

Pacific fisheries: Winners and losers identified in new climate change book¹

By Toss Gascoigne



Pacific Island nations are under significant pressure to sustain their fish resources and maintain a vital source of food. Now, climate change poses a fresh challenge. A new book, “Vulnerability of tropical Pacific fisheries and aquaculture to climate change”, claims there will be winners and losers from climate change, and the way Pacific governments react and adapt is vital to determining the end result.

The book, published by SPC,² was launched at the Conference of the Pacific Community in Noumea in November 2011 by James Batley, Deputy Director-General of the Australian Agency for International Development.

At 900 pages long, the book incorporates the contributions of 88 scientists from 36 institutions and is, according to Dr Jimmie Rodgers, SPC’s Director-General, “the most comprehensive and up-to-date analysis yet on the likely impacts of climate change on Pacific fisheries and aquaculture and the ecosystems that underpin these activities”.

Lead editor Dr Johann Bell, a Principal Fisheries Scientist at SPC, said that the book contains an analysis of the effects of projected changes to surface climate and the ocean on fish habitats, fish stocks and aquaculture.

The book also has a chapter on the implications for economic development, government revenue, food security and livelihoods, and another chapter on adaptations and policies to reduce the threats and capitalize on opportunities.

Dr Bell said the writing team has prepared a summary for each Pacific Island country and territory that sets out the ways that fishing communities and enterprises are

expected to be affected, and lists the most appropriate local adaptations and supporting policies.

The effects on fisheries fall into five main areas.

Changes in the distribution and abundance of tuna

Alterations in ocean temperatures and currents, and the nutrients at the base of food webs in the open ocean (made up of plankton, small fish, squid, and other organisms), are expected to affect the distribution and abundance of tuna species.

Skipjack, yellowfin and bigeye tunas are likely to move farther east. This has implications for how much fish is caught around each Pacific Island nation, and the supply of fish to canneries in Papua New Guinea, Solomon Islands and Fiji.

It will also affect the amount of government revenue that some smaller nations receive from access fees paid by distant-water fishing nations. Countries such as Kiribati, Nauru and Tuvalu, whose governments already depend heavily on these fees, are expected to benefit. More tuna in their exclusive economic zones (EEZs) is likely to result in more licence fees.

¹ This article appeared in the December 2011 issue of *Islands Business*.

² Available from SPC website at: <http://www.spc.int/climate-change/fisheries/assessment/>

Decline in coastal fisheries and coral reefs

Because many species of coastal fish in the tropical Pacific are already living very close to their upper temperature limits, they will have to move to cooler waters as sea surface temperatures rise.

Even where coastal fish species can tolerate rises in sea temperature, many of them will struggle because the coral reefs they depend on will be degraded by ocean acidification and increased bleaching due to higher water temperatures. Overall, the production of reef-associated fish in the tropical Pacific could decline by 20% by 2050 and by up to 50% by 2100 if high emissions of carbon dioxide continue.

According to Dr Bell, “The losers include people who continue to depend on coastal fisheries. They will have to find additional sources of food. Higher sea surface temperatures, ocean acidification, and loss of important habitats like coral reefs, seagrass beds, mangroves and intertidal flats are expected to have a dramatic impact on the fish and shellfish that support many coastal communities.”

Increases in freshwater fisheries production

Higher projected rainfall in the tropics will increase the area of fish habitat on the floodplains of large rivers in Papua New Guinea. Increased air temperatures are also expected to have positive effects on the growth rates of many freshwater fish.

Effects on aquaculture

The long-term effects of climate change on aquaculture are likely to be mixed.

Higher water temperatures, sea level rise, ocean acidification, reduced salinity and increased disease risk could eventually affect growth and survival of shrimp, pearl oysters, seaweed and ornamental species cultured for the aquarium trade.

On the other hand, increased rainfall and higher air temperatures should increase the number of places where freshwater fish can be grown in ponds, and the growth rates of these fish.

Increased operating costs

The possibility that cyclones could be stronger increases the risk of damage to shore-based facilities (wharfs, jetties), domestic tuna fishing fleets and processing plants. Fleets operating within the cyclone belt may need to be upgraded. Rising sea level may eventually make many existing wharfs and shore-based facilities unusable.



