

Chapter 5

Ocean Governance: Our Sea of Islands

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5.1 Introduction¹

The Pacific island countries and territories (PICTs)² are large ocean states with jurisdiction over 28 million square kilometres of ocean in their Exclusive Economic Zones (EEZs)³ or 8 per cent of the global ocean. This also covers 20 per cent of the global EEZs and 25 per cent of the world's coral reefs (Burke *et al.* 2011). These figures contrast markedly with the small combined land mass of only half a million square kilometres. The nine Commonwealth Pacific small states (Fiji, Kiribati, Nauru, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu and Vanuatu)⁴ have the lion's share of land resources (95%), coastline (72%), area accessible to inshore fisheries (70%) and coral reefs (60%) but only 40 per cent of the region's EEZ. The major share of the EEZ is fairly evenly distributed between non-Commonwealth countries and dependent territories.

The Pacific is extremely culturally diverse, as exemplified by the more than 1,000 languages spoken. The ocean and coastal seas have long been integral to the Pacific way of life and world view. Indeed, there has been a growing call by countries of the Pacific island region for recognition as guardians of the Pacific Ocean, as eloquently expressed by Epeli Hau'ofa in 'Our Sea of Islands' (Hau'ofa 2008): 'no people on earth are more suited to be guardians of the world's largest ocean than those for whom it has been home for generations.'

Pacific peoples originally migrated and some traditionally voyaged over an area totalling around 70 million square kilometres extending from Easter Island in the east to New Zealand in the south, the Northern Hawaiian Islands and Papua in the west.⁵ Thus, tens of millions of square kilometres currently considered beyond national jurisdictions have traditionally been the domain of the inhabitants of PICTs.

Pacific islanders' strong reliance on the ocean is exemplified by a consumption of fish 2-3 times more than the global average with 47 per cent of coastal households earning their first or second income from selling fish they catch. Commercial fishing access fees contribute up to 60 per cent of national revenue for some Pacific island nations and tourism may be the largest contributor to formal employment (Bell *et al.* 2011; Gillett 2016; World Bank 2016a).

The importance of the Pacific Ocean to the future of its island inhabitants is inescapable. This chapter sets out to briefly review the state and importance of its contributions to Pacific island countries, outline its governance and management arrangements, and after identifying some key issues and promising responses, suggest some ways forward to achieve a sustainable future.

5.2 Context

5.2.1 Pacific Ocean resources

The Pacific Ocean is currently an important resource for fisheries, transport and tourism, and there are also emerging opportunities for deep sea minerals, energy and bioprospecting.

Fisheries⁶

Fisheries production can be broadly categorised as coastal, offshore, freshwater and aquaculture (see Box 5.1). The volume of fisheries production in the Pacific region⁷ is around 1.7 million tonnes, with an estimated value of US\$3.6 billion dollars, 75 per cent of which is accounted for by Commonwealth Pacific small states (Table 5.1). The larger proportion is accounted for by offshore tuna fisheries, mainly by foreign-based vessels,⁸ particularly in Kiribati and PNG.

It is evident from the fishery production, the clear dominance of offshore fisheries by value. However, the importance of coastal fisheries should not be underestimated.

Box 5.1 Types of fisheries

Coastal commercial: The catch that is sold (i.e. enters commerce) and that derives from fishing operations that take place in lagoon, reef, deepslope or shallow sea areas. This category also includes fish caught by trolling/handling from small vessels in the open sea adjacent to islands.

Coastal subsistence: The catch that is retained for consumption by the fisher or given away to family or friends. For simplicity, the catches from recreational fishing are considered as production for home consumption, and therefore as a component of subsistence fisheries.

Offshore locally based: The catch from industrial-scale tuna fishing operations that: (a) are based at a port in the relevant Pacific island country; and (b) are generally harvested more than 12 nautical miles offshore.

Offshore foreign based: The catch from industrial-scale tuna fishing operations that are based at ports outside of the relevant country.

Aquaculture: The production from the farming of aquatic organisms, including fish, molluscs, crustaceans and aquatic plants. Farming implies some form of intervention in the rearing process to enhance production, such as regular stocking, feeding or protection from predators.

Freshwater: The catch from streams, rivers and lakes, whether for subsistence or commercial purposes.

Source: Gillett, 2016

Table 5.1 Fishery production by category in 2014 (US\$ million)

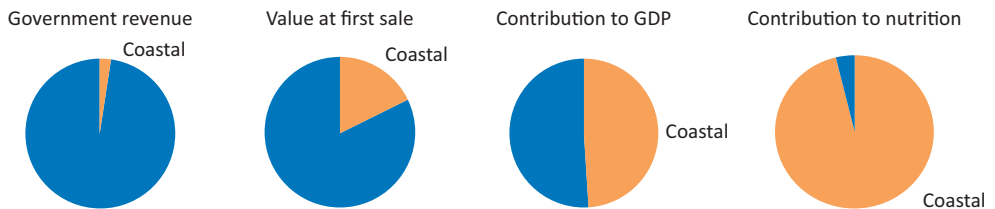
	Coastal		Offshore		Fresh-water	Aqua-culture	Total
	Commer-cial	Subsis-tence	Locally Based	Foreign Based			
Fiji	38	29	54		4	1	127
Kiribati	15	16	4	1,111		<1	1,147
Nauru	1	1		231			233
PNG	51	67	313	311	38	1	780
Samoa	18	12	5		<1	<1	35
Solomon Is	13	33	58	79	4	1	187
Tonga	18	10	4	5	<1	<1	37
Tuvalu	1	1		132	<1	<1	134
Vanuatu	6	7	1	26	<1	<1	42
Commonwealth Pacific small states	160	177	439	1,896	46	4	2,722
Pacific Region	218	236	738	2,273	47	116	3,628

Source: Gillett, 2016

This is because while coastal fisheries do not contribute significantly to government revenue, they provide half the fisheries-related contribution to gross domestic product (GDP) and most of the contribution to nutrition (Figure 5.1). These results are even more striking given that inshore fishing depends on little more than 1 per cent of the total ocean space under national jurisdictions. Aquaculture, which comprises a varied mix of low-value bulky products (such as seaweed) and small high-value products (such as pearls), and freshwater fisheries production contribute very little value to economic growth in Commonwealth Pacific small states.

Fisheries contribution to GDP is generally thought to be underestimated for most countries. Consequently, Gillett (2016) has attempted to re-estimate fisheries contribution to GDP given the weaknesses in official data. It was found that while official estimates varied from 1 to 9 per cent, re-estimates varied from 2 to 16 per cent. For countries where there are significant differences, the official estimates tended to

Figure 5.1 Relative importance of offshore and coastal fisheries to the Pacific Region



Source: Data from Gillett (2009) interpreted in Govan (2013)

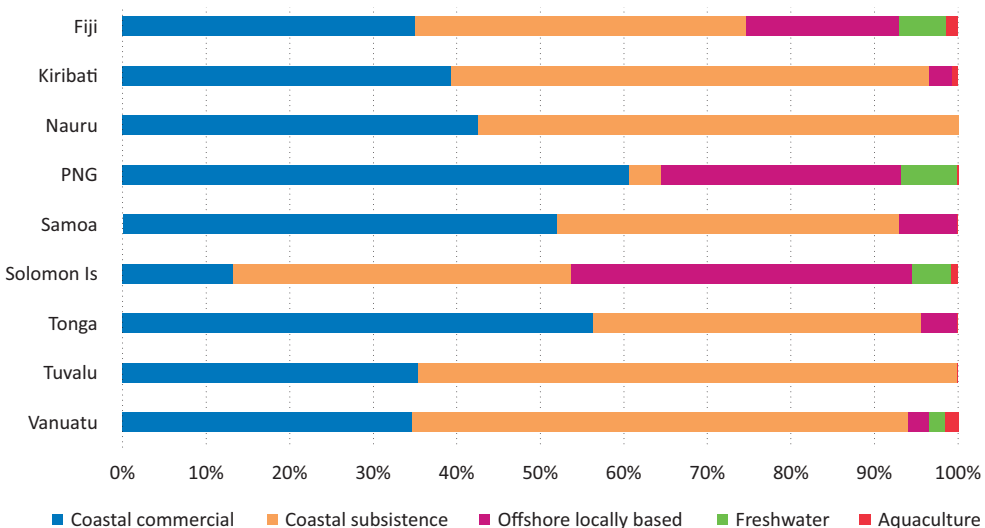
Table 5.2 Official estimates and re-estimates of fishing contributions to GDP

	Official fishing contribution (% of Official GDP)	Re-estimate of fishing contribution (% of Official GDP)	Year of GDP estimate
Fiji	1.8%	1.6%	2014
Kiribati	8.6%	16.2%	2014
Nauru	2.3%	1.3%	2014
PNG		1.7%	2014
Samoa	3.0%	3.4%	2014
Solomon Is	2.5%	7.2%	2014
Tonga	2.3%	4.4%	2013/2014
Tuvalu	9.4%	4.7%	2012
Vanuatu	0.6%	1.5%	2014

Source: Gillett, 2016

rely on dated surveys, weak indicators and/or poorly understood methods (Gillett 2016). Based on the re-estimates, Kiribati, Solomon Islands, Tuvalu and Tonga all recorded fisheries contribution of above 4 per cent of GDP (Table 5.2).

