FAD sets, where PS vessels are only permitted to set their nets a fixed number of times per year on FADs.

The hypothetical application of the assessment framework to this issue indicates that both seasonal FAD closures and capping FAD sets likely have similar broad intended benefits. Yet a number of key differences exist. These include: the gear that is targeted through each; potential impacts and risks in terms of who is impacted and the likely geographical focus of those impacts; and key factors that support feasibility and can mitigate negative impacts and risks. This demonstrates that such a framework allows for a basic analysis of two different initiatives at a high level, that can assist in addressing the complexities of implementing these in specific fisheries, and orienting future research efforts.

**Table 33. A hypothetical assessment of a seasonal FAD closure**

| **Type of governance intervention: Seasonal FAD closures**<br>**Fishery: purse seine, pole-and-line, handline fisheries** | | | | |
|---|---|---|---|---|
| **Intended benefits to coastal communities** | **Who benefits?** Including consideration of socio-economic status, migrant communities/ migrant labour, and gender. | **Potential lost benefits and risks** | **Who loses benefits or is exposed to risk?** Include consideration of socio-economic status, migrant communities/ migrant labour, and gender where relevant. | **Factors influencing effectiveness and risk/vulnerability mitigation** |
| Increased stock abundance (long-term).<br><br>Reduced fishing costs through increased productivity of each FAD (long-term).<br><br>Reduced supply leads to increased prices, which supports profits in fishing fleets (short–medium-term). | Fishers and fishing communities benefit from increased abundance, reduced costs (long-term).<br>Fishing vessels and some local traders benefit from price rises.<br>Reduced price volatility in prices relative to seasonal closures may allow processors to adjust to price rises gradually. | Reduced catch in the short term<br>Reduced food supply into local markets from FAD-based HL and coastal PS fisheries focused on small pelagics.<br>Reduced supply to larger-scale processing plants from PS and PL fisheries (short–medium-term).<br>Reduced flow of bycatch and low-quality fish from PS and PL fisheries (short–medium-term).<br>Reduced supply leads to increased prices, which increases costs for processors (short–medium-term). | ***Lost benefits:***<br>Local market chain actors may experience reduced supply and increased operating costs during closures.<br>Consumers in local markets experience reduced supply and increased food costs during closures.<br>Larger processors may experience reduced profitability due to increased costs during closures (price inelasticity in export markets likely to mean that increased costs for processors are not passed on to end-market retailers/consumers.<br>***Increased risks:***<br>Low-paid crew, local processors/traders, casual retailers exposed to income insecurity and heightened risk of poverty during closures.<br>Low-income consumers lose access to affordable source of protein, risk of food insecurity during closures. | ***Effectiveness:***<br>Requires effective spatial monitoring of FAD sets and fleet dynamics/FAD usage across small, medium and large-scale vessels.<br>Requires a licensing system across small, medium and large-scale vessels to enforce usage limits.<br>Requires fishers to not substantially increase effort outside of closure times.<br>***Risk mitigation factors:***<br>Diverse economy may have alternative livelihoods to reduce risk of income insecurity for low-paid crew and retailers. Simple economies may leave some workers/consumers exposed to risk during closures.<br>Presence of alternative affordable protein sources reduces risk of food insecurity for low-income consumers. |

