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Food Security in the Coral Triangle of the Pacific Countries: Prospects of Fisheries Development Strategies

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KEY POINTS

- Fisheries in the Coral Triangle of the Pacific countries are facing changing climatic conditions and ongoing environmental degradation, which threaten food security and livelihoods.
- The study identified the impacts of climate change on the fisheries sectors of Fiji, Solomon Islands, Timor-Leste, and Vanuatu, and evaluated the potential of three fisheries development strategies to improve food security.
- Modeling results indicated substantial economic gains and improved food security with the adoption of these strategies: aquaculture expansion, low-cost inshore fish-aggregating device utilization, and improved natural resources management (including marine-protected areas).
- The research findings can inform fisheries and conservation policy development that is tailored to each country's needs.

Based on the report prepared by Madan M. Dey, Mark W. Rosegrant, and Rowena A. Valmonte-Santos of the International Food Policy Research Institute, Washington, DC. The research was conducted under the ADB and Global Environment Facility initiative on Strengthening Coastal and Marine Resources Management in the Coral Triangle of the Pacific (Phase 2). For further details, visit the ADB website for the TA consultant's report (https://www.adb.org/projects/documents/ta-7753-prospects-adaptation-strategies-fisheries-sector-cc-pacific-coral-triangle-tacr). Also refer to http://blogs.adb.org/blog/securing-sustainable-fishing-pacific-coral-triangle-countries and http://ctknetwork.org/catch-of-the-week/securing-sustainable-fishing-in-the-pacific-coral-triangle-countries/.

INTRODUCTION

The health and livelihoods of rural communities, especially coastal communities that rely on fishing for subsistence and income, face serious risks. The ongoing degradation of coastal ecosystems, overharvesting of valuable species, and climate change (including more extreme weather events, rising sea levels, increasing sea surface temperatures, and ocean acidification) are lowering the production of fish, which is the region's primary source of protein.

In 2010, the Asian Development Bank (ADB) launched a regional technical assistance (TA) project in response to concerns raised by five Pacific developing member countries that lie within or on the border of the Coral Triangle—Fiji, Papua New Guinea, Solomon Islands, Timor-Leste, and Vanuatu (collectively called the Coral Triangle of the Pacific)—regarding management of their coastal and marine resources. The TA project aimed to help the countries address the urgent threats facing these resources and, at the same time, improve food security, in line with the objectives of the Coral Triangle Initiative on Coral Reefs, Fisheries and Food Security.[1]

As part of the project, from 2011 to 2013, the International Food Policy Research Institute conducted a research study on *Climate Change and Development Strategies for the Coastal Communities of the Pacific Coral Triangle Countries* in four countries—Fiji, Solomon Islands, Timor-Leste, and Vanuatu.[2] This brief presents the study's findings.

[1] ADB. 2010. *Technical Assistance for Strengthening Coastal and Marine Resources Management in the Coral Triangle of the Pacific (Phase 2)*. Manila (TA 7753-REG).
[2] Papua New Guinea was excluded due to the delay in inception activities and concerns about security.

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Seagrass farming in Atauro Island, Timor-Leste.

RESEARCH OBJECTIVE

The goal of the study was to assess the ability of three fisheries development strategies: aquaculture expansion, low-cost inshore fish-aggregating device (FAD)[3] utilization, and improved natural resources management (NRM), to address the growing food security concerns in these four countries in the face of climate change.

RESEARCH METHOD

The research followed three main steps, followed by a policy review and a qualitative assessment. Because the methodology was designed to overcome limitations in the data, it may be useful to other small island developing states facing similar information gaps.

1. Develop the baseline models. Recognizing the limited science on fisheries and biological/physical responses to climate change in the countries studied, this study developed and used a market fish supply–demand model.[4]

Each country's baseline model included data on fish production (a function of prices and supply shifters like technology and climate change) and consumption (a function of prices, income growth, and population growth); income growth; prices; technological change; and climate change. All domestic fisheries (not catch by foreign fishing fleets) were included and grouped into subsectors. The analysis considered three time periods: current, medium term (2035), and long term (2050).

2. Collect and construct data sets. Baseline data on demand, supply, and prices for fish types were collected from secondary sources and surveys of local markets, while estimates of demand and supply elasticity (responsiveness to changes in prices) were developed through expert opinion surveys and focus group discussions.[5]

3. Analyze the impacts of fisheries development strategies. The three fisheries development strategies and estimates of their impacts were identified through stakeholder discussions, expert opinion surveys, and focus group discussions. The strategies were then run through each country model so that their impacts could be compared with the baseline scenarios and with each other.

FINDINGS

Fisheries under baseline conditions to 2050—more demand and less supply

Under baseline conditions, it is likely that, across all four countries, the **demand for fish and seafood will increase substantially** due to rising per capita income and population, **while coastal fish supply will likely decrease** due to the ongoing degradation of the marine environment and the impacts of climate change. This will most impact subsistence and small-scale fishers and their communities that rely on coastal fisheries for food and income. Other likely scenarios show key differences between the four countries (mainly due to the prevailing fish trade regimes in different countries, the relative importance of various sectors in fish production and consumption, and the behaviors of producers and consumers).