Except for PNG, Solomon Islands and Fiji, coastal fisheries account for 90 per cent of the fishing contribution to GDP (Figure 5.2). Coastal fisheries account for more than 50 per cent of the fishing contribution to GDP in PNG (>60%), Solomon Islands and Fiji (>70%).

Figure 5.2 Re-estimated fishing contribution to GDP by fishery category (US\$)

Source: Gillett, 2016

*Offshore Fisheries*⁹

More than half of the world production of tuna is from the Western and Central Pacific Ocean (WCPO)¹⁰ and the Pacific island countries' (PICs) waters supply around 34 per cent of the world's tuna catch each year, worth some US\$3.4 billion to processors and generating net economic benefits to PICs of about US\$500 million in 2013 (World Bank 2016b). Just over two-thirds was from domestic harvesting and processing by PICs, with the remainder from access fees.

The main species fished, status and current management recommendations are¹¹:

- **Skipjack:** fast-growing and short-lived, in warmer tropical waters, the main species landed and regarded as relatively resilient to fishing pressure. Fishing mortality has been increasing but the stocks are not considered overfished, although in recent years catches have been around the maximum sustainable yield (MSY).¹² Current recommendations are to keep the skipjack stock around the current levels with tighter purse seine control rules.
- **Yellowfin:** relatively fast-growing species and the second largest component of catches found in tropical and subequatorial waters. Stocks are not considered overfished, although latest catches are close to or exceed the MSY. Current recommendations are that catches should not exceed 2012 levels, which had surpassed the MSY, and appropriate measures implemented to maintain current spawning biomass levels.
- **Albacore:** found in two discrete stocks, north and south of the equatorial zone, long-lived and generally caught in deeper waters. The northern stock is not considered overfished, and while the same applies to the southern stock, recommendations are to reduce longline catches to maintain economically viable catch rates.
- **Bigeye:** long-lived and among the largest tuna species with broad distribution. There has been overfishing for more than ten years and current management measures appear to be insufficient to end overfishing in the short term. Recommendations are to reduce fishing by 36 per cent compared to 2008-2011 levels.

The main tuna fishing methods are industrial, although small amounts are taken by small-scale artisanal fisheries in coastal waters:

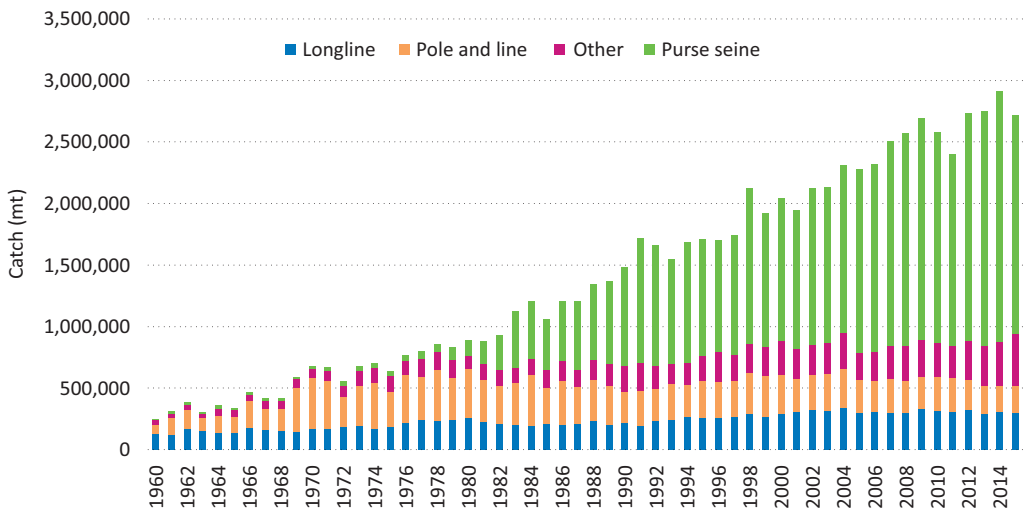
- **Industrial purse seining:** a large fishing vessel sets a net in a circle around a school of tuna. Largely targets skipjack and to a lesser extent yellowfin but may catch multiple species.
- **Industrial longline:** vessels set baited hooks from long lines with thousands of baited hooks attached at regular intervals. Larger vessels usually have their own freezing equipment and are based outside the Pacific and smaller vessels, which use ice, are based in Pacific ports. Representing around 10 per cent of catches, tropical longliners target mainly yellowfin and bigeye, while southern longline fishers target albacore.
- **Pole and line fishing:** catching fish by a pole with a single hook, while sprinkling sea with live bait targeting skipjack.

The movements of the region's four main tuna stocks cover a vast area of the WCPO and the fishing fleets have to cover thousands of kilometres in search of schools. However, the emergence of modern technology, particularly fish aggregating devices (FADs),¹³ is continually improving cost-effectiveness. The Commonwealth Pacific small states control over a third of these waters and together with the other PICs control over two-thirds.¹⁴

The purse seine sector has seen important growth over the past 35 years with a tenfold increase in vessels (Figure 5.3) and nearly 20 times the landings to over 2 million tonnes in 2014. Other fishing methods have not seen similar growth or have declined (ISSF 2016). The distribution and abundance of tuna stocks are influenced by the currents, water temperature, dissolved oxygen and nutrient supply (Bell *et al.* 2011), particularly the effects of the El Nino-Southern Oscillation.¹⁵ Subject to these variables, the major proportion of purse seine catches take place in the waters of Kiribati and PNG, with lesser proportions in Nauru, Solomon Islands, Tuvalu and non-Commonwealth Pacific small states of Federated States of Micronesia (FSM), Marshall Islands and Palau. Collectively, these states, which are also members of the Parties to the Nauru Agreement (PNA), control the world's largest sustainable tuna purse seine industry. Only around 20 per cent of catches occur outside the waters of the Commonwealth Pacific small states, including in Indonesia's and the Philippines' waters, and up to 7 per cent occurs in international waters.

Although there is a growing Pacific islands purse seine fleet (locally based), they were responsible for only 23 per cent of the WCPO purse seine catch in 2013, of which around half was caught by PNG. Foreign-based fleets accounted for the rest of the catch, with Taiwan, Japan, Korea and the USA accounting for 47 per cent, while Indonesia's and the Philippines' largely domestic fleets accounted for 20 per

Figure 5.3 Evolution of tuna catches in the WCPO by fishing gear



Source: Williams and Terawasi (2015)

cent. Other distant water fleets (China, Ecuador, New Zealand, El Salvador, Spain, Vietnam) accounted for the remaining catch (World Bank 2016b).

For the smaller longline industry, between a quarter and third of the tuna catches are in international waters, with other significant catches in the waters of Fiji, Kiribati, Solomon Islands and Vanuatu, as well as in the waters of non-Commonwealth Pacific small states (Cook Islands, FSM and French Polynesia) (World Bank 2016b using FFA 2015b data). Although PICs have jurisdiction over a relatively smaller proportion of the WCPO longline fishery, it generates higher value products (approximately triple by weight), such as albacore for higher priced canned tuna, and yellowfin and bigeye for sashimi. About half the catches are made by vessels from China, Taiwan and Japan while vessels from Indonesia, Korea, Vietnam, Vanuatu and Fiji catch between 5 and 10 per cent of the total each (World Bank 2016b).

Only around 12 per cent (US\$1.9 billion) of the total value of the offshore fisheries (US\$2.2 billion) is actually captured by the Commonwealth Pacific small states in terms of government revenue through access fees or levies (Table 5.3). Commonwealth Pacific small states receive access fees through fisheries treaties, particularly the PNA and the United States Tuna Treaty (see section on Regional Oceanic Fisheries Policy). Kiribati and PNG receive the majority of the US\$263 million in access fees (Table 5.3). Access fees make up a significant per cent of government revenue for Kiribati (75%) and Tuvalu (58%), and to a lesser extent in Nauru (14%).

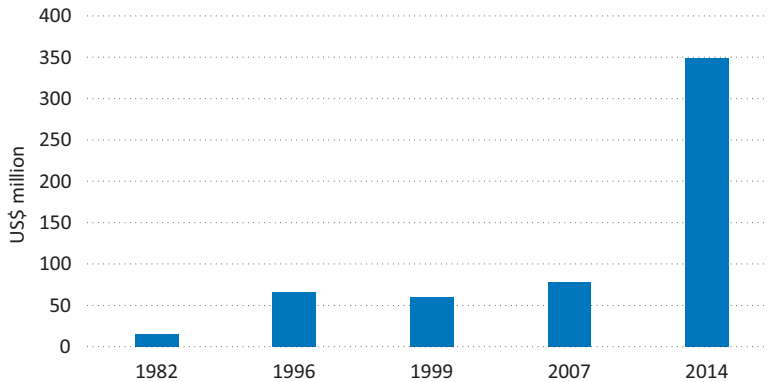
Access fees earned by the PICTs have increased since 1982. The United States has a long history relating to fishing agreements with the region since the signing of the South Pacific Tuna Treaty in 1987, which represented a 10 per cent rate of return compared to the 3 per cent average for bilateral access agreements up to that time (Tarte 1998; Toroa Strategy 2016). Access fees have risen sharply since 2007 (Figure 5.4). This increase has been attributed to the implementation of the ‘vessel day scheme’ (VDS) by PNA and Tokelau. Members of the PNA plus Tokelau have

Table 5.3 Access fees for foreign fishing in 2014

	Access fees (US\$ million)	Access fees (% of government revenue)
Fiji*	<1	<1
Kiribati	116	75
Nauru	16	14
PNG	85	2
Samoa*	<1	<1
Solomon Is	28	7
Tonga	<1	<1
Tuvalu	15	58
Vanuatu	2	1
Commonwealth Pacific small states	263	n/a
Pacific Region	349	n/a

Note: *The only access fees are from the US Tuna Treaty.

