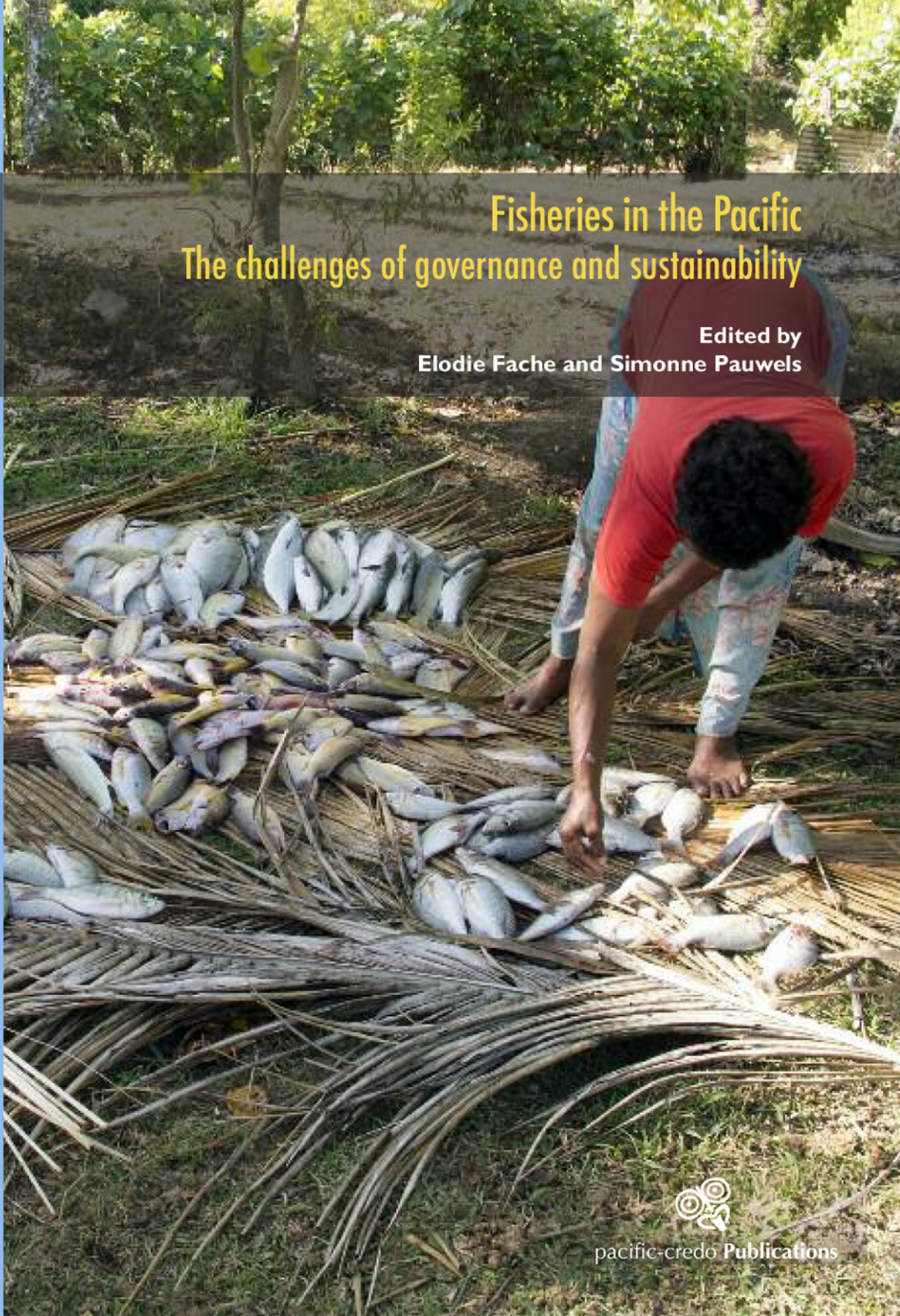


Cahiers du Credo

Fisheries in the Pacific

The challenges of governance and sustainability

Edited by
Elodie Fache and Simonne Pauwels



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Policy options for coastal and tuna fisheries in the Pacific Islands: sustaining resources on the same side of the same coin

Joeli VEITAYAKI, Esaroma LEDUA

Introduction

Coastal and tuna fisheries in the Pacific Ocean feed Pacific Islanders and supply global markets, which are the biggest sources of foreign exchange for some of the Small Island Developing States (SIDS) in the region (Pacific SIDS). This makes the health and sustainable use of these resources critical both for the countries holding the solemn responsibility of managing their fisheries resources and for the rest of humanity, which relies on fish catches in Pacific waters. In other words, the future of Pacific SIDS, or their preferred new grouping, Large Ocean Island States (LOIS), depends on the sustainable development of their fisheries resources. Pacific SIDS and their people thus must work individually, collectively and collaboratively to assure the sustainability of these resources, which are important for their national development and global markets. The sustainable development of these resources requires innovation, dedication and commitment from all stakeholders, including governments, regional and subregional organizations, private sector companies, the communities that own these fisheries and the multitudes with whom they share their bountiful food resources.

Coastal and tuna fisheries are two of the main economic sectors in Pacific SIDS. Although characteristically distinct, the two sectors are ecologically interrelated and are on the same side of the same coin. Tuna resources therefore cannot be seen as a convenient solution for depleted coastal fisheries, although this was attempted by Fiji between 1986 and 1990 under its Development Plan 9 (Fiji's Central Planning Office 1985). Under this plan, the Fiji government promoted the movement of surplus coastal fishers into offshore fisheries to facilitate the recovery of the overextended coastal fisheries. At the time, tuna, deepwater snapper and coastal pelagic fisheries were identified as new fisheries that would help Fiji achieve the objectives of Development Plan 9. The Food and Agriculture Organization (FAO) of the United Nations assisted Fiji in the design of a 28-footer fishing vessel and the Japanese government provided inboard engines for these vessels. However, the continuous reduction in snapper catch levels in near coastal areas made the operation of these vessels economically challenging. Some of the fishers who survived the snapper fishing converted into tuna fishing and became pioneers of the fresh tuna

sashimi long-line fishery in Fiji in the early 1990s. In 1995, the total allowable catch for tuna in Fiji was set at 7,500 metric tonnes per annum, but this was increased to 15,000 metric tonnes per annum in 2001 (Amoe 2006; Tavaga 2012), showing Fiji's intention to increase tuna fishing.