The supply of tuna and other oceanic fish from the domestic fishing industry will increase over time in Fiji and Vanuatu, but will remain about the same in Solomon Islands and decrease over time in Timor-Leste. The reason is that, in the future, concentrations of skipjack and bigeye tuna are likely to move further into the eastern Pacific Ocean because of climate change, while the biomass of adult tuna will decrease in the west and central Pacific Ocean.[6]

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3 A FAD is a permanent, semipermanent, or temporary structure or device made from any material and used to lure fish. See http://www.fao.org/fishery/equipment/fad/en.

4 Details of the methodology applied in this study are discussed in M. M. Dey, M. W. Rosegrant, K. Gosh, O. L. Chen, and R. A. Valmonte-Santos. 2016. Analysis of the Economic Impact of Climate Change and Climate Change Adaptation Strategies for Fisheries Sector in Pacific Coral Triangle Countries: Model, Estimation Strategy, and Baseline Results. *Marine Policy*. 67. pp. 156–163. http://dx.doi.org/10.1016/j.marpol.2015.12.011.

5 The respondents from the surveys and focus group discussions were members of selected fishing communities (fishers and fish farmers) and local markets in Suva and Ra Province in Fiji; Honiara and Isabel province in Solomon Islands; Dili, Atauro Island, and Liquica district in Timor-Leste; and Port Vila, Siviri, and Espiritu Santo Islands in Vanuatu; village/district/provincial and national governments; academia; nongovernment organizations; regional and international research agencies; and local climate change, economic, fisheries, and environmental experts.

6 The model used conservative estimates of the impacts of climate change on tuna catch, using the Spatial Ecosystem and Population Dynamics Model as a reference. (For details of the Spatial Ecosystem and Population Dynamics Model, see http://www.spc.int/OceanFish/en/ofpsection/ema/ecosystem-a-multispecies-modelling/seapodym/148-seapodym). Projections used in the model are within sustainable limits.

Pilot field test tilapia pond in Napauk village, Luganville district, Sanma province, Santo Island, Vanuatu.

The real prices of different fish groups are expected to increase over time in Vanuatu, but for other countries the real prices, except that of tuna in Fiji and that of coastal finfish in Timor-Leste, are likely to be held in check due to increased imports.

Per capita consumption of domestically produced fish will likely decrease. Over time, fish exports from the four countries are expected to decrease and fish imports are expected to increase. This will lead to a decline in per capita consumption of domestically produced fish, which has serious negative food security implications for these countries.

Fiji and Solomon Islands may become net importers of fish, with domestic demand (due to population growth and high per capita incomes) likely to surpass domestic supply. In many Pacific island countries, domestic prices of some fish species are higher than their world market prices. There is a risk that foreign countries that are able to produce fisheries and aquaculture products more efficiently may take advantage of this situation of higher fish prices and export their cheaper seafood products to the Pacific islands.

Fisheries development strategies: country-specific positive impacts

Small-scale and subsistence fishers will most benefit from improved natural resources management. Across the four countries, improved NRM (such as MPAs and locally managed marine areas) will increase coastal fish production (or halt its decline) and reduce coastal fish prices (or halt its increase). This will benefit small-scale and subsistence fisheries, rural communities, and poorer households who depend on coastal fisheries for their food supply and livelihoods. NRM is likely to have the highest positive impact in Fiji. This is because NRM will halt the decline in coastal fisheries, further expand production of oceanic fisheries, and provide a net economic gain higher than aquaculture alone.

Focus group discussions with different stakeholders in Namuaimada village, Navolau district, Ra province, Fiji.

Communities in the Coral Triangle of the Pacific countries already feel the impacts of food insecurity.

Focus group discussions revealed that fishers are finding it difficult to catch enough fish from coastal areas, even though they are spending more time fishing. They are losing income due to being unable to fish during cyclones, and are further constrained by being unable to access fish in deeper waters due to their traditional fishing gear and boat capacity. Vegetable gardens are being destroyed by cyclones and flooding and, when food is available, it is difficult to access because of floods or lack of transportation.

Food insecurity is also affecting community health and children's education. Participants reported that (i) the health of family members is poor as a result of insufficient food, imbalanced diets, and deteriorating hygiene; (ii) dependence on traditional medication is rising as money usually spent on medicines is being spent on food; and (iii) spending money on children's education is of lower priority compared with food nutrition and security. Fishers are also now spending less time with their families because they need to spend more time fishing.