Source: Gillett (2016)

Figure 5.4 Access fees in PICs 1982–2014

Source: Gillett, 2016

recorded successive increases in access fees, from US\$205 million in 2013 to US\$290 million in 2014 and an estimated US\$390 million in 2015 (World Bank 2016b; FFA 2015b; Gillett 2016; Williams and Terawasi 2015).

Government-led attempts over the years to capture more of the value of tuna, other than through access fees, have not generally been successful. With the notable exception of PNG, in-country processing has had a chequered history. As stated by the World Bank (2016b):

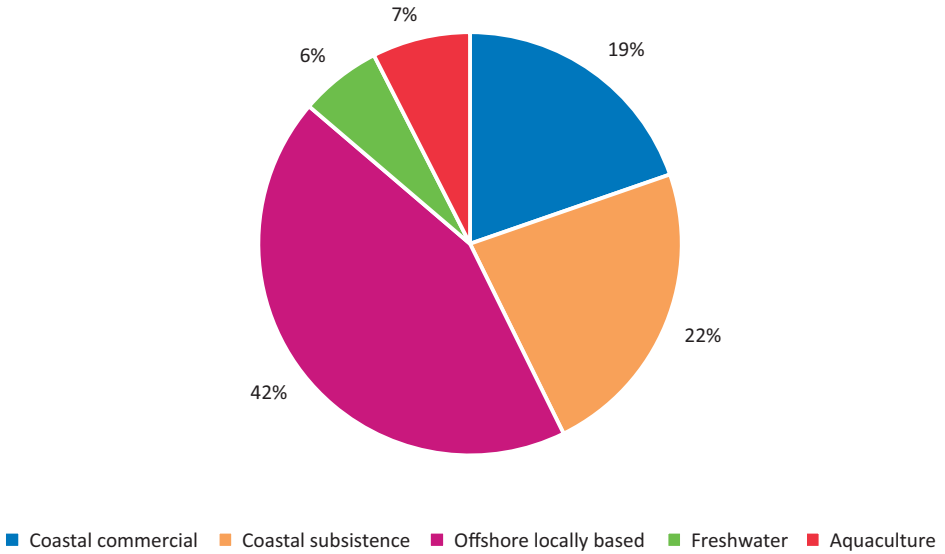
Most of the Government-led enterprises created in the 1980s or 1990s are no longer operating, but a number of private-led companies are currently processing catch in PNG, the Solomon Islands, Fiji and to a lesser extent RMI. In total the WCPO tuna fisheries value chains likely employ less than 0.5 percent of the region's current labour force. Less than 10 percent of the WCPO purse seine catch is processed locally, and Bangkok remains the world's largest tuna canner (despite increasing labour costs and several PICs' trade preference with the EU market).

Coastal fisheries

Coastal fisheries permeate all aspects of Pacific island life. However, because it is difficult to quantify the value of coastal fisheries, they have a much lower political profile than oceanic fisheries. Nevertheless, as discussed earlier, coastal fisheries contribute significantly to GDP, government revenue and nutrition (Figure 5.5).

Sea cucumbers (or *bêche-de-mer*) are the second most valuable fishery after tuna and have been exploited as a high-value export commodity for at least 170 years (Conand 1990; Kinch *et al.* 2008, Purcell *et al.* 2013, Purcell *et al.* 2016). However, unlike tuna, this fishery is directly open to, and benefits, coastal dwellers, with an estimated 300,000 fishers in the region. For Fiji, PNG, Solomon Islands, Tonga and Vanuatu, sea cucumber production in the past decade had an average value of some US\$20 million per year and it was estimated that improvements in resource management and processing could double the value accrued to communities (Figure 5.6) (Carleton *et al.* 2013). However, declining stocks manifest in boom and bust cycles, which

Figure 5.5 Fishing contribution by fishery category to the regional GDP in 2014

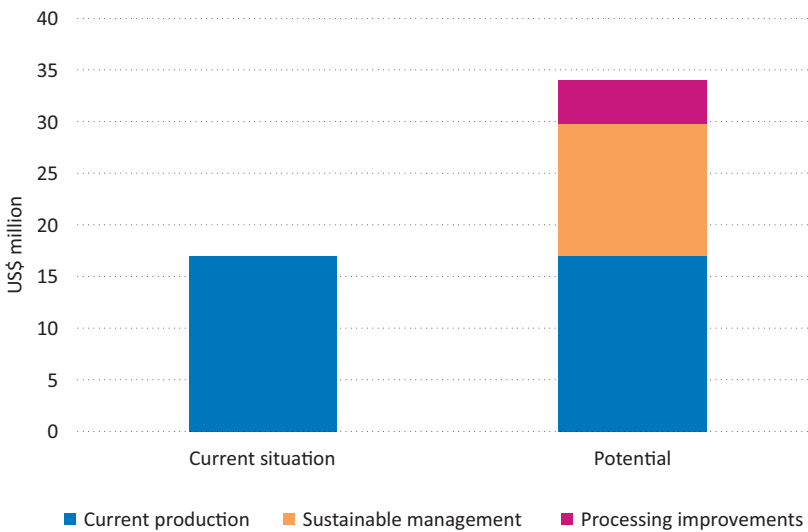


Source: Gillett, 2016

has prompted governments to set moratoria on sea cucumber production in many countries.

Coastal fisheries have a significant impact on local livelihoods for many of the Pacific coastal communities. While coastal fishing is mainly a subsistence activity to provide fish

Figure 5.6 Sea cucumber potential in Fiji, PNG, Solomon Islands, Tonga and Vanuatu



Source: Carleton *et al.* 2013

and invertebrates for household food, an average of 47 per cent of households in coastal communities are reported to earn their first or second income from selling surplus fish and invertebrates caught from coastal and nearshore waters (Bell *et al.* 2011).

In addition, coastal fishing contributes to the bulk of locally consumed fish, although in some places there are important contributions from offshore fishing (including tinned or discards/bycatch) and inland aquaculture (tilapia in PNG, Vanuatu and Fiji). Local consumption of fish in the Pacific region is estimated to be two to three times the global average but varies widely, being generally much higher in atoll nations (Kiribati, Nauru, Tuvalu) and lower in larger countries with significant inland populations (PNG, Vanuatu) (Gillett 2016).

Fish is rich in protein, essential fatty acids, vitamins and minerals and is thought to provide 50-90 per cent of dietary animal protein in rural areas across many PICTs (Bell *et al.* 2011). This 'healthy protein' is an alternative to nutritionally poor imported foods that increasingly form part of Pacific diets and is thought important to combat the high prevalence of non-communicable diseases in the region (Charlton *et al.* 2016). As a large proportion of the Pacific population lives in remote rural areas with poor transport infrastructure and lack of cash, they are heavily dependent on coastal fisheries in maintaining healthy diets. Healthy coastal fisheries also provide a source of emergency food during disaster recovery when agricultural production may be disproportionately affected.

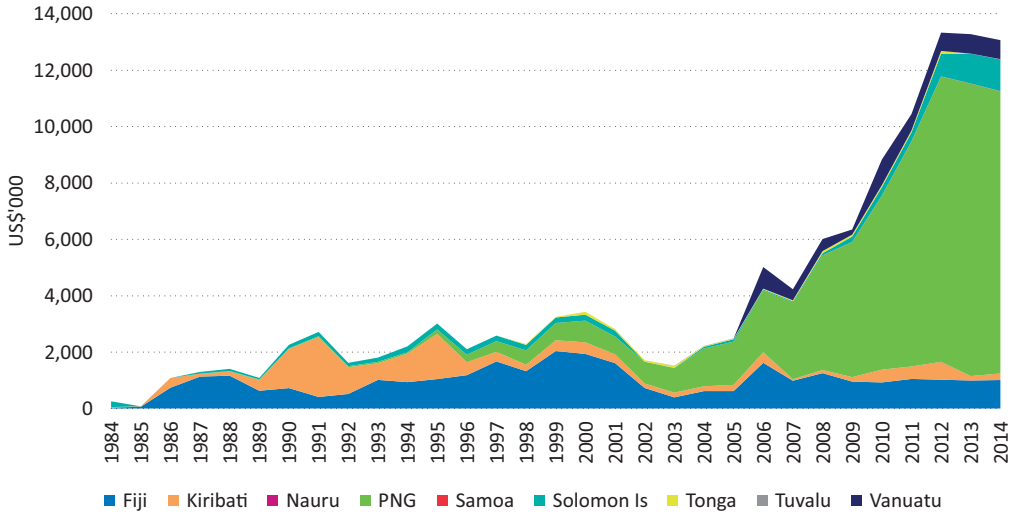
Moreover, other activities that rely on the availability of coastal fisheries, such as tourism and cultural obligations, depend on the inextricable link to the healthy functioning of the ecosystems. Culturally, local communities attach a high value to preserving ecosystems for use by future generations (bequest value). This may reflect the 'duty of care' that underpins the relationship between the people and land in many regions (O'Garra 2012). Coastal fisheries also play an important role in social cohesion (WWF 2016). These are some of the important non-market values of coastal fisheries and it is indisputable that these important 'intangibles' are of great value to people and industries in the Pacific (WWF 2016).