There is serious concern about the sustainability of tuna fisheries in countries such as Fiji given the mismatch between what is expected and what is achieved from the use of fisheries resources. In this case, the national allowable catch of 15,000 metric tonnes per annum is far higher than the domestic tuna landings of only around 11,044 metric tonnes per annum in 2013 and 7,747.2 metric tonnes in 2014 (Fiji Government 2014). According to Mr. Graham Southwick, the managing Director of the Fiji Boat Owners Association, tuna within Fiji waters is overfished and fishing effort should be reduced to only 50 tuna fishing vessels.¹ In addition to the threat of high level of fishing effort, Mr. Graham Southwick is also of the view that the national total allowable catch (TAC) of 15,000 metric tonnes is too high and should be reduced to 10,000 metric tonnes as advised by Pacific Community (SPC) scientists (Elbourne 2012). This is the reality that has to be addressed in the Pacific Islands, where it seems that national fisheries scientists do not have an accurate understanding of the stocks of targeted species and the linkages within and between the coastal and tuna fisheries sectors. Despite evidence that both sectors are under pressure and unlikely to provide the resources and services they have provided in the past unless proper management is undertaken immediately, Pacific Island countries continue to focus on maximizing their return from coastal and tuna fisheries. In Fiji, local tuna overfishing has been reported continuously by domestic industries over the last 10 years while regional tuna stocks are argued to be healthy.

Responsible fishing is required at all levels of governance in the Pacific Islands. In addition, efficient monitoring and effective management of fisheries resources are needed to ensure sustainable use. International instruments such as the United Nations Convention on the Law of the Sea, United Nations Conference on Environment and Development conventions and arrangements, and the FAO Code of Conduct for Responsible Fisheries provide the marine resource management framework that must be implemented across the Pacific Islands for the peaceful and sustainable use of marine resources. Pacific Islanders must assume leadership and avoid continually demanding more returns from their increasingly impoverished and depleted marine resources without matching their demands with a commitment to effectively manage their coastal and tuna fisheries resources.

This chapter will discuss the Pacific SIDS setting, the importance of the coastal and tuna sectors, their state, and sustainability challenges. It will also suggest some policy options to address the main challenges and assure the integrity and health of the fisheries resources while securing maximum returns for Pacific Islanders.

1. See Elbourne, "Harvest limit wishful thinking: Southwick". *Fiji Times*, 17 May 2012.

The setting – Pacific SIDS

The Pacific region is home to 14 young democracies, and includes an ancient monarchy and states in “close association” with former colonial powers. The 14 Pacific SIDS are the Cook Islands, the Federated States of Micronesia (FSM), Fiji, Kiribati, Nauru, Niue, Palau, Papua New Guinea (PNG), the Republic of the Marshall Islands (RMI), Samoa, the Solomon Islands, Tonga, Tuvalu, and Vanuatu (tab. 1). Kiribati, the Solomon Islands, Tuvalu, and Vanuatu are classified as Least Developed Countries.

Land in Pacific SIDS constitutes only 2% of the total area and less than 0.4% if PNG, the biggest country, is excluded. Four states have a land area of less than 30 km² each. Yet there are at least 11 km² of ocean for every coastal Pacific Islander (Anderson et al. 2003: 2). In addition, the Pacific is one of the most remote and far flung regions in the world (AusAID 2008: 1).

The estimated population of 10,566,500 people in 2013 makes Oceania numerically minute on the global scale. PNG has the largest population with 7.4 million (70% of the region’s population). Half of the countries have populations of less than 100,000 and Niue has the least with 1,500 inhabitants (SPC 2013). On average, 23% of the region’s population is urban, with almost everyone in Nauru, Northern Marianas and Guam living in urban areas (SPC 2010a).

Pacific SIDS face diseconomies of scale in production and exchange of goods and services, remoteness from export markets and vulnerability to natural disasters and climate change. There is high economic and cultural dependence on the natural environment and primary commodities. A high proportion of national income in many countries comes from aid from metropolitan countries and development partners and remittances from Pacific Islanders working abroad.

PNG has the largest economy (US\$8.2 billion in 2009), which is more than twice the size of the second largest, Fiji (US\$3.5 billion in 2009). PNG and Fiji account for 80% of the region’s Gross Domestic Product (GDP), with the remaining Pacific SIDS having very small economies (UNESCAP 2010: 7). The GDP per capita is generally higher for the metropolitan territories and for the countries with close association with metropolitan states. For most of the Pacific SIDS, serious economic development obstacles are posed by long distances, tiny populations, minute economies and minimal resources. Remoteness has significant economic, environmental, and social impacts: high fuel costs and low economies of scale make the cost of developing and maintaining essential infrastructure restrictive, while small populations offer a narrow range of resources and skills that limit capacity. Small populations and land areas create small markets and reduce people’s income earning potential (Redding and Venables 2004).

Population growth in urban areas places intensive pressure on all marine resources. South Tarawa, Kiribati, with around 54.1% of the country’s total population of 108,800 people in 2013 and an estimated annual growth rate of 5.2%, will see its

**Table 1: Pacific countries and territories, including 14 SIDS:
area, population, density, growth rate, GDP per capita and year.**

Country / Territory	Land Area (km ²)	2010 Population (estimate)	Density (Persons / km ²)	Mid-2010 Growth Rate (%)	Mid-2010 Growth GDP (US\$,000)	GDP per capita (US\$)	Year
American Samoa	199	65,896	331	1.2	558,800	9,041	2005
Cook Islands	237	15,708	66	0.5	230,541	10,875	2008
FSM	701	111,364	159	0.4	235,900	2,183	2007
Fiji	18,273	847,793	46	0.5	2,928,039	3,499	2008
Guam	541	187,140	345	2.7	3,700,000	22,661	2005
Kiribati	811	180,135	124	1.8	144,810	1,490	2008
RMI	181	54,439	301	0.7	149,219	2,851	2007
Nauru	21	9,976	475	2.1	19,115	2,071	2006-07
Niue	259	1,479	6	-2.3	15,639	9,618	2006
New Caledonia	18,576	254,525	14	1.5	9,397,063	37,993	2008
N. Marianas	457	63,072	138	-0.1	948,659	12,638	2005
Palau	444	20,518	46	0.5	170,144	8,423	2007
PNG	462,840	6,744,955	15	2.1	5,552,190	897	2006
Pitcairn	5	-	-		-	-	-
Samoa	2,785	183,123	66	0.3	497,146	2,672	2008
Solomon Islands	30,407	549,574	18	2.7	528,000	1,014	2008
Tahiti	3,527	268,767	76	1.2	5,403,934	21,071	2006
Tokelau	12	1,165	97	-0.2	-	-	
Tonga	650	103,365	159	0.3	270,223	2,629	2007-08
Tuvalu	26	11,149	429	0.5	17,514	1,831	2002
Vanuatu	12,281	245,836	20	2.5	507,454	2,218	2007
Wallis and Futuna	142	13,256	93	-0.6	-	-	-

Source: SPC 2010b.

population double every 13 years. The same situation is faced in Majuro (Marshall Islands), Funafuti (Tuvalu), Pago Pago (American Samoa), Guam and Nauru, where population densities rival those of Hong Kong and other cities in South East Asia. Although Pacific Islanders have customary resource management practices such as the demarcation and ownership of fishing grounds, the clear division of responsibilities and the right to declare resource management arrangements, these are now insufficient for the people who are living in modernizing societies with depleting resources, altered environments and increasing demands that threaten their survival. Although some people still observe their customary fishing practices and management arrangements, these are quickly changing due to modernization.