Aquaculture development will contribute to food security, enhanced livelihoods, and foreign exchange earnings. While, generally, it is unlikely that aquaculture alone could meet the growing demand for fish in these countries, the model found that aquaculture is likely to have a high positive impact in Vanuatu. For Timor-Leste, aquaculture is expected to affect freshwater supply substantially (about a 150% increase in 2050 from a low base value). Aquaculture development will have a significant positive impact on the country's fish consumption because the real price of freshwater fish is expected to decrease over time given its high supply.

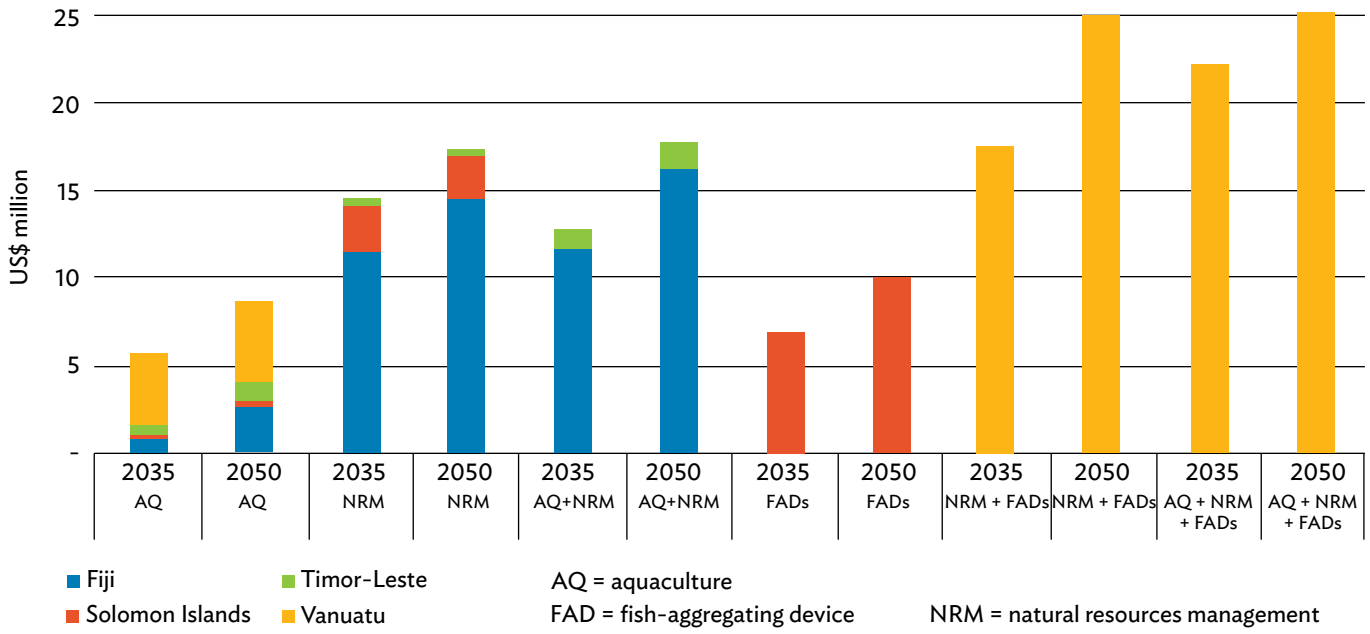
Deployment of low-cost inshore fish-aggregating devices is likely to have the highest positive impact on oceanic fish supply in Solomon Islands, decreasing the price of tuna and substantially enhancing the country's food security. Low-cost inshore FADs are accessible to subsistence and small-scale fishers, thereby increasing the domestic production of oceanic fish.

Returns on investments of fisheries development strategies are very high. The economic welfare analysis, conducted based on modeling results, show that the national net economic gains due to these strategies are substantial. In most cases, the yearly net benefit is more than 10–20-fold higher than the required annual investment cost. For example, the estimated yearly net economic gain from investment in NRM in Fiji is about 100 times of the annual investment cost and, in Solomon Islands, a yearly investment of about $230,000 on FADs is projected to generate an annual income of more than $5 million in 2035.

For each country, the following strategies show the highest returns on investment in 2050:

- Fiji: aquaculture plus NRM, followed by NRM
- Solomon Islands: FADs
- Vanuatu: aquaculture plus NRM plus FADs
- Timor-Leste: aquaculture, followed by NRM

Figure 1: National Level Economic Gains Resulting from Climate Change Adaptation Strategies, 2035 and 2050



Source: International Food Policy Research Institute. 2016. *Prospects and Adaptation Strategies for the Fisheries Sector under Climate Change in Pacific Coral Triangle Countries.* Washington, DC.

CONCLUSIONS

With rising population and incomes, the demand for fish is expected to increase substantially by 2050, while domestic fish supply is projected to slow due to climate change, environmental degradation, and other constraints. Under current conditions, Fiji, Timor-Leste, Solomon Islands, and Vanuatu will suffer fragile food security conditions in the future. Increasing the domestic supply of fish in these countries will require reversing the negative trends of coastal fisheries and increasing the supply from oceanic and freshwater systems.