Aquaculture

For more than 50 years, aquaculture has been promoted as a development opportunity, presumably owing to the abundance of appropriate environmental conditions, as well as to divert pressure from wild fisheries stocks. However, despite many years of research and investment, the production of aquaculture in the region is relatively small. According to Gillett (2016), aquaculture is valued at around US\$116 million (Table 5.1), mainly led by French Polynesia (pearls) and New Caledonia (shrimps). Commonwealth Pacific small states account for only US\$4 million of the regional catch or 0.1 per cent of the value of fisheries production (Table 5.1), with Fiji and PNG accounting for the bulk of that value, at US\$1.5 million and US\$1.2 million, respectively.

Interestingly, while the Food and Agriculture Organization (FAO) had similar estimates for the regional value of aquaculture, albeit slightly higher, at US\$135

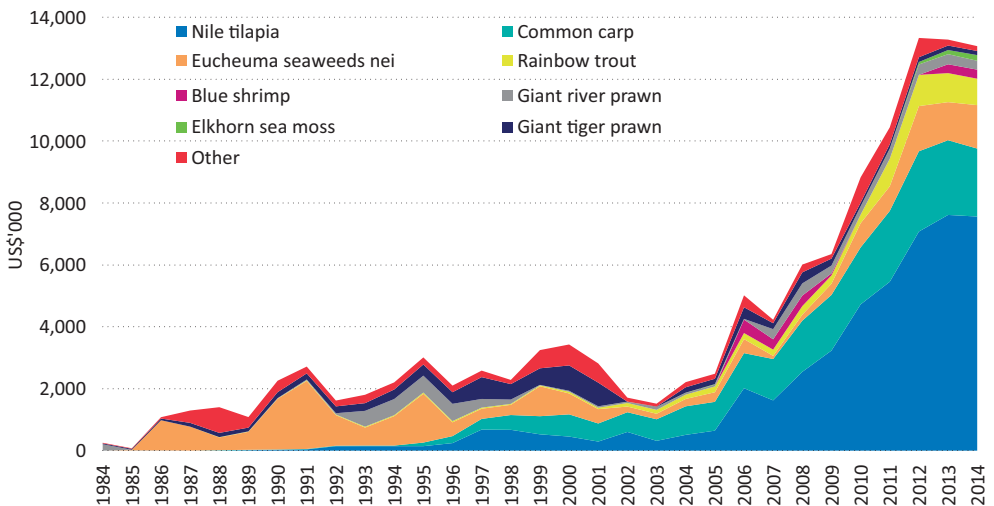
Figure 5.7 Value of marine and freshwater aquaculture by country



Source: FAO 2016

million (FAO 2016), the country-level estimates were quite different, particularly for PNG. FAO estimated the aquaculture value for PNG at US\$10 million in 2014 (Figure 5.7), led by tilapia (Figure 5.8). It is unclear, though, as to the source of FAO’s data. Although not strictly relating to ocean governance, given the potential that freshwater aquaculture may have, particularly in the larger islands, to substitute or supplement protein sources from marine fisheries, it is important to clarify the differences in the data.

Figure 5.8 Value of aquaculture by species



Source: FAO 2016

More than 40 species have been subject to experimental and sometimes commercial-scale pilots, including bivalves, shrimps, crabs, coral, seaweed and fish. Production of seaweed (eucheuma) has on occasion shown some promise in rural settings but has been characterised by large fluctuations over the past 30 years relating to variations in market price, project cycles and government policy priorities (Figure 5.7).

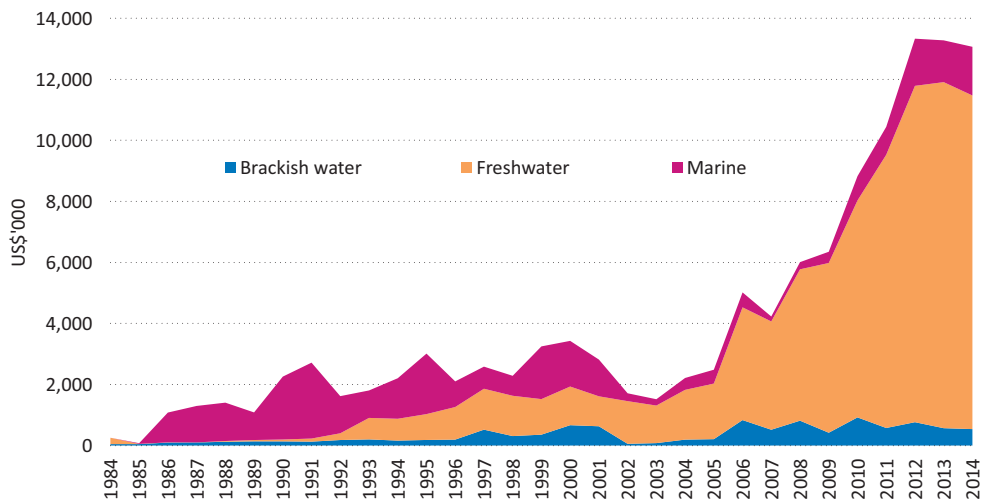
Subject to data reliability, the FAO's data indicates extremely disappointing trends in marine aquaculture or mariculture production (Figure 5.9), especially in light of continued investment by donors, governments and, perhaps consequently, regional organisations; and the often-stated hopes for marine aquaculture. The situation for freshwater aquaculture is more hopeful in terms of successes in PNG for tilapia and carp, but these data may be subject to verification.

Transport

The Pacific Ocean has long been vital to the indigenous people as a mode of communication, and more recently has acquired global importance for international and domestic transport and other shipping activities, such as fishing and cruise tourism. Spurred by global trade, global shipping has increased significantly in the last 20 years, with nearly four times as many ships at sea. The Pacific Ocean saw ship traffic spike after 2008, especially near China, with cargo shipping accounting for much of the growth (Tournadre 2014; Kinch *et al.* 2010). More than a third of the east-west global container traffic crosses the Pacific (UNCTAD 2015) (Figure 5.10) and the importance of trans-Pacific trade is intimately linked to the major defence spending in the region by bordering states, which dwarfs the economies of island states in comparison – this is further addressed in the discussion on geopolitical issues below.

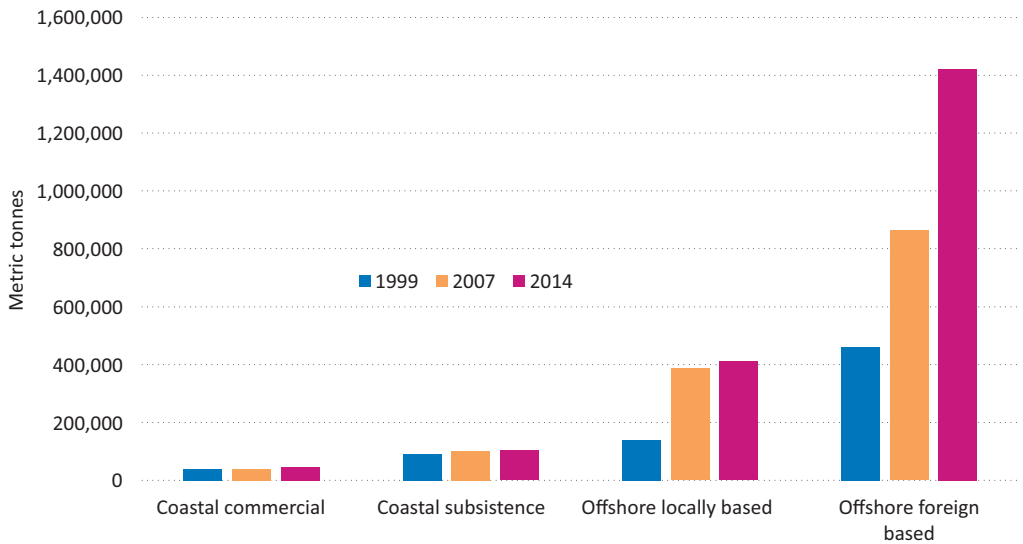
The high and increasing reliance of PICs on imports has created high dependency on domestic and international shipping. However, the unique characteristics of Pacific

Figure 5.9 Value of aquaculture by environment



Source: FAO 2016

Figure 5.10 Fisheries production of the Pacific Island Countries



Source: Gillett 2016

shipping (minute economies at the end of long routes, imbalance in inward/outward loadings, financing barriers, high operational risk and high infrastructural costs) present a greater challenge than for most other countries and regions (Nuttall *et al.* 2014). The majority of countries, apart from PNG and Fiji, unable to benefit from ‘way port calls’ (e.g. from services between Australasia and North America) (ADB 2007), are particularly challenged and there have been calls for more sustainable transport options (Newell *et al.* 2016).