Future projections in the Pacific SIDS are bleak as natural resources are impacted negatively by human activities (UNESCAP 2010: 10). In addition, climate change will have devastating and economically crippling impacts. Pacific Islanders have unique resilience associated with access to communal land, strong cultural identity, and systems of community governance supported through close kinship ties, sharing of communal resources, and cultural obligations of reciprocity (Bayliss-Smith et al. 1988; Coates 2009: 30; Veitayaki et al. 2011). However, the immensity and immediacy of the effects of climate change will make adaptation insufficient in many of the countries (Barnett 2002).

Pacific Islanders' coping strategies and survival mechanisms are quickly eroding due to the social and economic transformation taking place. Moreover, Pacific SIDS have for too long been mistakenly led by their regional organizations and development partners to adopt continental-centred or focused solutions that are inadequate or inappropriate (Barnett 2002). Patrick D. Nunn supports this view and adds that regional agencies serving the Pacific SIDS "have been largely reactive, uncritically imposing the priorities of international organizations on Pacific Island nations and focusing on short-term pilot studies rather than mainstreaming the lessons learned from these" (2010: 234). Such agencies therefore need to develop "proactive plans independent of either international or national agendas that take into account either the special needs of Pacific Island nations or the importance of developing adaptive solutions that acknowledge their singular cultural and environmental contexts" (2010: 233).

Coastal and tuna fisheries resources

The sustainable management and development of coastal and tuna resources in Pacific SIDS is critical because risks to their health and sustainability threaten the fisheries and those who depend on them. The development of fisheries often takes place haphazardly without a proper assessment at the national level of stocks, feasibility or impacts of fishing activities. More emphasis continues to be placed on achieving regional tuna stock assessments and less effort is focused on improving the level of accurate understanding of national stocks and the percentage of these stocks

that is migratory. At the Western and Central Pacific Fisheries Commission (WCPFC) Scientific Committee meeting held in Bussan, Korea, between the 7-15th of August 2012, John Holdsworth stated that tagged yellowfin tuna do not move more than a few hundred miles, even after long periods at liberty, and approximately 86% of recaptured yellowfin tuna have a tendency to remain near the continental shelf within 250 miles of their release location (Holdsworth 2012). This statement highlights the need to properly reassess the migratory behaviour of tuna and the relationship with the coral reef ecosystem.

There is limited appreciation of the relationships between the tuna resources, coral reefs and mangrove forests in coastal areas, resulting in poor decision-making that threatens the sustainability of the fisheries resources. Linkages between islands and continental slopes, and food webs for tuna, can occur via the planktonic/larval phase of coral reef fish and via micronekton (organisms larger than plankton and including cephalopod, crustacean and fish species). Postlarvae originating from populations of coral reef fish and invertebrates are often entrained in eddies while they develop to the stage where they are competent to settle on reefs and have been recorded in the stomach of tuna (Le Borgne et al. 2011: 212). In addition, many conflicting uses of ocean resources — for food, income, tourism, research and culture — require that the different uses be properly planned, implemented and governed.

Fisheries are the main sources of protein for many coastal dwelling Pacific Islanders. Their annual per capita fish consumption rates range from 16.9 kg in PNG to 181.6 kg in Kiribati (Gillett 2011: 83) (tab. 2). This level of dependence is far above the global average of 16.5 kg per person per year (Gillett 2011) and is supported by coastal fisheries. It shows the importance of nearshore resources to local communities and the pressure on the use of the fisheries stocks. In some remote atolls, annual fish consumption per capita can even surpass 250 kg (SPC 2008).

Data from all of the Pacific Island countries highlight declining and overfished stocks and the impact this situation has on the protein supply of coastal communities as well as the social and cultural consequences on these communities and the national economies (Lang 2008). Fisheries currently feed Pacific Islanders who will have to look for alternative sources of protein if their fisheries resources fail. Concern that tuna resources are being sold cheaply to fish processors overseas who then sell the processed products at much higher prices has been growing for some time.

As mentioned in the chapter by Allain et al. in this volume, over 2.6 million tonnes of tuna were caught in the Western and Central Pacific Ocean (WCPO) in 2013, constituting 82% of the Pacific tuna catch and 58% of the global tuna catch. Skipjack tuna catch dominated with approximately 69% of the total tuna catch in the WCPO. Yellowfin tuna, bigeye tuna and albacore tuna provided 20%, 6% and 5% respectively of the WCPO total tuna catch. The total value of the tuna catch in the region was estimated at US\$6.2 billion in 2013 (Williams and Terawasi

Table 2: Per capita annual fish consumption in the Pacific Islands

Country	FFA data, 1997	FAO data, Average 2001-2003
Cook Is.	67.8	44.6
Fiji	50.7	35.9
Kiribati	181.6	75.2
Marshall Is.	67.8	11.3
Micronesia	73.4	46.9
Nauru	50.0	-
Niue	62.3	-
Palau	107.7	58.8
Papua New Guinea	16.9	13.8
Samoa	31.8	57.3
Solomon Is.	44.8	42.6
Tonga	34.5	49.1
Tuvalu	113.0	40.6
Vanuatu	27.0	30.2

Source: <http://www.spc.int/coastfish/en/countries.html>; Laurenti 2007.

2014). Fishing access revenues also contributed between 11 to 63% of total national revenue for Kiribati, Tuvalu, the Federated States of Micronesia, Nauru, the Marshall Islands and Palau.

Purse seining is the main fishing method. It accounts for 72% of the catch weight from tuna schools and more than 200 other bycatch species caught in fish aggregating devices (FADs) or in unassociated schools. Longline fishing (9%), pole-and-line (8%) and artisanal fisheries (10%) provide the remaining catches. Tuna fishing and processing provide employment for thousands of people in Papua New Guinea, the Solomon Islands, Fiji and American Samoa (Gillett 2009).

According to Allain et al. in this volume, skipjack and South Pacific albacore stocks are biologically healthy and can support additional fishing efforts. The yellowfin stock is approaching the bottom of the acceptable range while the bigeye stock has been severely impacted by fishing and is overfished. The current state of the tuna fisheries underlines the importance of maintaining the health and sustainability of the region's resources, which are critical not only to Pacific Islanders and their economies, but also to the habitats and resources that provide food and livelihoods for coastal communities.