**Table 34. A hypothetical assessment of a cap in purse seine sets on FADs**

| **Type of governance intervention: Cap purse seine sets on FADs**<br>**Fishery: purse seine fisheries** | | | | |
|---|---|---|---|---|
| **Intended benefits to coastal communities** | **Who benefits?** Including consideration of socio-economic status, migrant communities/ migrant labour, and gender. | **Potential lost benefits and risks** | **Who loses benefits or is exposed to risk?** Include consideration of socio-economic status, migrant communities/ migrant labour, and gender where relevant. | **Factors influencing effectiveness and risk/vulnerability mitigation** |
| Increased stock abundance (long-term).<br><br>Reduced ETP catch (short–medium-term)<br><br>Reduced fishing costs through increased productivity of each FAD (long-term).<br><br>Reduced conflicts among fishers (short–medium -term)<br><br>Reduced supply in large ports leads to increased prices, which supports profits in fishing fleets (short–medium-term).<br><br>Reduced price volatility relative to seasonal closures. | Fishers and fishing communities benefit from increased abundance, reduced costs and reduced conflicts.<br><br>Fishing vessels and some local traders benefit from price rises. | Reduced catch by PS fleet.<br><br>Reduced supply to larger-scale processing plants from PS fisheries (short–medium-term).<br><br>Reduced flow of bycatch and low-quality fish from PS and PL fisheries (short–medium-term).<br><br>Reduced supply leads to increased prices, which increases costs for processors (short–medium-term). | ***Lost benefits:***<br><br>Larger processors may experience reduced profitability due to increased costs (Price inelasticity in export markets likely to mean that increased costs for processors are not passed on to end-market retailers/consumers). In extreme cases this may lead to job losses.<br><br>Local market chain actors in larger ports may experience some reduced supply and increased costs.<br><br>Consumers in local markets in larger ports may experience some reduced supply and increased costs.<br><br>***Risks:***<br><br>Low-income consumers in large ports may experience increased food costs, increasing the risk of food insecurity.<br><br>Fishing fleet may experience reduced incomes if overall catch across sectors is not managed and price rises do not occur. Low-paid crew on catch-share arrangements may be exposed to income insecurity and heightened risk of poverty in this scenario. | ***Effectiveness:***<br><br>Requires governance system to manage overall catch/effort levels across sectors. If only implemented as an isolated measure reduced catch/effort in one sector may be replaced in another.<br><br>Requires an effective means of monitoring FAD sets on PS vessels, for example technology to monitor engine usage/signatures.<br><br>This approach is likely to be more feasible for fisheries with predominantly large PS vessels, and in settings where informal sharing of catch from HL vessels with PS vessels does not frequently occur.<br><br>Requires a licensing system for PS vessels that can enforce usage limits.<br><br>***Risk mitigation factors:***<br><br>Careful planning to identify level of FAD sets least likely to result in reduced profitability/job losses.<br><br>Diverse economy in larger port areas may provide alternative livelihoods.<br><br>Presence of FAD-based fisheries oriented towards local markets may mitigate risk of reduced supply to local markets. |

Sources fpr Tables 33 and 34: Primary interviews, Holmes et al. (2019).

Notes: This is a hypothetical example to illustrate how the framework might be used. It is not a thoroughly researched assessment of a governance intervention proposed for a specific FAD-based fishery.

### Hypothetical example 2 – Fair Trade certification

The following example is a basic analysis of the benefits and risks of entering Fair Trade certification in a coastal handline yellowfin tuna fishery in Indonesia, based on the material presented in this report, and Bailey et al. (2015).

Based on this hypothetical use of the assessment framework, implementing Fair Trade certification is likely to benefit some coastal communities where coastal handline yellowfin tuna fisheries exist. Yet the framework also highlights that as a result of changes in benefit sharing, some negative impacts may be experienced by coastal traders. Moreover, the framework also helps identify whether certification is likely to be feasible to implement in a particular situation. Of particular interest is that all factors influencing the effectiveness of the initiative, and risk mitigation, focus on the presence of key relationships between fishers, communities, traders and external organisations, and the quality of those relationships. Where existing co-operation and trust is high between value chain actors, implementation is considered likely to be more feasible, and unintended or negative impacts may be lessened or mitigation measures negotiated.

**Table 35. A hypothetical assessment of gaining Fair Trade certification in a small-scale tuna fishery in Indonesia**

| **Type of governance intervention: Fair Trade certification**<br>**Fishery: Handline yellowfin tuna** | | | | |
|---|---|---|---|---|
| Intended benefits to coastal communities | **Who benefits?** Including consideration of socio-economic status, migrant communities/ migrant labour, and gender. | **Potential lost benefits and risks** | **Who loses benefits or is exposed to risk?** Include consideration of socio-economic status, migrant communities/ migrant labour, and gender where relevant. | **Factors influencing effectiveness and risk/vulnerability mitigation** |
| Price premium and infrastructure that the premium funds | Coastal communities, socially and economically marginal migrant Butonese fishers. | Fishers don't directly receive premium. May receive higher prices outside Fair Trade value chain. | Fishers | ***Effectiveness:***<br>Requires community-level governance and good relations between fishers and communities to establish a premium fund.<br>Requires a buyer in the US market, and a processing/exporting company willing to aggregate and export product, and support certification process.<br>Capacity level of fishers organisations. May require support from an NGO/company to manage auditing and data collection processes in initial years of certification. |
| Training, equipment (fish-handling, safety-at-sea) | Migrant Butonese fishers and fishing families. | None | n/a | ***Effectiveness:***<br>Requires a supporting NGO/company to arrange and deliver training. |
| Improved bargaining power and improved market/price intelligence | Migrant Butonese fishers. | Reduced bargaining power and potentially reduced benefits to traders/collectors in the export chain.<br>***Risks:***<br>Where fishers are in positions of patronage with local traders, long-term erosion of benefits to traders may compromise beneficial aspects of patronage, with influence on overall community resilience. | Traders/collectors directly. Indirectly there may be a loss of benefits to communities and fishers if community resilience is compromised. | ***Effectiveness:***<br>Power relations in communities and level/nature of dependence between fishers and traders/collectors. Where a high dependence on traders/collectors exists, resistance from traders/collectors may be present.<br>***Risk mitigation:***<br>Active planning between fishers, communities and processing/exporting companies that both fishers and trader rely on has the potential to broker fair negotiations for new arrangements that shift power relations and benefit sharing. |
| Improved status in community due to improved and new infrastructure. | Migrant Butonese fishers. | None | N/A | ***Effectiveness:***<br>Requires effective community-level governance and good relations between fishers and communities to establish a premium fund. |