The growth of cruise ships is also high in the South Pacific region, up 18.7 per cent in 2014 from 2013, and more than double the number in 2010 (World Bank 2016a). In 2014, cruise ships brought over 400,000 cruise passengers from the two top source markets of Australia and New Zealand to the region. Of the total, Fiji, PNG, Samoa, Tonga and Vanuatu received 350,197 cruise passengers, with the greatest share going to Vanuatu.

Developing countries are increasingly turning to open ship registries as a source of revenue. These registries, which allow registration of foreign-owned vessels for a fee, are also known as ‘flags of convenience’, with 71 per cent of the world’s total shipping tonnage registered in such a way. Panama, Liberia and the Marshall Islands are the largest vessel registries, which together accounted for 42 per cent of the world tonnage in 2015, with the Marshall Islands having recorded an impressive growth of over 13 per cent over 2014 (UNCTAD 2015). Tuvalu and, until recently, Tonga, are the Commonwealth Pacific small states that have operated small open registries.

Tourism¹⁶

Tourism has emerged as an important sector for the Commonwealth Pacific small states with 1.2 million visitor arrivals, worth US\$500 million in 2014 (World Bank

2016d). Fiji is by far the most popular destination, followed by PNG, Samoa and Vanuatu. Most of the market comprises visitors from Australia and New Zealand.

Many, if not most, of these visitors are attracted to the region's predominant resource, the ocean. For instance, more than 75 per cent of tourists surveyed in Fiji reported that swimming was one of the primary activities of their vacation, with over 50 per cent reporting a variety of other water- or beach-related activities (Verdone *et al.* 2012). The attraction of these marine resource-based activities will be affected by factors including carrying capacity and reduced environmental quality.

The World Bank (2016a) estimates that potentially by 2040, transformational tourism opportunities could bring an additional US\$1.89 billion in revenue and 127,600 jobs to Pacific island countries through an additional million tourists. The cruise ship industry is growing rapidly at near 20 per cent per year to 400,000 passengers in 2014. Home-basing cruise ships alone could bring over 133,000 tourists per year, up to US\$75 million in receipts and port fees and 4,500 jobs.

Emerging uses

Energy

Interest in renewable energy production from ocean resources has a long history, most notably ocean thermal energy conversion (OTEC) and wave energy. At present there are no large-scale commercial operations¹⁷ anywhere in the world but, theoretically, Commonwealth Pacific small states could all benefit from these technologies (Hourcourigaray *et al.* 2014; Lohani and Vega 2014). Wave energy converters are deemed unproven as the small tidal range in most Pacific islands limits this technology. However, a recent study (Bossarelle *et al.* 2016) found that Pacific islands south of latitude 20 degrees receive sufficient wave energy for generation costs to be

on a par with the cost of generation of other renewable energies, such as wind and solar, and, for exposed sites, on a par with the cost of diesel generation. These findings suggest that wave energy is a genuine contender for the development of renewable energy in the Pacific.

In other areas, land-based wind generation is increasingly being deployed in the region and, though limited to sufficiently windy zones, there are opportunities for offshore wind farms, particularly where land availability is a constraint. In French Polynesia, seawater air conditioning has been used at several resorts, which have the appropriate conditions of nearby deep water (Hourcourigaray *et al.* 2014).

There are considerable economic factors to be taken into account to harness the oceanic energy potential for commercial production, and a regional investment approach may be more appropriate in ensuring that investment in large-scale pilots is appropriately targeted. However, there appears to be limited justification to deploy complex and unproven technologies in the Pacific until proven elsewhere (e.g. Hawaii) and there is sufficient capacity built in the Pacific.

PNG is the region's only exporter of fossil fuels and continues to carry out offshore oil exploration, where terminal facilities and undersea pipelines also affect the surrounding ocean environment. Other Commonwealth Pacific small states have historically been interested in offshore oil exploration (e.g. Fiji, Tonga and Solomon Islands) although attention is currently focused on deep sea minerals.

*Deep sea minerals*¹⁸

Prospecting of the deeper sea floor in the late nineteenth century and again in the twentieth century has provided evidence of the existence of metallic minerals across large sections of the ocean floor, including in the EEZs and extended continental shelves of the PICs. These deep sea minerals (DSM) occur in deep water (400-6,000 metres), with three main types identified within the national jurisdiction of PICs:

- **Seafloor massive sulphides:** Minerals precipitated around seafloor hydrothermal or volcanic vents, including copper, iron, zinc, silver and gold. Known to occur in Fiji, PNG, Solomon Islands, Tonga and Vanuatu.
- **Polymetallic manganese nodules:** Nodules containing minerals such as cobalt, copper, iron, lead, manganese, nickel and zinc, which usually occur at great depths (4,000-6,000 metres). These have been found in the waters of Cook Islands and Kiribati, as well as the Clarion Clipperton Fracture Zone in the eastern Pacific, beyond national jurisdictions.
- **Cobalt rich crusts (CRC):** As well as cobalt, these may contain precious metals such as silver and some of the strategically important rare earth elements. These are found between 400 and 4,000 metres depth and have been prospected in Kiribati, Samoa, Tuvalu, Marshall Islands and FSM.

The renewed interest in DSM, not seen since the 1970s, has been driven by a number of factors, including the gradual decline of the grade of onshore minerals, the high commodity prices of 2008 and again in 2010-11, as well as technical advances in DSM exploration. PNG is the only country so far to grant a deep-sea mining licence under the Solwara 1 Project in a world first lease to Nautilus Minerals. Fiji, Solomon Islands, Tonga and Vanuatu have previously granted DSM exploration permits.

There were increasing expectations that DSM mining may soon become a reality in the Pacific, but these have been thrown into question by the persistently low mineral commodity prices of recent years. In addition, given the uncertainty surrounding the amounts and value of minerals on the seabed, costs associated with their extraction, and the cost of potential social and environmental impacts, it is hard to assess the economic potential of DSM.

A recent study (SPC 2016b) suggests that the Solwara 1 Project in PNG could produce US\$130 million present value for Nautilus, after taking out capital and operating expenses, as well as generating around US\$83 million over two years for the PNG government based on royalties, corporate tax and the Government's 15 per cent share of Nautilus's profits. The same study calculated negligible costs in terms of lost environmental services or unplanned spills. A more complex analysis for manganese

nodules in Cook Islands found, in the *best scenario*, a present value of US\$494 million accruing to Government over 20 years though considerably less under other scenarios. However, for the case of CRC in the Marshall Islands, given current technology and market conditions, the benefits associated with DSM mining were unlikely to exceed the costs. Although there is still a major need for cost models and more information, potential revenue of these magnitudes would clearly be attractive to Pacific island governments, particularly in the smaller countries.

Bioprospecting and marine genetic resources

Recent Commonwealth Secretariat reviews (Day *et al.* 2016; Commonwealth Secretariat 2014) highlight that:

oceans and seas are the source of a huge variety of living marine resources that have huge potential for developing new food, biochemical, pharmaceutical, cosmetics and bioenergy applications. About 18,000 natural products have been developed to date from about 4,800 marine organisms, and the number of natural products from marine species is growing at a rate of 4 percent per year.

Thus, marine genetic resources (MGR) are deemed to represent an important opportunity for small island developing states (SIDS)¹⁹ and PICs in particular.

5.2.2 Global and regional ocean governance

Commonwealth Pacific small states have acceded to or ratified many multilateral agreements. Some provide access to global funds which facilitate implementation. However, in general, implementation is a major challenge for most PICs. International (and many regional) policy commitments in general do not correlate with national emphasis on implementation (Chasek 2009; 2010; Pratt and Govan 2010), but in the field of ocean governance (and more recently climate change), PICs have punched far above their weight in terms of influencing global policy in their favour (Quirk and Hanich 2016), particularly in the area of tuna. The following sections outline the policy instruments of most relevance to ocean governance in the region,²⁰ as well as those institutions responsible for its implementation (see Appendix 5.1 for a detailed account of the various roles of regional organisations in ocean governance).

Global oceans conventions and relevant international agreements

United Nations Convention on the Law of the Sea (UNCLOS), 1982

This global convention defines the rights and responsibilities of nations with respect to their use of the world's oceans, establishing guidelines for businesses, the environment, and the management of marine natural resources. The convention has been ratified by 168 parties, including all the Commonwealth Pacific small states.²¹ Fiji was the first country to ratify in 1982.

The United Nations (UN) supports the implementation of the Convention through inter-agency mechanisms such as UN Oceans. The Division for Ocean Affairs

and the Law of the Sea (DOALOS) serves as the Secretariat for the Convention, reporting annually to the General Assembly, making recommendations promoting better understanding of the Convention and supporting States in implementing its provisions. Other aspects are handled by bodies, such as the Commission on the Limits of the Continental Shelf (CLCS) or specific international organisations; those of most relevance are: the International Maritime Organisation (IMO), the International Whaling Commission (IWC), Western and Central Pacific Fisheries Commission (WCPFC), and the International Seabed Authority (ISA).