The study showed that the impacts on food security of each fisheries development strategy are generally positive and significant, but differ between fisheries, ecosystems, and countries. It also showed that current use of the strategies is too small to have meaningful impacts on food security in the future. To upscale strategy use, it will be important to understand the specific enabling conditions needed in each country, and at what level each strategy would be optimal for food security and sustainable in the long term.

A number of other actions were highlighted in the study that could help to improve food security from the fisheries sector and that warrant further consideration. These actions include providing better processing, storage, and transport infrastructure in some countries, and creating better domestic access to the tuna supply that is expected to increase with climate change.

ADB's response. ADB's regional technical assistance project continues to assist the Coral Triangle of the Pacific countries to introduce more effective management of coastal and marine resources, especially those associated with coral reef ecosystems. This is to maintain their productivity over a longer period of time, while building their resilience to climate change impacts and human-induced environmental threats. The project has supported capacity-building activities on integrated coastal resources management, including on legal and policy reforms.

For instance, in Solomon Islands, the project facilitated the development and approval of the Malaita Provincial Fisheries Ordinance. Gazetted in May 2015, the ordinance sets rules for fisheries management and development in Malaita, including a permits system, development of community fisheries management plans, and enforcement. It provides for the establishment of a Fisheries Advisory Committee to guide the provincial government on implementation of the ordinance. The project also facilitated the establishment of two MPAs in Atauro and Batugade in Timor-Leste. Their boundaries, setting up of an aquatic natural reserve, and regulating their management are covered in a ministerial diploma issued by the Ministry of Agriculture and Fisheries in February 2015.

Climate change adaptation for resilience-building has been emphasized through the implementation of project activities. The application of fish-aggregating devices, development of community-based resource management plans, and effective management of MPAs are central in the ongoing implementation of activities under the project.

FIJI CASE STUDY

Fiji's fisheries sector contributes to both the country's food security and gross domestic product. Fisheries can be grouped into six main types: coastal subsistence fishing, coastal commercial fishing, offshore locally based fishing, offshore foreign-based fishing, freshwater fishing, and aquaculture. Fish production and value are highest in the coastal areas, and small-scale and subsistence fishers are heavily dependent on the coastal fisheries for food and income. In 2000–2008, about 1.7% of the total gross domestic product was supported by the fisheries sector (Gillett 2009; and Ahmed et al 2011).

Fisheries development strategies in Fiji include NRM practices (e.g., MPAs, locally managed marine areas, and the ridge-to-reef concept); alternative livelihood development; enforcement of fisheries regulations; low-cost inshore FADs; and aquaculture. The model considered three scenarios: (1) aquaculture, (2) NRM (specifically MPAs, locally managed marine areas, and FADs), and (3) a combination of aquaculture and NRM.

What is going to happen to Fiji's fisheries under baseline conditions?

The model projects the following likely situations to 2050:

- Overall, domestic production will grow at a negligible rate, while domestic demand will rise (with higher-income growth being accompanied by a higher rise in demand).
- Oceanic production will grow to some extent and supply from freshwater areas will expand substantially, though its share will remain small.
- Coastal production will decline over time due to climate change and other impacts, while the demand for coastal fish will increase further. This has serious food security implications, given that poorer households mostly rely on coastal finfish for their fish consumption needs.

Can fisheries development strategies help to improve food security?

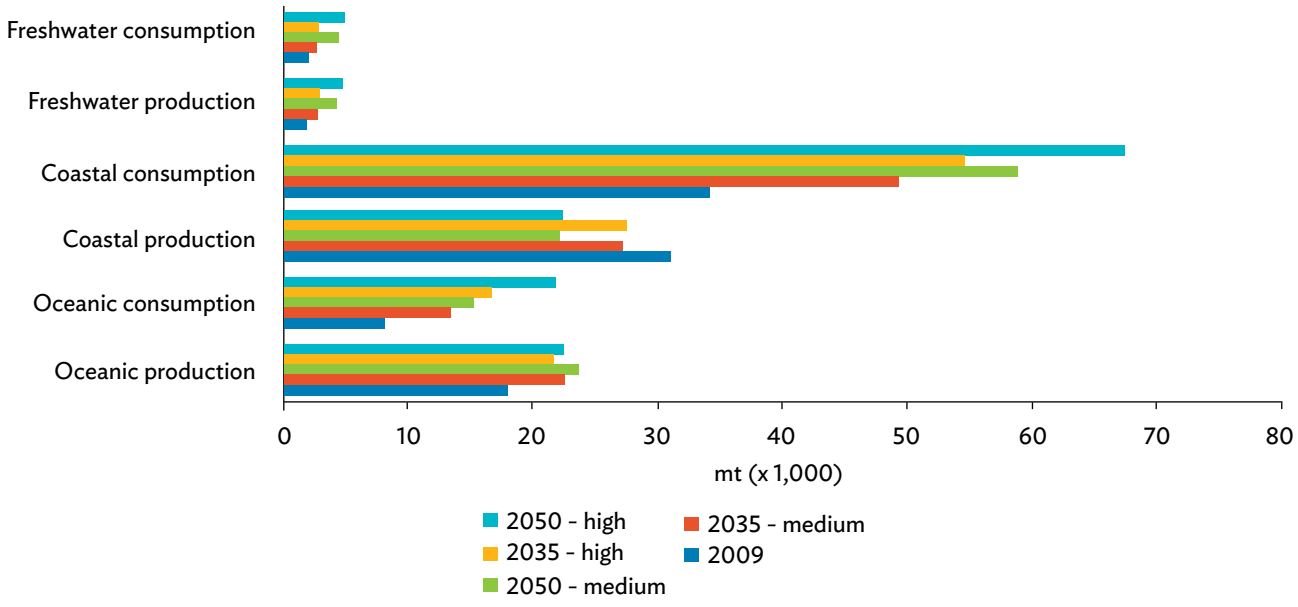
Yes. The model showed the following scenarios are likely with the fisheries development strategies:

- Prices of freshwater finfish and freshwater invertebrates are projected to decrease with the adoption of aquaculture technologies. Given that most of the freshwater production is for domestic consumption, this is likely to improve food security.
- The adoption of various NRM strategies (such as MPAs) is expected to halt production declines in coastal fisheries, and to further expand the production of oceanic fisheries. This is important for food security because small-scale and subsistence fishers depend on these coastal fisheries.

What other impacts might the fisheries development strategies have?

- Indirectly, increased income from aquaculture will increase tuna catch, resulting in higher prices and market demand for tuna and other oceanic fish.
- The adoption of NRM adaptation strategies will reduce Fiji's import of fish/seafood substantially, which will likely reduce the burden on foreign exchange.
- The national level economic gains from the adoption of the strategies will be substantial. They were calculated annually at $2.6 million for aquaculture, $14.5 million for NRM, and $16.2 million for aquaculture plus NRM (in 2009 US dollars constant price) in 2050.

Figure F-1: Projected Production and Consumption of Different Fish Groups in Fiji for 2035 and 2050 Under Two Baseline Scenarios, with 1% and 2% Annual Growth Rates of Real Per Capita Income.



Source: International Food Policy Research Institute. 2016. *Prospects and Adaptation Strategies for the Fisheries Sector under Climate Change in Pacific Coral Triangle Countries.* Washington, DC.

SOLOMON ISLANDS CASE STUDY

Fisheries resources play a major role in the national economy and to food security in Solomon Islands. There are four broad categories of fisheries: industrial offshore capture (foreign-based and locally or domestic-based), coastal capture (subsistence and commercial), freshwater capture, and aquaculture. Foreign fleets dominate offshore capture fisheries, and their catches are primarily for export markets. Coastal capture fisheries are the most important source of fish supply for domestic consumption in the country, and coastal subsistence fisheries are integral to food security and livelihood of the rural population of Solomon Islands. Solomon Islands is currently implementing three main fisheries development strategies, and they were considered in the models as follows: (1) aquaculture; (2) NRM approaches, particularly MPAs; and (3) low-cost inshore FADs.

What is going to happen to Solomon Island's fisheries under baseline conditions?

The model projects the following likely situations to 2050:

- Overall, the domestic supply of fish will increase marginally. There will be some increase in supply from oceanic and freshwater systems, but supply from coastal fisheries (most important for domestic consumption and for subsistence fishers) is likely to decrease over time, resulting in reduced food security.
- Demand for different types of fish will increase as a result of an increase in population and incomes, and a major part of this increased demand will be for oceanic species such as tuna.
- Total demand is likely to surpass total domestic fish production. If Solomon Islands cannot catch more oceanic fish than otherwise harvested by foreign vessels, the country may have to import fish in large volumes to meet the projected demand.

Can fisheries development strategies help to improve food security?

Yes. The use of low-cost inshore FADs, in particular, is expected to significantly enhance the country's fisheries economy and food security. The model found that employing these FADs will decrease the real price of tuna in 2035 and 2050 and, even with higher growth in per capita income, reduce tuna prices by 2050. This is important given the high contribution of tuna to fish and seafood consumption in Solomon Islands.

Low-cost inshore FADs are also expected to significantly reduce the country's likely dependence on fish imports, as are NRM strategies because of their positive effect on production. The role of FADs will be even more important if the country's per capita real income rises at a faster rate.