*Louisiade Archipelago, Papua New Guinea
(Image: Christophe Launay)*

Dr Brian Dawson, SPC’s Senior Climate Change Adviser, said scientists have a reasonably good idea about where climate change is heading, and what the potential impacts will be, but the changes may not turn out exactly as expected, so we need to adjust to circumstances.

“There’s a range of adaptations that can substantially reduce the risks and costs, but they need to be tailored to the circumstances. Adaptation is a flexible, not a static concept.” He said planning for change is vital, because fish is the single biggest source of animal protein in Pacific Islanders’ diet. Smaller atoll countries are particularly dependent on fish to meet their daily protein requirements. Exports of fish products, particularly tuna, also provide a large income flow. Anything that reduces those export incomes is going to undermine the ability of Pacific Island countries and territories to meet their development aspirations.

“The important thing is that there are opportunities for reducing the risks and our vulnerability. Some of these are: managing the coastal zone to protect fish habitats, looking at how to include a greater proportion of tuna into Pacific diets to fill the gap between the fish required for good nutrition and the catches available from coral reefs, and developing freshwater pond aquaculture,” he said.

The average annual consumption of fish by rural coastal populations in the tropical Pacific ranges from 30 kg to more than 100 kg per person. Even in urban centres, fish consumption usually greatly exceeds the global average of 16–18 kg per person per year.

Dr Bell said that scientists are seriously concerned about the capacity of coastal fisheries to supply the fish needed for food security.

“Another 115,000 tonnes of fish will be needed to help provide good nutrition for the expanding population of the region by 2030. That’s an increase of 47%,” he said.

And Dr Jimmie Rodgers added, “The reality is that there will be countries in the Pacific with bigger populations and fewer fish to eat. We ignore the book at our peril because it comes up with sound scientific analyses, hard-hitting key messages and policy options. It gives Pacific leaders the opportunity to look 20 years ahead and plan for the future,” he said.

“Vulnerability of tropical Pacific fisheries and aquaculture to climate change” contains a comprehensive list of win-win adaptations to address the pressures facing fisheries now, and the threats and opportunities associated with climate change. These recommended adaptations fall into three broad areas. The following examples indicate the sort of actions required.

1. Adaptations for economic development and government revenue

- Fully implement the vessel day scheme, which allows fleets to follow the tuna into the EEZs of Pacific Island countries as climatic conditions change.
- Diversify sources of tuna to supply canneries in Papua New Guinea, Solomon Islands and Fiji when fish are not so abundant in the EEZs of these countries.
- Conduct energy audits to improve the efficiency of vessels and reduce the carbon footprint of fishing operations.

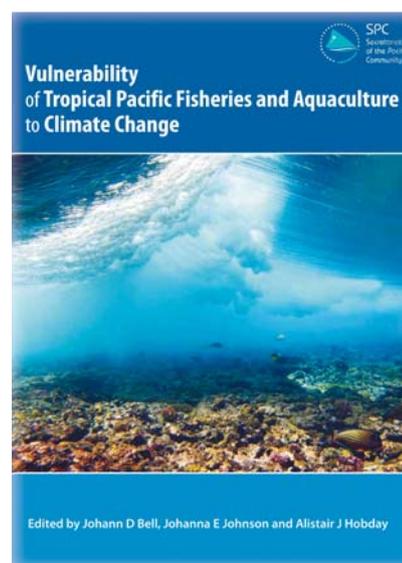
2. Adaptations for maintaining the contribution of fish to food security

- Restore vegetation in river catchments to prevent sediments and nutrients from entering coastal waters and putting coastal fish habitats (coral reefs, mangroves, seagrasses) under stress.
- Install fish aggregating devices to attract tuna closer to shore and make them easier for coastal fishing communities to catch.
- Develop freshwater pond aquaculture for the large inland populations of Papua New Guinea.

3. Adaptations for maximizing sustainable livelihoods

- Improve technical and business skills of Pacific Island communities through training in fishing and farming techniques, and provide access to micro-credit.
- Rebuild stocks of high-value export commodities (sea cucumbers and trochus).
- Develop coral reef ecotourism ventures as an alternative to deriving income from catching and selling fish.

Dr Jimmie Rodgers said that Pacific Island countries and territories can work on putting legislative and legal measures in place to help protect future generations. “I think those are some of the tangible things that we can work towards,” he said. “The challenge is not to plan only for today’s generations, but to use the information that we have at hand and then ask the question: What kind of Pacific do we want to see in 20 years?”



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