International Maritime Organisation Conventions

Except for Nauru, all the Commonwealth Pacific small states are party to the various IMO conventions (SPC 2016d):

- International Convention for the Prevention of Pollution from Ships (MARPOL) is the main international convention covering prevention of pollution of the marine environment by ships from operational or accidental causes.
- Intervention on Oil Pollution Preparedness, Response and Co-operation (OPRC) and Protocol on Preparedness, Response and Co-operation to Pollution Incidents by Hazardous and Noxious Substances (OPRC-HNS).
- International Convention relating to Intervention on the High Seas in Cases of Oil Pollution Casualties (INTERVENTION Convention) and the 1973 Protocol Relating to Intervention on the High Seas in Cases of Marine Pollution by Substances Other Than Oil (INTERVENTION Protocol).
- International Convention on the Control of Harmful Anti-fouling Systems in Ships (AFS Convention), 2001 (in force 2008).
- 2004 International Convention for the Control and Management of Ships' Ballast Water and Sediments (not yet in force).

At the regional level, the South Pacific Regional Environment Programme (SPREP) supports countries with implementing strategies and contingency plans, as well as facilitates the development of legislation consistent with the IMO Conventions.

United Nations Convention on Biological Diversity (CBD), 1993

The CBD is a global agreement addressing all aspects of biological diversity: genetic resources, species, and ecosystems, with the specific goals of the conservation of biological diversity (or biodiversity), the sustainable use of its components; and the fair and equitable sharing of benefits arising from genetic resources. There are number of protocols under the CBD addressing issues such as Biosafety and Access to Genetic Resources and the Fair and Equitable Sharing of Benefits. All the Commonwealth Pacific small states have signed and ratified the Convention.

In 2010, countries adopted a Strategic Plan for Biodiversity, including the Aichi Biodiversity Targets to be achieved by 2020. These targets include applying ecosystem-based approaches to ensure sustainable fisheries (Target 6) and targeting

the conservation of 10 per cent of coastal and marine areas through protected areas and other effective area-based measures (Target 11).

The Western and Central Pacific Fisheries Commission

The WCPFC was established by the Convention for the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean (WCPFC Convention), which entered into force on 19 June 2004,²² to implement the Provisions of the UN Fish Stocks Agreement (UNFSA).²³ The WCPFC adopts ‘resolutions’ which are non-binding statements and ‘conservation and management measures’ which are binding, with about 40 management measures currently in force.

The WCPFC meets annually and decisions are taken on the basis of consensus, which can be problematic for members:

Pacific island countries form the largest block of members in the WCPFC, and most often agree on common positions on issues before a WCPFC meeting – but this does not equate to those countries getting what they want in Commission meetings. The convention that established the commission states that as a general rule, decision-making in the Commission shall be by consensus. The convention indicates that ‘consensus’ means the absence of any formal objection made at the time the decision is taken. Given the diversity of interests by WCPFC member countries, this provision has created problems for the WCPFC (and all the other regional tuna commissions in the world) as it often means that a small number of countries can block measures that are perceived by other countries to be important. It should be noted that when fisheries commissions “fail” it is not because of lack of action of the secretariats of those commissions (in this case, the WCPFC office in Pohnpei).

(Gillett 2014)

There is a widespread perception that ‘the fishing industry has an overly large influence in the delegations of several distant water fishing country members’, which hinders decision-making relating to sustainable resource management on the high seas and places an unfair ‘conservation burden’ on PICs (Aqorau in Gillett 2014), which implement more effective management in their EEZs.

The 2030 Agenda for Sustainable Development, 2015

The 2030 Agenda sets out to strengthen universal peace, eradicate poverty, protect the planet and revitalise global partnership, through the achievement of 17 Sustainable Development Goals (SDGs) by 2030. Goal 14 focuses on the conservation and sustainable use of the oceans, seas and marine resources for sustainable development (Appendix 5.2). The Goals relating to poverty (Goal 1), hunger and food security (Goal 2), gender (Goal 5), climate change (Goal 13) and governance and participation (Goal 16) also have links with ocean issues.

Pacific Islands Forum Leaders have committed to the implementation of the SDGs, with particular attention to the region’s ‘unfinished business’ on the Millennium Development Goals. The region is currently undertaking a country-driven process to tailor the global indicators to the national and Pacific context. These tailored

indicators will be used to monitor the region's progress on the SDGs, as well as to monitor the implementation of the SIDS Accelerated Modalities of Action (SAMOA) Pathway and initiatives of the Framework for Pacific Regionalism (see Box 5.2).

SAMOA Pathway, 2014

The Third International Conference on Small Island Developing States held in Apia, Samoa, in 2014 adopted the SAMOA Pathway, which specifically addresses oceans, covering, inter alia, sustainable use, conservation, pollution, research, coral reefs, illegal, unreported and unregulated (IUU) fishing, small-scale fisheries development and management, subsidies, capacity, co-operation and a series of environmental commitments, including a 10 per cent commitment to protected areas.

Regional ocean policy instruments

Pacific Islands Regional Ocean Policy (PIROP), 2002

After a relatively lengthy process of consultation, PIROP was endorsed by Pacific Islands Forum Leaders in 2002 and its Framework for Integrated Strategic Action (PIROF-ISA) in 2005 (Pratt and Govan 2010). The PIROP envisions a healthy ocean that sustains the livelihoods and aspirations of Pacific island communities and defines the ocean in a broad sense to include the waters of the ocean, the living and non-living resources and the seabed, as well as the ocean interfaces with islands and atmosphere. This broad definition can be taken to include the areas beyond national jurisdiction (ABNJ).²⁴

The policy reaffirms international commitments but also addresses issues of specific concern to PICs, including the importance of communities and customary processes, the impact of land-based activities, the impact of potential DSM on ecosystems, and the importance of co-ordination and consensus.

Box 5.2 Framework for Pacific Regionalism

The Framework for Pacific Regionalism was endorsed by Pacific Islands Forum Leaders in July 2014. The Framework replaced the Pacific Plan for Strengthening Regional Cooperation and Integration. In seeking regional collective action, the Framework explicitly values the 'integrity of our vast ocean and our island resources'. Based on objectives relating to sustainable development, governance, security and economic growth, Forum Leaders will each year prioritise a limited number of regional initiatives (with no more than five, ongoing or new, to be selected at any one time) in support of deepening regionalism. The process involves open submissions, which are screened by the Specialist Sub-Committee on Regionalism. To date, several ocean-related submissions have been received and approved by Leaders in the form of the Roadmap for Sustainable Fisheries in 2015 and a commitment to coastal fisheries in 2016.

Source: PIFS, 2014

While the PIROF-ISA remains the most comprehensive ocean policy guidance in the region, it did not define an adequate co-ordination or resourcing system. The facilitation role to co-ordinate implementation of the PIROP and PIROF-ISA fell almost by default to the Council of Regional Organisations of the Pacific (CROP) Marine Sector Working Group (MSWG), but this role was never added to its formal mandate, nor were dedicated resources provided, which hindered implementation.

Despite the lack of implementation of the PIROP, some of its elements have gained traction in later related agreements, such as the Pacific Islands Forum Leaders' Vava'u Declaration on Pacific Fisheries Resources (2007), which called for solidarity in managing WCPO tuna stocks and effective management of coastal fisheries. Subsequently, the Pacific Islands Regional Coastal Fisheries Management Policy and Strategic Actions (Apia Policy, 2008-2013) was developed, and shortly thereafter, several other regional tuna strategies were developed.

Our Sea of Islands, Our Livelihoods, Our Oceania. Framework for a Pacific Oceanscape, 2010

Agreed by Pacific Islands Forum Leaders the Framework for a Pacific Oceanscape (FPO) envisions 'A secure future for Pacific island countries and territories based on sustainable development, management and conservation of our Ocean', and defines three objectives (Pratt and Govan 2010):

- **Integrated ocean management:** to focus on integrated ocean management at all scales that results in the sustainable development, management and conservation of our island, coastal and ocean services.
- **Adaptation to environmental and climate change:** to develop suitable baselines and monitoring strategies that will inform impact scenarios and specific understanding of environmental and climate change stressors.
- **Liaising, listening, learning and leading:** use of appropriate facilitative and collaborative processes, mechanisms and systems and research that results in the achievement of the objectives.

Since the endorsement of the FPO, a number of PICTs and territories have made Large Scale Marine Protected Areas (LSMPAs) commitments, including the Cook Islands Marine Park or Marae Moana and Palau's National Marine Sanctuary (Giron 2016; Jones and de Santo 2016). However, the main intention of the FPO is to revitalise cross-sector planning, management and sustainable development as previously outlined in PIROP and to provide guidance on appropriate processes. There are some key 'new' actions that update or complement perceived gaps in previous policy – particularly the Ocean Commission and Alliance mechanism, climate change and ocean acidification.

To date, there has been progress in implementing the FPO. An Ocean Commissioner has been designated (not fully dedicated as originally intended, but the Secretary-General of the Pacific Islands Forum Secretariat in a part-time capacity), supported by the Office of the Pacific Ocean Commissioner (OPOC). The Pacific Ocean Alliance

was launched and is currently working on issues of the high seas. In addition, funding for the FPO has been forthcoming from Australia and through Conservation International.