State of coastal fisheries in the Pacific Islands

Coastal fisheries consist of subsistence, artisanal and commercial fisheries, aquaculture and mariculture. They are arguably the most important sector in Pacific SIDS economies but are poorly understood. The lack of information makes these fisheries invisible in terms of their economic importance, their contribution to local livelihoods, and the dire need for their management. Coastal fisheries are the main source of food and income for local communities, the home of unique marine biodiversity, and the stage for varied commercial activities. The fisheries are vulnerable to intensive resource uses that inflict negative impacts on the land, coast and open sea. The multiple species and stakeholders in these fisheries make resource management complicated.

Coastal fisheries are diverse and employ a wide range of fishing methods and gear that mirror the multiple species that are available. These fisheries are highly dependent on the continued productivity of the coastal areas, which are amongst the most dynamic and complex environments. These areas contain important habitats, such as sand and mudflats, sea grass beds, mangroves and coral reefs, which need to be managed and governed to support the local people's diverse ecological, economic, cultural and social interests. An integrated coastal management approach that addresses all of the pertinent resource use issues and involves all of the stakeholders in a fair and transparent way is required in this sector. Reasons for this include the variety of activities that have to be undertaken, the growing population that has to be provided for, overfishing that has to be brought under control, and the erosion of traditional resource management arrangements and of local authority that renders the customary resource management system ineffective (Veitayaki et al. 2011).

Coastal fisheries must be properly sustained because they support the majority of the local protein supply (Gillett 2011). For example, coastal fisheries account for the majority of the protein accessible to Fijians whose annual per capita fish consumption rate rose from 26 kg in 1986 to 47 kg in 1990, then to 50.7 kg in 1997, only to drop to 35.9 kg in 2002 (FAO 2009). Gillett (2011: 83) placed Fiji's annual per capita consumption rate at 36.8 kg in 2011 and mentioned other studies that estimated rates between 44 kg and 62 kg.

About 80% of the Pacific region's coastal fishery production of around 100,000 tonnes annually is used for subsistence and does not enter the market (SPC 2008). Subsistence fishery is restricted to nearby areas that can be reached within three to four hours. "Using various sources of data (including non-fishery surveys), it has been recently estimated that Fiji's coastal fishery production consists of about 17,400 tonnes by subsistence fishing and 9,500 tonnes by commercial fishing" (FAO 2009: 3). Subsistence fishers target everything and consume and share whatever is caught or gathered. Surplus and highly valued species such as lobsters and mangrove crabs are sold whenever possible to provide much needed income.

Since the 1970s, the development and management of coastal fisheries have been important priorities for Pacific SIDS. Coastal fisheries are dominated by local community groups that are increasingly better organized and commercially oriented. Twenty percent of the coastal fisheries catches enter the cash economy through high-value marine products that are exported from the region, such as dried sea cucumber (bêche-de-mer), trochus, mother-of-pearl shells and black pearls from cultured pearl oysters, dried shark fins, chilled deepwater red snapper, live reef fish species, seaweed (*Eucheuma cottonii*), giant clams and coral (SPC 2008).

The commercial fishing of sea cucumbers in Pacific SIDS has not been controlled properly and has led to the characteristic boom-and-bust cycle that has been a feature of this fishery since its introduction in the 1800s; this fishery starts, thrives and then collapses because of overfishing (see also David in this volume). According to Crick Carleton et al. (2013), the boom and bust cycle reduces yields to less than half the volume of production provided before the stock collapses. Sea cucumber fishing is luring local households at the expense of subsistence and other revenue-generating activities and encouraging greater dependence on imported products, requiring households to earn more from sea cucumbers. Although local stakeholders and governments are aware of the need to manage these resources, the implementation of management measures is difficult in practice, resulting in ever-growing pressure and strong motivation for sea cucumber harvests (Carleton et al. 2013). This is why a more considered, strategic and coordinated management approach is required to benefit the industry, national economies, and rural communities at the same time. The commercial use of food sources is contributing to resource overexploitation and food insecurity in local communities. According to a survey in Viti Levu, Fiji, 60% of small-scale fishing took place in the lagoon in the mid-1990s (Rawlinson et al. 1995). This type of fishing in areas close to population centres is causing the overexploitation of commercially important species and the creation of overfishing spheres that are enlarging as the fishers move out to more distant fishing grounds (FAO 2009).

Given the growing population with improved technologies and capabilities and increased coastal development, it is crucial that the management of coastal fisheries resources be seriously pursued. Coastal fisheries are critical for national self-sufficiency and food security and therefore must be managed to ensure that optimum fisheries production is obtained from healthy and vibrant resources (Gillett et al. 2014; Kailola 1995; Pita 1996; Veitayaki et al. 2011).

State of tuna fisheries

Development aspirations in most Pacific SIDS revolve around the attainment of maximum returns from their tuna resources to fund improvements for the well-being of their people. Tuna fisheries remain the main source of foreign exchange for most

of these countries. Since the 1970s, many of these countries have promoted the development of domestic industry (Geen 1994; Gillett 2003, 2008; Philipson 2008; Ram-Bidesi 2003; Waugh 1986). This continued into the 1980s when these domestication strategies were promoted by countries which were dissatisfied with foreign vessels fishing in their waters under access agreements. Allegations were made of underreporting and non-reporting of catches by distant-water fishing nations (DWFNs) causing lost revenue for the countries involved (Maxwell and Owen 1995; Tarte 1998). It was also suspected that some DWFNs were misreporting their data and were paying low access fees, which undermined the capacity of the Pacific SIDS to manage and conserve their tuna resources (World Bank 1996).

Tab. 3 summarizes the development aspirations for tuna fisheries in some of the Pacific SIDS. Common development aspirations include the expansion of the longline fleet and catch and of the purse seine fleet and catch, an increase of non-cannery value adding, new and expanded shore bases and small-scale development, and additional cannery and loining² operations (Gillett 2008).

As mentioned in this volume by Allain et al., Pacific SIDS have agreed and formulated innovative regional arrangements and institutions to maximize their benefits from their tuna resources. They have established the Pacific Islands Forum Fisheries Agency (FFA) to advise them on tuna management and development issues and successfully negotiated their regional fisheries management organisation, the WCPFC, to collaborate with their DWFN partners in the sustainable use of the region's tuna resources. The FFA has facilitated numerous regional tuna management agreements and actions. For example, the agreements formulated by the Parties to the Nauru Agreement (PNA), a subgroup of the FFA countries, and the Palau and the Federated States of Micronesia Arrangements aim to increase domestic landing and processing and in turn increase the benefits from tuna to domestic economies (Aqorau and Bergin 1997a, 1997b, 1998; Gillett 2008, 2010; Lodge 1998; Ram-Bidesi 2003). In the same manner, the Pacific SIDS have implemented some of the conservation and management measures (CMMs) recommended by the Scientific Committee of the WCPFC to protect tuna and associated stocks.