Sources: Primary interviews, Bailey et al. (2015)

Notes: This is a hypothetical example to illustrate how the framework might be used. It is not a thoroughly researched assessment of a governance intervention proposed for a specific fishery.

### Hypothetical example 3 – Community-based effort management

The following example is a basic analysis of the benefits and risks of establishing community-based co-operative effort management in a coastal handline tuna fishery in the Solomon Islands, based on the material presented in this report, and Albert, Warren et al. (2014 [unpublished data]).

Based on this hypothetical use of the assessment framework, implementing community-based co-operative effort management is likely to benefit coastal communities and particularly fishing families where coastal handline yellowfin tuna fisheries exist. The framework also highlights that as a result of reductions in fishing effort, some negative impacts may be experienced by urban consumers, but these were not identified as likely to result in increased risks or vulnerabilities for specific groups, under circumstances similar to those the Gizo communities considered in this report. However, the framework highlights specific factors influencing the effectiveness and feasibility of the initiative. Specifically, geographical and market factors play an important role, as do the presence of key relationships and governance processes internally in fishing communities, and between different fishing communities. Relationships with external training providers also support fishers to enhance the wellbeing impacts of the increased economic benefits of the change in governance.

**Table 36. A hypothetical example of community-based effort management in a small-scale handline tuna fishery, Solomon Islands**

| **Type of governance intervention: Community-based effort management**<br>**Fishery: Mixed handline tuna** | | | | |
|---|---|---|---|---|
| **Intended benefits to coastal communities** | **Who benefits?** Including consideration of socio-economic status, migrant communities/ migrant labour, and gender. | **Potential lost benefits and risks** | **Who loses benefits or is exposed to risk?** Include consideration of socio-economic status, migrant communities/ migrant labour, and gender where relevant. | **Factors influencing effectiveness and risk/vulnerability mitigation** |
| Reduced supply increases prices in local markets, leading to increased household income to vendors.<br><br>Reduced time fishing leading to reduced exposure to safety risks at sea.<br><br>Reduced spoilage of catch due to oversupply in local markets.<br><br>Training in financial literacy. | Fishing families in economically marginal migrant Gilbertese communities gain reduced fishing time and increased incomes. Additional income may be invested in schooling, housing or supplemental income generating activities. | Reduced raw material supply into local markets. | Urban consumers in Gizo may have reduced food supply, or have to pay more for both fresh and processed fish if increased costs of fish passed on to consumers.<br>Female fish-and-chip vendors may have reduced raw material supply.<br>***Risks***<br>No specific increased vulnerabilities were identified in the Gizo case as a result of this change in the governance of the fishery (e.g. increased exposure to safety risks, or increased income insecurity). | ***Effectiveness:***<br>Requires a fixed or stable number of fishers accessing the resource and/or market.<br>Requires awareness of benefits among fishing community members to voluntarily reduce catch.<br>Requires effective community-level governance to support initial co-operative efforts, and to support dispute resolution.<br>Cultural factors at the community level may influence effectiveness. For example, hierarchical customary governance structures may not enable co-operative effort management as effectively as more plural, family-based governance structures.<br>Requires an NGO/company to arrange and deliver training. |

Sources: Primary interviews, Albert, Warren et al. (2014 [unpublished data])

Notes: This is a hypothetical example to illustrate how the framework might be used. It is not a thoroughly researched assessment of a governance intervention proposed for a specific fishery

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## 4.2 Monitoring framework for tracking community wellbeing

The monitoring framework provides a series of potential indicators, and methods for tracking those indicators, for the domains of community wellbeing presented in this report.