Regional oceanic fisheries policy

South Pacific Forum Fisheries Agency Convention, 1979

The Pacific Islands Forum Leaders established the Forum Fisheries Agency in 1979 endorsing the South Pacific Forum Fisheries Agency Convention in response to the emerging Law of the Sea and the perception that distant water fishing nations negotiated access agreements bilaterally in a strategy of 'divide and conquer' (Gillett 2014). This treaty created the Forum Fisheries Agency (FFA) that aimed to drive regional co-operation for the sustainable use and management of Forum members' shared tuna resources. Members of the FFA consists of 15 PICTs plus Australia and New Zealand, including all the Commonwealth Pacific small states.

FFA services include development of regional and national policies, national and regional tuna fisheries management services (such as maintaining a tuna fishing vessel registry and a satellite-based tuna fishing vessel monitoring system), and providing information, analysis and training for countries.²⁵ The Niue Treaty on Cooperation in Fisheries Surveillance and Law Enforcement in the South Pacific Region 1992/2012 promotes co-operation among FFA members, including on enforcement, regional surveillance procedures and patrols, and establishment of harmonised minimum terms and conditions of foreign fishing vessel access to PIC waters. FFA has also helped facilitate negotiations with the United States on a Multilateral Fishing Treaty since 1987, for common conditions and fees for access to PIC waters by the US tuna fleet, together with targeted bilateral aid from the USA (US Department of State 2015).

Nauru Agreement Concerning Cooperation in the Management of Fisheries of Common Interest, 1982

Fish stocks are not evenly distributed across the Pacific and the PICs with the heaviest concentration of purse seine fishing built on the FFA convention to harmonise management of fish stocks shared across the zones of the PNA. In order to increase the benefits accruing from access fees, an FFA study in 2000 suggested that the eight countries of the PNA should shift their attention from capping vessel numbers to limiting the number of purse seine fishing days. By 2007, the Palau Arrangement for the Management of the Western Pacific Purse Seine Fishery (PA) created a vessel day scheme (VDS) that sets a collective limit on the total allowable effort (TAE) and allocation of the effort between the parties. The PA has been amended regularly and by 2015 had achieved measures to combat 'effort creep', the closure of a number of high seas areas to vessels wishing to obtain a licence to fish in PNA waters, the establishment of an Office in the Marshall Islands (PNAO) and the inclusion of longline fishing in 2014.

The mechanism appears complex but is best suited to the multi-jurisdictional setting of the PNA countries and is implemented as part of the Conservation and

Management Measures agreed at WCPFC. PNAO co-ordinates with FFA on vessel registration, monitoring and surveillance.

Significantly, PNA has been able to maintain solidarity among its members, as they have a smaller number of countries with similar stakes and pay careful attention to negotiating approaches.

The more recent Tokelau arrangement (TKA), effective since December 2014, aims to control the South Pacific longline fishery using similar regional co-operative approaches to the PNA by establishing rights-based management, setting limits across the jurisdictions of all participants and allocating shares to participants (Reid *et al.* 2016).

Regional Roadmap for Sustainable Fisheries, 2015

In 2015, the fisheries sector was identified as a regional priority under the Framework for Pacific Regionalism public policy process. Subsequently, Pacific Islands Forum Leaders endorsed a Regional Roadmap for Sustainable Fisheries and established a fisheries taskforce to focus on oceanic fisheries. The Roadmap sets out goals, indicators and strategies for both tuna fisheries and coastal fisheries (World Bank 2016b and FFA 2015b).

Management arrangements for PICs' oceanic fisheries rely on the internationally recognised scientific advice on stocks from the Secretariat of the Pacific Community (SPC). FFA supports national fisheries agencies directly, as well as providing support to PNA and the WCPF management initiatives, including operating the Vessel Monitoring System and Regional Fisheries Surveillance Centre. FFA also supports regional observer programmes, assists with port state enforcement, and maintains the FFA vessel register. There are Monitoring, Control and Surveillance Working Group Meetings (MCSWGM) in place to oversee, review and advise on regional and national monitoring, control and surveillance activities.

Regional coastal fisheries policy

Despite increasingly urgent calls for attention to coastal fisheries management since the Apia Policy (Gillett and Cartwright 2010), national implementation of effective improvements to coastal fisheries management, except for Samoa, remains slow in most countries (Gillett and Cartwright 2010).

Melanesian Spearhead Group Roadmap for Inshore Fisheries Management 2015-2024

In 2012, the Prime Minister of Fiji along with other Leaders of the Melanesian Spearhead Group (MSG)²⁶ recognised the precarious state of coastal fisheries and the massive potential impacts on food security, calling for a roadmap for inshore fisheries management. This led to a review process, which was supported by the SPC (Govan 2013a), and development of the draft policy in 2013. The MSG Coastal Fisheries Roadmap 2015-2024 was subsequently endorsed in 2015, and has been explicitly used to guide the development of the Solomon Islands and PNG national coastal

fisheries policies, currently awaiting endorsement, as well as Fiji's coastal fisheries policy, currently under development.

The Noumea Strategy: A New Song for Coastal fisheries – Pathways to Change, 2015

The Noumea Strategy: A New Song for Coastal Fisheries – Pathways to Change (SPC 2015) ('New Song'), endorsed by fisheries ministers, replaced the region's coastal fisheries policy (Apia Policy 2008-2013). The New Song drew inspiration from, and is entirely compatible with, the MSG Roadmap, with proposals made for other subregions to carry out their own roadmap exercises given the different situations prevailing in each. The New Song represents a significant step forward in regional attention to and management of coastal fisheries.

The essence of the 'New Song' was subsequently endorsed by Pacific Islands Forum Leaders in 2015 under the Future of Fisheries: A Regional Roadmap for Sustainable Pacific Fisheries (FFA 2015a).

Regional Roadmap for Sustainable Fisheries, 2015

In 2015, the fisheries sector was identified as a regional priority under the FPR public policy process, which led to the development of a Regional Roadmap for Sustainable Fisheries that included targets and goals for coastal fisheries. The Regional Roadmap for Sustainable Fisheries was subsequently endorsed by Pacific Islands Forum Leaders and is already influencing technical and donor programming (L. Chapman, SPC, personal communication).

Many elements of the Regional Roadmap are aligned with the FAO's recently produced Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries in the Context of Food Security and Poverty Eradication.

Management of coastal fisheries is almost exclusively in the national or local community domains. However, there are suggestions for MSG countries to co-operate on the monitoring and possible regulation of companies trading bêche-de-mer. There are also signs of a greater commitment by regional agencies, such as SPC and the OPOC, to monitor the country implementation of ocean-related policies and this may encourage more political oversight and momentum on national coastal fisheries management.

Regional frameworks on deep sea minerals

UNCLOS provides states with the rights to exploit the DSM resources of their continental shelves and, in addition, states are able to seek rights to undertake or sponsor DSM activities within the ABNJ ('Area'). UNCLOS also creates a general obligation for states to protect and preserve the entire marine environment both within and outside areas of national jurisdiction (SPC 2012).

Under UNCLOS, the International Seabed Authority administers the Area and within this general legal framework, ISA issues rules, regulations and procedures referred to as the 'Mining Code'. UNCLOS signatory states (including all Commonwealth Pacific small states) may access the DSM of the Area by applying to the ISA, or may sponsor

a corporate body to do so. By 2014, four PICs (Nauru, Tonga, Kiribati and the Cook Islands), in partnership with foreign companies and investors, became sponsoring states in the Area (SPC 2016e).

Regionally, SPC's EU-funded DSM Project (SPC-EU DSM) has been actively producing regional guidance frameworks, including on the development of DSM legislation. As of June 2016, the following regional frameworks had been produced:

- Pacific-ACP States Regional Legislative and Regulatory Framework for Deep Sea Minerals Exploration and Exploitation (SPC 2012).
- Pacific-ACP States Regional Financial Framework for Deep Sea Minerals Exploration and Exploitation (SPC 2016e).
- Pacific-ACP States Regional Environmental Management Framework for Deep Sea Minerals Exploration and Exploitation (SPC 2016b) (REMF).
- Pacific-ACP States Regional Scientific Research Guidelines for Deep Sea Minerals (SPC 2016d).

The SPC-EU DSM provides an example of effective regional support. Although this project is scheduled to end in 2016, it is expected that SPC will continue to offer support. Commonwealth Secretariat's Oceans and Natural Resources Advisory Division also has specialist in-house technical experts who can advise member States on deep sea mineral policy, law and economics.

5.2.3 Maritime boundaries and jurisdiction

Legally defined jurisdiction provides a basis for securing ocean benefits under UNCLOS. Maritime boundaries are established through delimitation where zones overlap. The establishment of maritime zones is a unilateral act, notification of which is provided to the international community through the formal deposit of information relating to State parties' baselines and maritime zones' outer limits with the Secretary-General of the UN. Regional policy such as the Framework for the Pacific Oceanscape and donor support have emphasised the high priority that should be given to finalising maritime boundaries as a legal basis for PICs' maritime jurisdiction. The certainty provided by fixing maritime boundaries, declaring normal baselines on official large scale charts, and depositing information on baselines and maritime limits as required under Articles 16(2), 47(9), 75(2) and 84(2) of UNCLOS²⁷ will put PICTs in a stronger position in the face of potential loss of maritime space due to rising sea levels.