Some of these CMMs include a ban on the use of large-scale driftnets on the high seas and a three-month ban on the use of fish aggregation devices (FADs) on a yearly basis. The permanent closure of high seas pockets (i.e., international waters wholly enclosed by exclusive economic zones — EEZs) has also been agreed together with full catch retention and the elimination of discards in the EEZs of PNA countries.³

2. Loining is the processing of tuna meat for canning overseas.

3. See <https://www.wcpfc.int/conservation-and-management-measures> (Accessed on October 20, 2015).

Table 3: Expressions of national tuna industry development aspirations

Country	Expression of development aspirations
Solomon Islands	Vision for tuna industry in the government policy statement: i) introduction of small-scale tuna fishing for rural residents ii) setting up two new loining facilities iii) strengthening government fishing/processing company for long term survival
Papua New Guinea (PNG)	Expansion of benefits would come from shore-based activities and aspire to increase processing and create new facilities to serve tuna vessels: i) 100% processing of in-zone catches by increasing cannery and loining plants ii) further sourcing of raw materials from outside of PNG to take advantage of relaxed rules of origin iii) providing all necessary facilities to the harvesting and processing of tuna at the “Marine Park” iv) increasing employment of PNG nationals as crew members v) National Tuna Fishery Management Plan specifies the domestication policy through the application of preferential licensing criteria in favour of PNG nationals and companies vi) Government expects that a cumulative investment of US\$192.5 million with a production capacity of 1,115 million tonnes per day will ensure that all catches in PNG waters will be landed on PNG shores (Usu, Kumasi and Baje 2012)
Fiji	i) assuring an adequate flow of fish to processing plants for loining and canning ii) fishing activities based on non-tuna species iii) value-adding activities iv) Marine Stewardship Council Certification v) 60-90 vessels in local fleet and 140 vessels based in Fiji vi) 6 fish exporting processing plants
Kiribati	i) a fresh tuna export operation on Christmas Island ii) participation in a Parties to the Nauru Agreement’s/regional cannery iii) small-scale low technology processing of tuna iv) local crew employment on foreign fishing vessels
Marshall Islands	i) phasing out of distant-water fishing and replacing with locally-based fleet ii) expansion of loining plant to 80 tonnes per day within 5 years iii) all fish caught by locally-based vessels
Tuvalu	i) a fleet of small longline vessels that will be crewed and operated by locals ii) offering access to tuna longline on preferential access terms to employ Tuvaluan crew and management trainees

Sources: Gillett 2008; Usu et al. 2012; National Tuna Management Plans

Fisheries sustainability issues

Sustaining fisheries resources is the ultimate challenge in all Pacific SIDS given the multiple species that have to be managed in a healthy environment, the dependence of people on coastal resources for food, the growing demand associated with higher population, the increasing commercial use of resources and the wide areas that have to be covered. Although sustainable fisheries are included in the strategic objectives of the countries and are commonly part of national plans and poverty reduction strategies (SPC 2008), they have not yet been implemented. The short life span of fisheries development initiatives and ineffective monitoring, control and surveillance associated with poor planning and limited resources illustrate the problems to be addressed and the need to regularly formulate and implement relevant fisheries development policies, strategies and activities. Common issues affecting the sustainability of fisheries development include the pursuit of government development objectives, poor planning, inaccessible markets, lack of attention to environment management, lack of understanding of the complex social and cultural conditions, insufficient human resources and lack of evaluation.

Fish production in coastal areas by local people has increased considerably in recent decades, threatening the health of the fisheries stock. The option of shifting to deeper and distant offshore resources as the nearshore resources are fully used has evaporated with intensively exploited nearshore fisheries. Furthermore, the option of improving production through improved post-harvest processing (such as loining and canning) and collection of products from rural areas for sale in urban and overseas markets has greatly enhanced the commercial use of fisheries in areas farther from the main centres, which makes fisheries management even more challenging. Unfortunately, current post-harvest processing through drying, ice storage and frying has not improved the price of value-added products because the commodities are still sold at relatively low prices.

On the other hand, the many attempts to bring markets closer to people in rural areas through collection arrangements have resulted in overexploited resources and failed initiatives. In such cases, according to C.S. Evening (1983), both the people and the resources are unlikely to support regular intensive collection while the accumulation of catch over a period of time is impossible without proper storage facilities and enabling infrastructure. It also has been argued that the structure of the subsistence sector is not conducive to the regular supply of fish needed in the urban markets (Carleton 1983). Moreover, fish marketing schemes established to involve local communities in commercial fishing should be offered only as a social service after proper planning has been undertaken because government officials, who provide these facilities, are ill-equipped to conduct commercial operations and therefore should not run them (Carleton 1983).

Sadly, the prophetic advice mentioned above has not been taken into consideration in the Pacific SIDS. In the past few decades, approximately 150 fisheries centres have been established in these countries but few, if any, have been commercially viable or sustainable (Gillett 2010). However, with growing urban demand for fish, production spheres are extending further into rural areas, causing resource depletion and the undermining of local communities' food sources and resource use rights. In rural areas, the isolation of fishers from export markets remains a problem because of the time required and the lack of handling facilities, which translates into extra effort and costs for those who dare to be involved. Remote locations, poor infrastructure, the high cost of transportation and the uncertain quality of products harvested by artisanal fishers make the successful operation of export markets in rural areas highly unlikely. Training and services are needed to improve the quality of locally produced fish to meet the rigorous quality standards that are required on export markets.

Collapsed fisheries across the Pacific SIDS emphasise the need for fisheries development to be in line with the capacities of the stock and have the support of local stakeholders. Numerous reports have alluded to the deteriorating state of coastal fisheries (Aqorau 2014; Gillett 2009; Joint Fisheries Strategies Mission 1988; Kailola 1995; Lang 2008; Pita 1996; Veitayaki et al. 2011) but poor data and the multiple species targeted have made it difficult to address the problem as fishers quickly move to a new commodity after noticing depletion signs in the stocks they are fishing.

Tuna stocks in the WCPO are declining while the numbers of fishing boats are high. According to Allain et al. in this volume, longline fishing vessels continue to fluctuate between 3000 and 6000, which is about 10 to 20 times the number of purse seiners. Overfishing is worsened by pollution, climate change, habitat destruction, weak governance and lack of fisheries management knowledge exacerbating the fishing pressure on the EEZs of the Western and Central Pacific nations. Illegal, unreported and unregulated (IUU) fishing remains a major problem because of the lack of capacity on the part of coastal states to enforce compliance. Moreover, exemptions, noncompliance and non-compatibility of national, sub-regional and regional objectives weaken regional management arrangements and compromise their stand for an equitable share of the benefits from the use of their fisheries resources. For example, exemptions and the use of special provisions for SIDS to develop their tuna resource to support shore-based processing facilities resulted in the Philippines fleets recommencing high seas fishing and their increased involvement under the PNG flag (Allain et al. in this volume).