The monitoring framework is structured around six categories:

1. Domain of wellbeing
2. Operational objective
3. Subsection
4. Indicators
5. Methods for collecting data on indicators
6. Disaggregation

### 1. Domain of wellbeing

These are domains presented in this study relevant to tracking the wellbeing of coastal communities in tuna fisheries in Indonesia and Solomon Islands.

### 2. Operational objective

For any ongoing monitoring process, clear management objectives are required. Monitoring and data collection take organisational resources, so are best used to determine progress towards objectives.

Setting fisheries management objectives requires careful discussion amongst stakeholders, and weighing of various options for how to structure both strategic/high-level objectives, and operational objectives for particular fisheries. Strategic, high-level objectives are broadly supported goals that in many cases may be applicable across diverse fisheries. Examples include: sustainable harvest of stocks; maximising economic performance; ensuring community wellbeing. Multiple strategic objectives are balanced to achieve optimal outcomes. For example, maximising economic performance or achieving community wellbeing may be balanced with operating within a biologically safe fishing limit.

Operational objectives refer to the means via which strategic goals are achieved in particular fisheries. Examples of operational objectives to achieve the strategic objective of ensuring community wellbeing in a specific fishery might include maximising supply of fish to local markets, maximising employment in processing sectors, ensuring secure resource access for small-scale fishers, or reducing conflicts between fishing sectors. Jennings et al. (2013) provide a useful discussion of the use of high-level/strategic and operational objectives in fisheries management planning.

### 3. Subsection

These subsections are aspects of the wider domain of wellbeing that assist in developing a monitoring approach for a specific fishery, given the needs of the fishery, and constraints and opportunities management faces in regards to developing monitoring processes. Not all subsections of a domain will be relevant to all fisheries. Relevant subsections need to be selected to track progress in relation to specific operational objectives.

### 4. Indicators

Indicators are drawn from available literature and from the case-study material presented in this report. Not all indicators are relevant across all fisheries. Relevant indicators need to be selected to track progress in relation to specific operational objectives.

## 5. Methods for collecting data on indicators

Methods have been identified based on available data, such as fisheries data collected by fisheries ministries and port authorities, and national-level socio-economic surveys in Indonesia and Solomon Islands. Where data is not collected or may be insufficient, relevant methods/techniques have been identified.

## 6. Disaggregation

Disaggregation of monitoring data is often required in order to undertake analysis focused on specific issues. Disaggregation for the following categories are presented as potentially relevant to specific tuna fisheries:

- National and provincial-level contributions.
- Sector-level contributions according to gear and vessel size.
- Contributions related to specific species and products.
- Contributions related to different roles (investors, company managers, captains, crew, processing workers, traders of different varieties, owner/operators etc).
- Contributions to communities living below/above the poverty line (role of low socio-economic status in impacting participation, and the distribution of benefits and risks).
- Contributions related to men's and women's participation (role of gender status in impacting participation, and the distribution of benefits and risks).
- Contributions related to migrant/non-migrant workers in industrial fisheries (role of labour migration in supporting economic contributions and particularly poverty alleviation, as well as growth in fishing effort).
- Contributions related to migrant/non-migrant communities in small-scale fisheries (role of migrant status in impacting participation, and the distribution of benefits and risks).

Not all these disaggregation processes are relevant across all fisheries. Relevant disaggregation processes need to be identified so as to track progress in relation to specific operational objectives