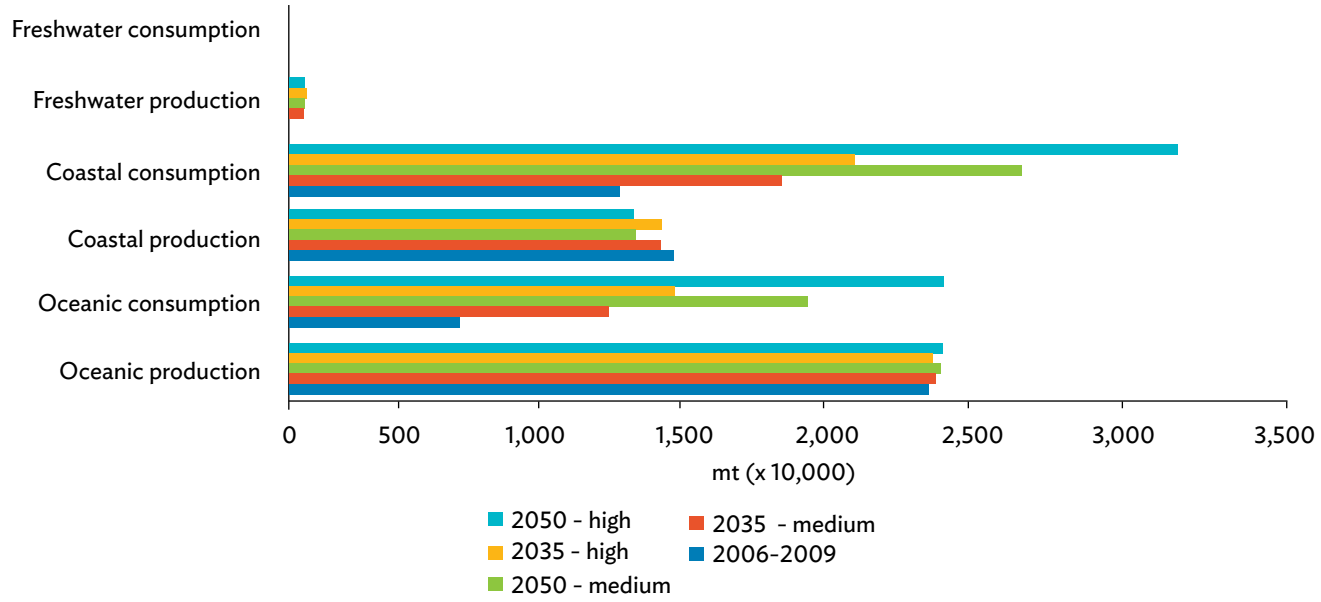
The model also projects that the adoption of NRM strategies will likely have a positive impact on coastal fish supply, and will halt the rise of coastal finfish prices. However, FADs may have a negative impact on coastal fish supply because of the substitution effect between coastal and ocean fish species. This would negatively affect subsistence fishers.

Aquaculture development will also reduce the real price of coastal invertebrates, and increase consumption of freshwater fish in 2035 and 2050. This impact will increase over time with income.

What other impacts might the fisheries development strategies have?

The national level net economic gains from the strategies will be substantial. They were calculated annually at $0.37 million for aquaculture, $10.08 million for FADs, and $2.57 million for NRM strategies (in 2009 US dollars constant price) in 2050.

Figure S-1: Projected Production and Consumption of Different Fish Groups in Solomon Islands for 2035 and 2050 Under Two Baseline Scenarios, with 2% and 3% Annual Growth Rates of Real Per Capita Income



Source: International Food Policy Research Institute. 2016. *Prospects and Adaptation Strategies for the Fisheries Sector under Climate Change in Pacific Coral Triangle Countries.* Washington, DC.

TIMOR-LESTE CASE STUDY

Information on the fisheries sector of Timor-Leste is very limited as the country only gained its independence in 2002 and, prior to this, most information and data were highly aggregated from Indonesia. As such, assessing Timor-Leste's fisheries sector is difficult.

Unlike Fiji, Solomon Islands, and Vanuatu, Timor-Leste has only two islands and a smaller exclusive economic zone of 72,000 square kilometers. The country's most dominant fish category is coastal fisheries for small-scale fishing activities, due to the absence of domestic commercial fishing vessels exploring offshore fishing grounds. In 2008, Timor-Leste's fisheries sector employed 7,600 people. The model considered three fisheries development strategies: (1) aquaculture, (2) NRM with emphasis on MPA, and (3) a combination of aquaculture plus NRM.

What is going to happen to Timor-Leste's fisheries under baseline conditions?

The model projects the following likely situations to 2050:

- Total fish production will increase only marginally, while total fish demand will rise substantially due to growth in population and incomes. This implies that the country will have to import more fish to fill this increasing deficit in domestic fish supply.
- Fish supplies from oceanic and coastal ecosystems are likely to decrease during 2010–2050. Only freshwater ecosystems will be able to supply more fish in the future. Given that oceanic and coastal fisheries supply about 94% of current fish consumption in Timor-Leste, this projected fish supply scenario has serious food security implications for the country.