Existing regional and subregional conventions, including the PNA through its Third Implementing Arrangements and the WCPFC Convention, while consistent with international fisheries management and governance, do not apply these international principles and standards in their existing tuna CMMs. In accordance with the exemption provisions provided for in the WCPFC Convention

to accommodate the special requirements and needs of Pacific SIDS to develop their domestic tuna fisheries, the Cook Islands, Samoa, Fiji, French Polynesia and Vanuatu have all increased their domestic longline fleets over the last decade. Pacific SIDS, therefore, must balance the attainment of their national development targets against maintaining the future availability of their most important resources, which funds most of their development aspirations.

The effectiveness of regional CMMs, including some of the ones mentioned earlier, is weakened by inherent contradictions that need to be addressed. For example, exemption provisions intended to support Pacific SIDS development aspirations allowed a 30% increase in purse seine effort over the 2001-2004 average (WCPFC 2009). Despite their own policies to reduce tuna fishing mortality of bigeye and yellowfin tuna in the WCPFC area by 25%, all of the Pacific SIDS embraced this exemption, causing an increase in the number of purse seiners fishing in Pacific SIDS waters under the US Multilateral Fisheries Treaty with the Pacific SIDS. Likewise, the three-month FAD fishing closure that was declared by the PNA was inadequate because of the small reduction in fishing mortality recorded for FAD fishing (Hampton and Harley 2009) due to the uncertain level of fishing around FADs during this short-term closure. Similarly, the high seas pockets closures that were agreed to by the PNA were of little benefit because fishing for targeted species was diverted to other non-closed high seas areas, where the catches were high (Hampton and Harley 2009). Thus, the CMMs for bigeye and yellowfin tuna were undermined by the high fishing mortality of juvenile bigeye tuna in the archipelagic waters (Hampton and Harley 2009). Moreover, the 30% reduction of bigeye longline catch at 2001-2004 average was inadequate to reduce adult bigeye fishing mortality and foster the recovery of bigeye stock.

The International Seafood Sustainability Foundation (ISSF) report of February 2012 (ISSF 2012) also advised members of the WCPFC to be more aggressive in implementing their CMMs to protect the region's tuna stocks and marine environment. There was also concern that the WCPFC's observer program did not ensure compliance and that the granting of exemptions allowed Pacific SIDS to use FADs in some areas even during closure periods. An article published on the Atuna website on 30 November 2012 reported that ISSF encouraged WCPFC members to ban purse seine fishery and emphasised the development of reference points and harvest control rules (Atuna 2012). It recommended that Pacific SIDS effectively regulate, monitor and report transshipments (transfers of catches from one boat to another) in their EEZs and to reduce the number of fishing vessels to levels determined by the productivity of the fisheries. According to the ISSF, not all purse seine vessels fishing in the PNA subregion are Monitoring Surveillance and Control certified and some are using FADs in certain areas during closure periods.

Due to a limited scientific capacity, Pacific SIDS were not able to accurately calculate maximum sustainable yields and continued to set total allowable catch levels that justified more development. Weak governance and noncompliance with catch quotas weakened the sustainable management of tuna in the region. When individual states pursue different objectives based on their own interests, the effectiveness of regional management arrangements is minimized. Indeed, the success of regional tuna resource management arrangements depend on the similarity of objectives of member states and the compatibility of regional and national policies and strategies. This is an area that has to be looked at closely by Pacific SIDS.

A lack of quality data and uncertainties in stock assessment methods affect the effectiveness of the regional management regime. According to ISSF (2012), the WCPFC's observer program is not at the level to ensure compliance, as overfishing is annually reported at the WCPFC Convention but is difficult to manage. Indeed, the sovereign rights exercised by Pacific SIDS enhance their own national interests rather than the collective regional position.

Sustainable fisheries management initiatives

Innovative fisheries management arrangements are now being attempted in the Pacific Islands to safeguard valuable marine resources. Local communities are supporting their governments' resource management projects that are both in accordance with their own interests and global ideals such as ecosystem-based management,⁴ integrated coastal management,⁵ the precautionary principle,⁶ and sustainable development.⁷ These regional and subregional arrangements combine customary and traditional practices and contemporary science-based co-management methods

4. Ecosystem-based management refers to resource management that covers the ecosystem in which the targeted species live. This has evolved after people realized that it is difficult to manage species in isolation given their relations with and within their habitats.

5. Integrated resources management requires the involvement and collaboration of all stakeholders including governments, regional and subregional organizations, private sector companies, the communities that own the fisheries and the multitude of people with whom they share the resources, in the formulation and implementation of management activities. The system allows the consideration of the concerns of all stakeholders and the commitment to have a system that is fair to all of the people involved.

6. The precautionary principle emphasizes the need to manage resources even if there is no concrete scientific evidence that prompts them to do so. It came from the United Nations Conference on Environment and Development (also called the "Earth Summit", 1992) and argues that a lack of scientific data cannot be used to justify a lack of management activities.

7. Sustainable development is usually defined as development that allows present generations to meet their own needs without compromising the ability of future generations to meet theirs.

involving roles for local communities and their governments. For example, the Micronesia Challenge aims to declare marine protected areas (MPAs) over 30% of participant countries' marine areas by 2020, i.e., to reduce fishing effort in their waters and thereby enhance fisheries management. The Micronesia Challenge has secured much needed financial and technical support from the international community to fund community-based resource management activities such as the preparation, declaration, monitoring and control of their MPAs, which are part of the contribution to the national commitment.⁸

Similarly, the Melanesian Spearhead Group's Fisheries Technical Advisory Committee (MSG FTAC) has been mandated by Fiji, the Kanak Socialist National Liberation Front (FLNKS) of New Caledonia, Papua New Guinea, the Solomon Islands and Vanuatu to provide advice on common fisheries matters relating to the development of fisheries in ways that benefit the countries, coastal fisheries and aquaculture management, and the development and downstream processing of fishery products. The MSG FTAC has developed the MSG Road Map to concentrate its intervention in areas not covered by existing regional fisheries management arrangements. In 2014, it was part of the first regional Ministerial Beche-de-Mer and Coastal Fisheries Summit to find ways of improving the management of these fisheries that are vital for coastal communities.

A 2013 Greenpeace study proposed that Pacific SIDS should abandon the contemporary tuna fisheries development trend where they are spectators who receive only fishing access fees amounting to less than 10% of the value of the tuna fished from their waters. According to Greenpeace, the reliance on DWFNs, which presently control all activities from fishing to the marketing of fish commodities, will continue unless Pacific SIDS change to smaller scale and more labour intensive fishing methods. Such methods would be affordable and accessible to their people, who therefore would be able to target higher prices in the more lucrative sashimi markets rather than the low prices at canneries. Indeed, canneries are supporting the decimation of Pacific SIDS's tuna resources while offering only minute financial returns to these countries (Greenpeace 2013). Earlier on in this volume, Allain et al. mentioned the important role of eco-labelling in increasing the value of the PNA member countries' tuna resources and PNG's desire to bolster its pole-and-line fisheries and target the lucrative sashimi market.