**Table 37. Framework for monitoring community wellbeing in tuna fisheries**

| Domain of wellbeing | Operational objective | Subsection | Example indicators | Methods for collecting data on indicators | Disaggregation |
|---|---|---|---|---|---|
| **Economy** | To be determined by fisheries managers in consultation with stakeholders for specific fisheries | Generating revenue | Direct economic contributions – GVP | Landings and price data | Disaggregate to allow for both national and provincial-level analyses<br>Disaggregate by gear and vessel size where possible<br>Disaggregate by species and product type (canned, fresh, smoked etc) where possible |
| | | | Indirect economic contributions | Value chain multipliers for small-scale fisheries<br>Input–output modelling for large-scale fisheries | |
| | | | Value added | For Indonesia, provincial fisheries reporting<br>For Solomon Islands, HapiFish markets data<br>Market and processing sector economic questionnaire<br>where existing data insufficient | |
| | | | Government revenue from fishery | Government data | |
| | | Employment and livelihoods | Numbers employed full-time equivalent (FTE) | Government data<br>For Indonesia – SUSENAS socio-economic survey raw data<br>For Solomon Islands – HIES socio-economic survey raw data<br>Household surveys with fishing and seafood trading families where existing data insufficient | Disaggregate to allow for both national and provincial-level analyses<br>Disaggregate by gear and vessel size<br>As appropriate, disaggregate to allow for analysis of contributions flowing to<br>- communities living below the poverty line<br>-men/women (gender analysis) across all fisheries.<br>- migrant/non-migrant workers in large-scale fisheries (role of labour migration in poverty alleviation)<br>- migrant/non-migrant communities in small-scale fisheries (role of migrant status in impacting participation, and the distribution of benefits and risks). |
| | | | Average monthly income per job type | Household surveys with fishing and seafood trading families<br>For Indonesia – SUSENAS socio-economic survey raw data<br>For Solomon Islands – HIES socio-economic survey raw data | |
| | | | Total wages from fishery per annum | Economic questionnaire | |
| | | | Fisheries dependence and alternative livelihoods | Household surveys with fishing and seafood trading families<br>For Indonesia – SUSENAS socio-economic survey raw data<br>For Solomon Islands – HIES socio-economic survey raw data | |
| | | | Poverty headcount ratio of fishing-dependent communities relative to provincial and national averages | Household surveys with fishing and seafood trading families<br>For Indonesia – SUSENAS socio-economic survey raw data<br>For Solomon Islands – HIES socio-economic survey raw data | |

| Domain of wellbeing | Operational objective | Subsection | Example indicators | Methods for collecting data on indicators | Disaggregation |
|---|---|---|---|---|---|
| **Economy** | To be determined by fisheries managers in consultation with stakeholders for specific fisheries | Employment and livelihoods | Remittances sent to home villages/towns | Household surveys with fishing and seafood trading families | Disaggregate to allow for both national and provincial-level analyses<br>Disaggregate by gear and vessel size<br>As appropriate, disaggregate to allow for analysis of contributions flowing to<br>- communities living below the poverty line<br>-men/women (gender analysis) across all fisheries.<br>- migrant/non-migrant workers in large-scale fisheries (role of labour migration in poverty alleviation)<br>- migrant/non-migrant communities in small-scale fisheries (role of migrant status in impacting participation, and the distribution of benefits and risks). |
| | | | Housing conditions | For Indonesia – SUSENAS socio-economic survey raw data<br>For Solomon Islands – HIES socio-economic survey raw data<br>Questionnaires and/or field observation with fishers, traders and workers where existing data insufficient | |
| | | | Asset ownership | For Indonesia – SUSENAS socio-economic survey raw data<br>For Solomon Islands – HIES socio-economic survey raw data<br>Questionnaires and/or field observation with fishers, traders and workers where existing data insufficient | |
| | | | Access to basic services – water, electricity | Household surveys with fishing and seafood trading families<br>For Indonesia – SUSENAS socio-economic surveys raw data<br>For Solomon Islands – HEIS socio-economic survey raw data | |
| | | | Levels of education of fishers/workers/employees | Household surveys with fishing and seafood trading families<br>For Indonesia – SUSENAS socio-economic survey raw data<br>For Solomon Islands – HEIS socio-economic survey raw data | |
| | | | % of household income spent on educational expenses | Household socio-economic surveys with fishing and trading families<br>For Indonesia – SUSENAS Konsumsi module socio-economic survey raw data<br>For Solomon Islands – HEIS socio-economic survey raw data | |
| | | | Opportunities for formal training through employment | Socio-economic questionnaire with fishers, traders, workers | |