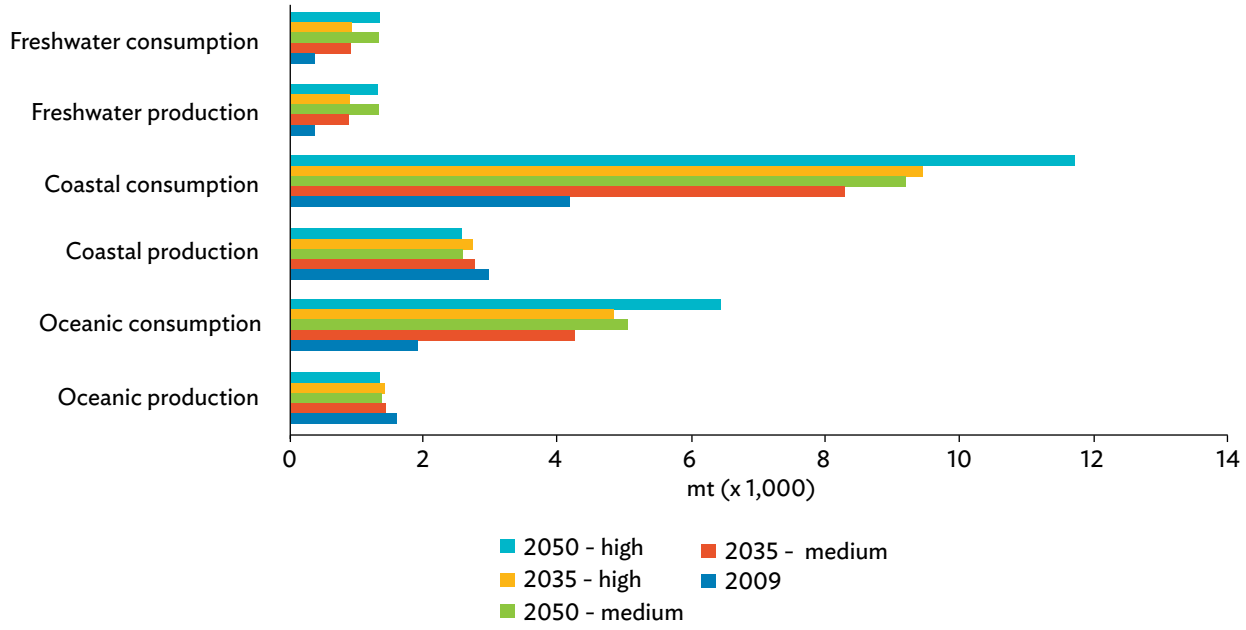
Can fisheries development strategies help to improve food security?

- NRM is likely to increase coastal and freshwater fish production, and the aquaculture development strategy is expected to increase freshwater fish production by about 100% in 2035 and by about 150% in 2050.
- Aquaculture development is expected to reduce the real price of freshwater fish, but raise the real price of other fish categories, mainly because of the higher incomes associated with aquaculture development.
- Aquaculture growth will increase income, resulting in higher demand for coastal fish and seafood and lower demand for freshwater fish. These effects together may neutralize some positive impacts of the combined aquaculture plus NRM strategy on freshwater production. Given that the freshwater ecosystem supplies fish for domestic consumption only, the aquaculture plus NRM strategy may not have any additive effect on freshwater fish consumption.
- Only aquaculture development will have any significant and positive impact on fish consumption in Timor-Leste, mainly through increased consumption of freshwater fish. The NRM strategy is not expected to have a significant impact on fish consumption in the country, but rather will reduce fish imports.

What other impacts might the fisheries development strategies have?

Estimated national-level annual economic gains resulting from the strategies will range from $0.4 million from NRM, $1.2 million from aquaculture, and $1.6 million from aquaculture plus NRM (in 2009 US dollars constant price) in 2050.

Figure T-1: Projected Production and Consumption of Fish Groups in Fiji for 2035 and 2050 Under Two Baseline Scenarios, with 2% and 3% Annual Growth Rates of Real Per Capita Income



Source: International Food Policy Research Institute (IFPRI). 2016. *Prospects and Adaptation Strategies for the Fisheries Sector under Climate Change in Pacific Coral Triangle Countries.* Washington, DC.

VANUATU CASE STUDY

Among the Melanesian countries, Vanuatu has the smallest total water area and exclusive economic zone. Vanuatu's fisheries can be grouped into coastal commercial fisheries, coastal subsistence fisheries, offshore foreign-based fisheries, offshore locally based or domestic fisheries, freshwater fisheries, and aquaculture. The highest-value fish harvest in Vanuatu is in coastal subsistence fisheries. Coastal finfish and tuna are the two most important sources of fish and seafood in Vanuatu, contributing ~77% of current consumption, and ~72% of the country's rural households involved in some form of fishing.

Vanuatu has adopted coastal and freshwater aquaculture (coastal and freshwater); NRM (ridge-to-reef, regulations, MPAs); and low-cost inshore FADs. The model considered (1) NRM plus FADs, and (2) aquaculture.