These new development options should be carefully studied in Pacific SIDS as they strive to better control the use of their tuna resources, employ more of their citizens, and sustainably utilize their resources while attaining maximum returns from their fisheries resources. The lead taken by the PNA in implementing the Vessel Day Scheme (see Allain et al. in this volume), has increased the income of its member countries close to five times since the scheme was begun in 2010. This is a

8. See <http://themicronesiachallenge.blogspot.fr/> (Accessed on October 21, 2015).

good start that should be built on to change the way business is done in Pacific SIDS. According to the Chief Executive of the PNA and architect of its Vessel Day Scheme, Transform Aqorau (2014), creating scarcity was necessary to add value to PNA's resources. He also warned that finding a solution for overexploited resources such as sea cucumbers will not be easy but can start with the education of local people on the changes that need to be undertaken.

It is clear that policy changes are needed to ensure that the coastal and tuna resources are sustainably used while providing maximum returns to Pacific SIDS. Both coastal fisheries and tuna resources are important and are fully exploited, and in some cases overexploited. They need to be managed effectively to continue to provide the services they currently offer. Business as usual is not an option as Pacific SIDS must now make the difficult decisions and the sacrifices to sustain these sources of livelihood. As Dr. Aqorau recently reasoned, "If the U.S. can't afford to fish in our waters, won't invest with us, and doesn't like the tight controls in our waters, they should go back to fishing in the Eastern Pacific where they originally came from".⁹

Proposed policy changes

The policy changes being proposed here are general and can be adapted by individual Pacific SIDS to suit their specific context. Fisheries development in the atolls will be different from those in higher and larger islands states but the basic principles will be similar. The proposed policy changes include the formulation of an integrated sustainable fisheries development framework for the region, one that offers the individual governments appropriate options which they can choose from. The framework must address the known threats and hindrances that weaken resource management by fostering overexploitation. Existing CMMs must be implemented unilaterally with as few exemptions as possible. Governments, which are responsible for managing national resources, must be proactive and apply the precautionary principle whenever necessary. They must demonstrate political resolve. Resource assessment, marine scientific research and capacity building must be part of the new resource management framework with set procedures and processes to allow transparency in licensing, monitoring, surveillance and control activities.

A carefully coordinated and integrated sustainable fisheries development framework must be formulated for the national governments in the region to use to suit their situation. Pacific SIDS must collaborate to exercise effective control to prevent the depletion of coastal and tuna resources. These countries must make the right

9. PNA media release in *Samoa News*, 21 March 2015, entitled "PNA to New Zealand and U.S. tuna industry: 'If you don't want to play by the rules, fish elsewhere'", <http://www.samoanews.com/content/en/pna-new-zealand-and-us-tuna-industry-%E2%80%99if-you-don%E2%80%99t-want-to-play-by-rules-fish-elsewhere%E2%80%99> (Accessed on October 20, 2015).

choices knowing that little can be accomplished by most of them if the fisheries resources that feed their people and support their economies are lost. Government agencies need to work closely with each other as well as with nongovernmental organizations, civil society and international development agencies to ensure that optimum benefits accrue to the Pacific SIDS and people, who in turn must uphold the health and integrity of their fisheries resources.

Pacific SIDS need to focus attention on formulating their national ocean policies to reflect the principles of the Pacific Islands Regional Ocean Policy (PIROP) that was presented to the World Summit on Sustainable Development (WSSD) in 2002. PIROP proposes the safeguard of a “healthy Ocean that sustains the livelihood and aspirations of Pacific Island communities”¹⁰ and provides a principled approach to responsible ocean governance in the region. The “Pacific Oceanscape” emphasised resource management patterned along the Phoenix Islands Protected Area (PIPA), the world’s largest MPA at the time. The consequent declaration of even larger management areas in the Cook Islands, Tokelau and New Caledonia, and the appointment of an Ocean Commissioner at the Pacific Islands Forum, all demonstrate the commitment in the Pacific region to better manage the ocean because of its importance to Pacific Islanders and the world.

At the 2012 Pacific Forum, Henry Puna, the Prime Minister of the Cook Islands, prompted the leaders of other Pacific Island countries to consider a rethink of their shared identity within the Pacific saying: “it is time that we break the mould that defines us too narrowly and limits us in any way”. Puna called for a recasting of regional identity to one of “Large Ocean Island States”: “Our large ocean island states should demonstrate — now more than ever — renewed commitment to define our future in our own terms. Our intimate and connected relationship is built from a deep spiritual bond and translated across an expanse of ocean in unique and traditional ways”.¹¹ This rhetoric relates directly to the ideas that Epeli Hau’ofa (1993, 2000) articulated.

Sustainable fisheries development is the only way forward for Pacific SIDS. The prospects for the future are not good if current practices, where fisheries development is single-mindedly pursued and management is attempted only after signs of fish stock depletion are encountered, are continued. Fisheries resources are potentially sustainable but this depends only on the effectiveness of the resource management arrangements in place. The experience in the Pacific SIDS in this regard is mixed and now more challenging. The countries have succeeded in formulating conservation and management measures but have not been effective in the implementation of these arrangements to allow for the sustainable use of their fisheries resources.

10. See http://innri.unuftp.is/short_courses/pp_samoao8a/International_Instruments/2004_Pacific_Islands_Regional_Ocean_Policy.pdf (Accessed on November 26, 2015).

11. See *Fiji Times*, 31 October 2012.

Overall changes are needed in the reactive management approach that does not effectively control the use of the region's fisheries resources. Pacific SIDS must now take stock of what they need to ensure the sustainability of their fisheries resources. They have acquired a lot of invaluable lessons through their earlier experiences with their management arrangements to know what works and what does not. The banning of driftnet fishing from the Pacific, the Multilateral Treaty with the US and the PNA's Vessel Day Scheme all demonstrate the improvements that Pacific SIDS can attain when they collaborate.

They need to dedicate themselves to their regional positions on the sustainable use of their fisheries resources to better serve their people and the marine environment. It is sad to note that the issues mentioned here are exactly what Hau'ofa (1993, 2000) warned would arise if countries did not have a strong regional identity or work together for the common good. To maximize their returns from the use of their fisheries resources while preventing the deterioration of fish stock in the region, Pacific SIDS must make serious attempts to protect their fisheries resources and the quality of their marine environment. Pollution, overfishing and the alteration of natural habitats should be effectively addressed using available science and technology. Legislation and regulations on the control of sources of land-based pollution should be closely monitored and enforced by relevant agencies while innovative techniques such as rehabilitation of coastal habitats, re-seeding with the introduction into the wild of organisms spawned and bred in laboratories and research stations, aquaculture and mariculture can be promoted in appropriate situations to maintain and stimulate the recovery of fisheries resources.