| Domain of wellbeing | Operational objective | Subsection | Example indicators | Methods for collecting data on indicators | Disaggregation |
|---|---|---|---|---|---|
| **Economy** | To be determined by fisheries managers in consultation with stakeholders for specific fisheries | Working conditions | % of positions in formal/informal sectors | Questionnaires and/or field observation with fishers, traders and workers<br>Further references for indicators include International Labour Organisation (2012) and USAID Oceans (2018b). | Disaggregate to allow for both national and provincial-level analyses<br>Disaggregate by gear and vessel size<br>As appropriate, disaggregate to allow for analysis of contributions flowing to<br>- communities living below the poverty line<br>- men/women (gender analysis) across all fisheries.<br>- migrant/non-migrant workers in large-scale fisheries (role of labour migration in poverty alleviation)<br>- migrant/non-migrant communities in small-scale fisheries (role of migrant status in impacting participation, and the distribution of benefits and risks). |
| | | | % of vessels owner/operators | | |
| | | | Levels of debt for owner/operators | | |
| | | | Source of debt (bank, trader/patron, company, other) | | |
| | | | % of workers/crew received contract | | |
| | | | % of workers permanent, fixed-term/short-term/seasonal, casual. | | |
| | | | % of fishers on catch-share payments | | |
| | | | Wage as a % of relevant minimum wage | | |
| | | | Average working hours per day | | |
| | | | Average overtime | | |
| | | | % of workers under 18 | | |
| | | | Presence of hazard and risk assessments | | |
| | | | Presence of hazard and risk mitigation measures | | |
| | | | % of workers with health insurance or access to universal health care | | |
| | | | % of workers with pension fund payments | | |
| | | | Presence of a fishers/workers association | | |

| Domain of wellbeing | Operational objective | Subsection | Example indicators | Methods for collecting data on indicators | Disaggregation |
|---|---|---|---|---|---|
| **Food and nutrition security** | To be determined by fisheries managers in consultation with stakeholders for specific fisheries | Food supply | Total catch | Government production data from fishing and processing company reporting | Disaggregate to allow for both national and provincial-level analyses<br>Disaggregate by gear and vessel size<br>Disaggregate by species and product type (canned, fresh, smoked, etc) |
| | | | Percentage of production supplied to export markets, domestic markets, and informal market chains | Government production data from fishing and processing company reporting<br>Household surveys with fishing and seafood trading families where existing data insufficient (e.g. for small-scale fisheries, or informal market chains). | |
| | | Food consumption | Tuna consumption at community, provincial and national scales | Diet recall surveys<br>Household consumption surveys.<br>For Indonesia – SUSENAS Konsumsi module raw data. | Disaggregate to allow for both national and provincial-level analyses<br>Disaggregate to allow for both national and provincial-level analyses<br>Disaggregate by species and product type (canned, fresh, smoked, etc)<br>As appropriate, disaggregate to allow for analysis of contributions flowing to<br>- communities living below the poverty line<br>- men/women (gender analysis) across all fisheries.<br>- migrant/non-migrant workers in large-scale fisheries (role of labour migration in poverty alleviation)<br>- migrant/non-migrant communities in small-scale fisheries (role of migrant status in impacting participation, and the distribution of benefits and risks). |
| | | | Income from tuna sales spent on food | Household consumption surveys.<br>For Indonesia – SUSENAS Konsumsi module raw data. | |
| | | | % of baitfish catch used for consumption | Economic questionnaires<br>Household surveys in specific locations | |
| | | | Importance of tuna in local culture | Qualitative interviews and focus groups. May only require baseline study rather than ongoing monitoring. | |

| Domain of wellbeing | Operational objective | Subsection | Example indicators | Methods for collecting data on indicators | Disaggregation |
|---|---|---|---|---|---|
| **Environmentally sustainable fisheries** | To be determined by fisheries managers in consultation with stakeholders for specific fisheries | Government regulation | % of fleet operating legally and under effective management systems | Government data | Disaggregate to allow for both national and provincial-level analyses<br>Disaggregate by gear type where appropriate |
| | | | Community trust in government | Social questionnaire with community | |
| | | Industry | Involvement in environmental stewardship activities (including certification) | Qualitative interviews and focus groups<br>Socio-economic questionnaire with fishers, traders, companies | |
| | | | Community trust in industry | Social questionnaire with community | |
| | | Fishing communities | Environmental knowledge of fishers | Qualitative interviews and focus groups | |
| | | | Role of tuna in traditional life and perceptions of fishery change | Qualitative interviews and focus groups | |

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Correction:

This report was first made available online in November 2019. In May 2020 the report was updated, adjusting all references to Albert, Warren et al., (2014) to reflect the unpublished nature of this data. References were changed to Albert, Warren et al. (2014 [unpublished data]). Further information on the limitations of this data have also been added on p. 160 and p. 164. We wish to acknowledge Joelle Albert's willingness to allow us to cite this data and provide us with these clarifications, despite the initial oversight.

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