What is going to happen to Vanuatu's fisheries under baseline conditions?

The model projects the following likely situations to 2050:

- Production of oceanic fish is expected to increase, but production of coastal fish is projected to decline. Given that many of the poorer households rely on coastal fisheries for their consumption needs, this likely scenario has serious food security implications.
- Though the consumption of oceanic fish is expected to rise at a faster rate than any other sector, the oceanic fisheries sector will continue to be a net exporter. With growth in population and income, oceanic fish demand may increase by ~5 times in 2050.
- Vanuatu will have to import coastal fish to meet the increasing demand from population and income growth. Demand for freshwater fish will also exceed domestic production.
- Total fish consumption will rise substantially, but the country will remain a net exporter by 2050.

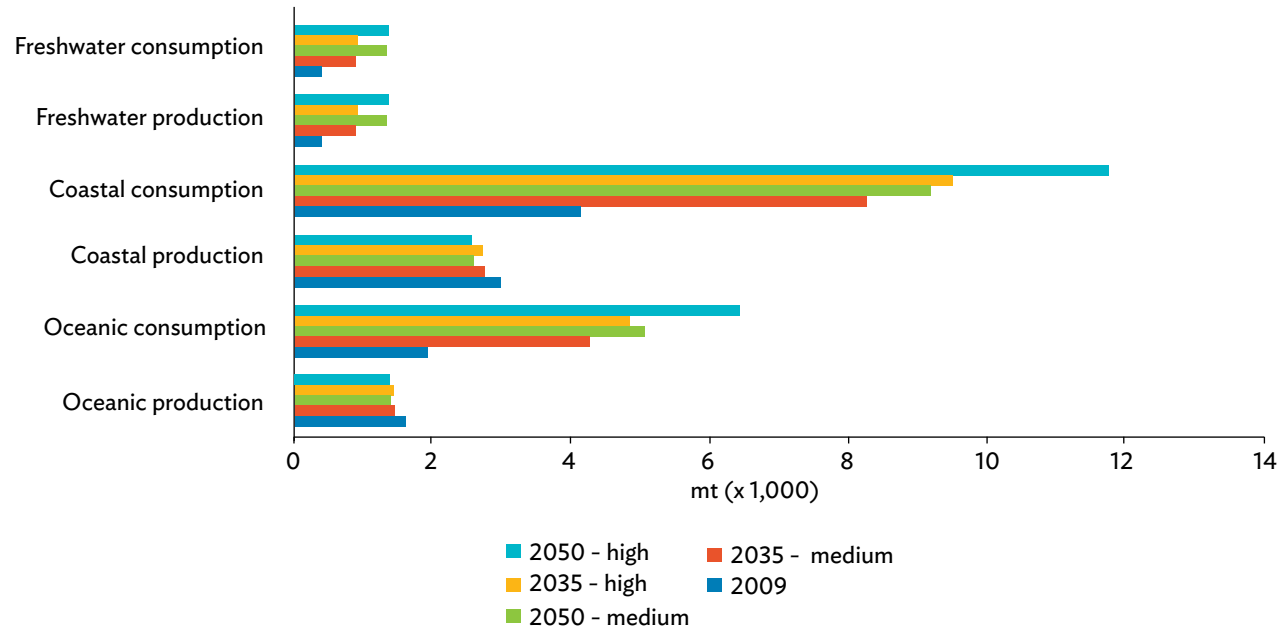
Can fisheries development strategies help to improve food security?

Yes. The model showed that the adoption of NRM strategies and low-cost inshore FADs together would decrease the prices of tuna, coastal finfish, coastal invertebrates, and freshwater finfish in 2035. Coastal finfish and tuna are the two most important sources of fish and seafood in Vanuatu and, because coastal finfish is widely consumed by Vanuatu's poorer households, this strategy is likely to have a positive impact on these consumers. This strategy will also increase demand for all categories of fish in 2050, and increase consumption through expected reductions in the real price of these fish categories. However, with its current pace of implementation, it will not be able to halt the rise of fish prices in 2050. Aquaculture development would also provide higher incomes, leading to increased demand for tuna and other oceanic fish.

What other impacts might the fisheries development strategies have?

- Adoption of low-cost inshore FADs plus NRM will have the highest positive impact on oceanic fish, increasing supply by about 19%–20% in 2050.
- The national level economic gains from the adoption of the strategies will be substantial. They were calculated annually at $4.5 million for aquaculture, $35 million for FADs plus NRM, and $38 million for all three (in 2009 US dollars constant price) in 2050.

Figure V-1: Projected Production and Consumption of Different Fish Groups in Vanuatu for 2035 and 2050 Under Two Baseline Scenarios, with 2% and 3% Annual Growth Rates of Real Per Capita Income



Source: International Food Policy Research Institute. 2016. *Prospects and Adaptation Strategies for the Fisheries Sector under Climate Change in Pacific Coral Triangle Countries.* Washington, DC.

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