Resource monitoring, control and surveillance should be the basis for sustainable fisheries development. Customary fishing rights and national fisheries areas should be regularly surveyed and assessed biologically to determine the guidelines for their sustainable use. The assessments should provide the maximum number and type of licenses that can be offered in these areas. More concerted attempts should be made to record the coastal fisheries catches from national waters. This can be best done at the markets and at the village and island levels. For effective management, fisheries managers at all of the different levels, from individual fishers to their villages and island councils, provincial, national, regional governments right up to regional fisheries management organisations such as the WCPFC, need to know the amount of fish they have and those that are taken from their fishing grounds.

Scientific research should be made the basis of fisheries development. Catch data in relation to the number of fishers in different fishing grounds should be closely monitored to guide fisheries development. It is also important to promote and support local research capacity and to act swiftly to address the sustainable development issues raised by researchers.

Governments should establish reliable and up-to-date databases and information systems to assist in decision-making. The number and type of fisheries and coastal

and offshore development licenses granted for any area should be based on scientific research and data, which should be used to closely monitor the state of the fisheries and the marine environment. It is important that fish catch records are accurately recorded and updated to guide decision-making and management. The provision of catch data should be made a condition of a fishing license, while environment impact assessment reports on the impacts of human activities on fisheries resources should be expected from all proponents of coastal and offshore development. An environmental impact assessment process and model used in Fiji could be adopted to determine the impact of fishing activities. The model used in Fiji includes the following processes:

- The Department of Environment calls for the prequalification process of qualified private consultants to carry out environmental impact assessment work;
- Applicants are assessed and those that meet the selection criteria are approved and registered under the Department of Environment database; and the approved list is printed in the local newspaper for public use;
- Prior to implementing any development project, it is the responsibility of the developer to obtain an environmental impact assessment report signed by one of the approved consultants; and
- The development proposal (with environmental impact assessment report) is then submitted to the Department of Environment for final assessment.

Thorough consultation with appropriate training and follow-up support with all stakeholders should be provided to the people involved in fisheries development and management initiatives. Participants at training events should be carefully picked using objective selection criteria that take into consideration the applicants' experience and suitability to the project's aims and objectives. This will ensure that training is provided to the most deserving candidates who will perform well in the training and in the project activities. Training should improve the participants' understanding of the development activities they are involved in and how their activities relate to the management of fisheries resources. Development assistance must be offered only to people that have been adequately trained, have prior experience in fisheries and have the enabling conditions to succeed with the development activity they want to be involved in.

The process of granting fisheries development licenses and permits should be standardized, transparent and well controlled. Proportions of the standard fees that are set and collected by governments should be shared with the owners of the customary fishing areas who need to not only know the other stakeholders with whom they share their fishing grounds, but also to have the resources to actively monitor and control the activities within their fishing areas. Sustainable development and the precautionary principles must be emphasized at all levels of governance to ensure the effective management of fisheries resources.

Governments must provide the enabling environment to allow other stakeholders such as fishers, tourist operators, customary owners, the private sector, and civil society organizations to be involved in the sustainable development and marketing of fish and fish products. There is a need to improve the use and value of current fish catch through improved postharvest processing. The sale of raw tuna and the increasing import of canned tuna, which is many times more expensive than the exported raw tuna, have driven the domestication aspirations and policies of many regional governments. While this is important, it must be done properly and for the right reasons. The involvement of the private sector will enhance this transition to develop sustainable marine fisheries to maximize returns on the use of fisheries resources.

Governments should avoid the introduction of unilateral projects and must formulate a new system of development funding instead of emphasising three to five-year funding periods. The changes that are necessary for sustainable fisheries development cannot be rushed and must be sensitive to local contexts. In many local communities across the Pacific SIDS, local people have customary resource management practices such as the periodic declaration of no-take areas for a given purpose that can be used for the promotion of sustainable fisheries. The new system of development funding must emphasise sustainable fisheries development by tightly controlling the optimal use of fisheries that maximizes the return on the effort and minimizes the failures. The new funding agencies must conduct technical, managerial and financial evaluation of proposed sustainable fishing ventures and should provide the funds whenever appropriate to people and groups who are prepared to be involved in the development activity.

Pacific SIDS need to commit to their conservation and management measures, which are there to protect their fisheries, countries and communities. Resource depletion has to be effectively controlled before it causes irreversible damage to the fish stock, the fishing industry, and the local and international communities. Pacific SIDS should learn from their ancestors who would take unanimous resource management decision when the need arose. There should be no exemptions and special considerations when it comes to resource management and people should be well rewarded only if they are devoted to their resource management arrangements.

Conclusion

Pacific SIDS must determine whether their future is with the continuation of the current status quo, where resources are threatened with overfishing and countries are complaining about the inequitable share they receive for the use of their fisheries resources while their resources plummet to extinction, as has happened elsewhere in the world in the past, or whether they wish to bring about holistic changes that will provide more returns in terms of control of fishing activities, sustainable use of fisheries,

employment, and income. Moreover, the expected devastation associated with global challenges such as climate change, ever increasing population growth, worsening poverty, food insecurity and irreversible environment changes will demand the total engagement, solidarity and commitment of all Pacific SIDS to sustainable fisheries resources. These countries must work together or they will fail to effectively protect their coastal and tuna fisheries because they are dependent on these resources, rely on their use by outsiders, and are limited in their power to exert effective control on their own.

The attainment of sustainable development in coastal and tuna fisheries has not been satisfactory up to now. Both of these important sectors are now seriously threatened by overexploitation, resource depletion and environmental degradation. The development of the two sectors has not offered the outcomes that Pacific SIDS envisaged. The number of initiatives that have failed in the two sectors are also indicative of the need to adopt a new fisheries management approach — one that is more appropriate to the socioeconomic conditions in Pacific SIDS and conducive to more successful and equitable fisheries development.

Pacific SIDS need to take difficult decisions such as the declaration of marine protected areas in parts of their EEZs to reduce the fishing effort and thereby boost productivity and production when such outcomes are needed. These countries and their fisheries resources are now at the juncture where actions more than plans are expected to save their coastal and tuna fisheries resources. Experiences in other regions such as Canada have demonstrated that resource conservation will always be easier and cheaper than environmental repair, clean up, rehabilitation and restocking. Moreover, the changes that occur as a consequence of overfishing associated with global changes such as climate change and population growth may result in the irreversible degradation of ecosystems.

The management of coastal and tuna fisheries needs to be improved. The long-term solution lies with Pacific SIDS and the choices they make, particularly with regard to their relations with DWFNs. They have achieved remarkable success in the past that should serve them well as they move into the future. They now must rise to the challenge because the price of failure for them, the fisheries and the international community will be unbearable.

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