Baselines and maritime boundaries

Progress in depositing information relating to baselines and registering the maritime boundaries of the Commonwealth Pacific small states has been steadily pursued over the years, with the support of SPC's Geoscience Division, the Commonwealth Secretariat, the Forum Fisheries Agency, UNEP's Grid Arendal, Geoscience Australia and the Australian Attorney General's Department. By 2017, 12 PICs have lodged information regarding their baselines and steady progress has been made in lodging maritime boundaries and in some cases, maritime zones legislation with the UN (SPC 2016c).²⁸

Shared boundaries

Shared maritime boundaries add a layer of complexity and time investment, but progress has been steady and 36 maritime boundary agreements have been signed so far with approximately 13 yet to be negotiated.²⁹ Some work remains, e.g. the treaty between Vanuatu and Solomon Islands signed in October 2016 has yet to be deposited with the UN. FSM has deposited information relating to its maritime boundary agreement concluded with Palau without its baseline coordinates being deposited. Similarly, Tonga has lodged its agreement with France regarding Wallis and Futuna without depositing its baseline coordinates or charts.³⁰

Extended continental shelf

Technical assistance (by the Commonwealth Secretariat and others) is also being provided to countries for the submission and defence of claims for the Extended Continental Shelf beyond 200 nautical miles. Preliminary indicative information has in most cases been replaced by full, partial or joint submissions – as of early 2017, 11 PICT submissions have been lodged with CLCS totalling some 2 million km², seven of these pertaining to Commonwealth Pacific small states.³¹ FSM, PNG and the Solomon Islands will shortly receive recommendations from the CLCS regarding their joint submission relating to the Ontong Java Plateau. Fiji, FSM, PNG and the Solomon Islands may still require support for the presentation and defence of other related submissions.

Areas beyond national jurisdiction

The Pacific Islands Regional Ocean Policy (2002), subsequently reinforced by the Framework for a Pacific Oceanscape (2010), made clear the region's interest in managing the areas beyond national jurisdiction, both the seabed and the water column. In July 2014, Pacific Islands Forum Leaders endorsed the 'Palau Declaration - The Ocean: Life and Future, Charting a Course to Sustainability', which included the following statement:

We support a decision in favour of launching negotiations by September 2015 for an International Agreement under the United Nations Convention on the Law of the Sea on the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction.

In June 2015, the United Nations General Assembly adopted a resolution to develop an international legally binding instrument under UNCLOS on the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction. This resolution established a preparatory committee, which will report to the General Assembly in 2017 on its progress. The instrument on the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction (BBNJ) will be developed based on the following elements:

- Marine genetic resources, including questions on the sharing of benefits.
- Measures such as area-based management tools, including marine protected areas (MPAs).

- Environmental impact assessments.
- Capacity-building and the transfer of marine technology.

Despite calls for the protection of the high seas pockets dating back to the Noumea Convention of 1986, MPAs have not been established in the ABNJ covered by UNCLOS. Instead, Southwest Pacific countries have been able to progress protection of marine biodiversity in ABNJ through the adoption of fishing regulation measures through the framework of the Western and Central Pacific Fisheries Convention and the work of the Commission. In addition, under implementing arrangements of PNA, there is an explicit closure of the high seas pockets to purse seine fishing (Rochette *et al.* 2014; Druel *et al.* 2012; Pratt and Govan 2010), and this highlights the potential to build on these experiences for the practical measures for marine biodiversity protection in the ABNJ.

5.2.4 National governance, policy and institutions

While recent regional policy has apparently improved the uptake and functioning of regional agencies, there are less indications of the impact of regional policies on national policy development and legislation. Some insights into national policies are provided below.

Fisheries management

The primary fisheries legislation in Commonwealth Pacific small states is relatively up to date and, except for Fiji and Nauru, dates between 2002 and 2015 (Govan 2015a).

Access to and regulation of tuna fishing within the waters of PICs broadly follows the various regional agreements and is regulated at the national level. Almost all PICs have prepared national Tuna Fishery Development and Management Plans or the equivalent with varying degrees of implementation to date (World Bank 2016b). Only Kiribati, Samoa and Solomon Islands of the nine Commonwealth Pacific small states have a coastal fisheries policy, and one of these is currently being updated. Fiji and PNG are in the process of drafting such policies (Govan 2015a).

The national fisheries agencies are government departments or ministries dependent on annual government spending allocations and priorities, except in the case of PNG, which has a statutory authority and its own revenue from fisheries levies. Operational (as opposed to project or development) budgets are expected to reflect the long-term commitment of governments to fisheries agencies. Commonwealth Pacific small states data for 2012-2013 suggest that these totalled about US\$50 million (excluding PNG amounts to US\$10 million), and of these budgets less than 20 per cent was estimated for coastal fisheries development and management. About 870 staff (580 excluding PNG) were employed in these nine countries and between 20 and 50 per cent had at least some coastal duties (data from Govan 2015a).

Significant costs in negotiating access arrangements or managing resources are likely borne by other public agencies and departments (World Bank 2016b). For example, significant tuna fisheries management costs in the Pacific are borne by regional

agencies and often via donor funding sources, while coastal fisheries management efforts are often heavily supported by non-government organisations (NGOs) (Govan 2013a).

Environmental management

According to the latest assessment of the state of conservation in Oceania:

most of the Pacific island countries have made commitments to the main biodiversity Multilateral Environmental Agreements (MEA), in particular CBD. However, overall, the current status of domestic law within the Oceania region related to international environmental law is considered to be low. Most States have not enacted specific or comprehensive legislation to enable compliance with their obligations under relevant Conventions and MEAs, and existing laws do not predominantly address these obligations.

(SPREP 2016)

Of the Commonwealth Pacific small states, only Samoa is considered to be fully implementing the CBD through domestic law.

Parties to the CBD are required to develop National Biodiversity Strategies and Action Plans (NBSAPs), the principal instruments for implementing the CBD at the national level. Some progress is reported for all states towards meeting most targets of the CBD Strategic Plan 2001–2010 but 20 out of the 21 targets have seen little or deteriorating progress, and none of the NBSAPs had yet incorporated the Aichi Biodiversity Targets.

While PICTs have laws related to environmental impact assessments (EIAs), many of the laws and policies are too broad and urgently require more specificity. In particular, there is a need for international standards to be applied in the EIA process so that a defined and agreed standard of this important environmental management tool is met.

Only PNG has designated its environmental agency as a statutory authority, although in this case its opportunities for raising revenue are not so promising as in the fisheries sector. While data relating to public expenditure on the environment are scarce, an unpublished study (Govan 2015b) estimates that five of the Commonwealth Pacific small states (Fiji, Kiribati, Tonga, Solomon Islands, Vanuatu), together invest less than US\$2 million per year on the operational or recurrent budgets of the environment departments. This is a very low figure compared to regional and national donor projects or initiatives (although it is doubtful that projects achieve sustained management or enforcement).

Leaders of PICTs, with the encouragement of international NGOs and philanthropic foundations, have made Large Scale Marine Protected Area declarations. Kiribati established the Phoenix Islands Protected Area and World Heritage Site in 2006 and other declarations include those of the Cook Islands Marine Park (2012) and Palau Marine Sanctuary (2015). Territories have been active too, with declarations of the Mariana Trench Marine National Monument (2009), Natural Park of the Coral Sea by New Caledonia in 2014, Pitcairn's Marine Reserve (2015) and the Motu Motiro Hiva Marine Park in Easter Island/Chile (2010).

Deep sea minerals development

Cook Islands and Kiribati have national deep sea mineral (DSM) policies that underwent public consultation before being finalised. In Vanuatu, again following a public consultation process, a DSM policy has been completed and submitted to cabinet for adoption. A draft DSM policy has been developed for Tuvalu that was scheduled to be discussed in national public consultation to be held in August 2016 (SPC 2016d).

Cook Islands, Tonga and Tuvalu have legislation that specifically covers management of national DSM. Cook Islands has DSM licensing regulations providing more detail to their regime for DSM exploration. Tonga is currently developing DSM Trust Fund Regulations that should be finalised by the end of 2016. Fiji, Nauru, Tonga, and Tuvalu also have laws enacted to regulate their sponsorship of DSM activities in the ABNJ.

These legal instruments have been produced under the auspices of the SPC-EU DSM project, which produced regional legislative, financial, environmental and scientific research frameworks and guidelines. Other countries (FSM, Kiribati, Marshall Island, and Niue) were drafting DSM legislation under this project (SPC 2016a). The Pacific is more active in DSM matters than other regions, and these national DSM policies and laws have set a global precedent. These laws include a number of good governance measures aimed to promote transparency and accountability in DSM management.

Other countries (Fiji, PNG, Solomon Islands, and Vanuatu) have onland mining laws that to some extent cover offshore DSM activities. PNG is reviewing its mining laws, which will cover DSM.

Traditional environmental governance

Traditional tenure and ecological knowledge may also be considered assets for the region, having very tangible benefits in terms of both the restriction of access or certain activities in customary areas, and the prevailing cultural sense of stewardship that affects resource management decisions at the local level. Given that over 90 per cent of land in the Commonwealth Pacific small states is under customary ownership, and given the largely rural population, the importance of these non-formal mechanisms is perhaps under appreciated. Under some definitions, customary land could be considered a protected area and, certainly, the rights systems that exists provides a good basis for co-operative management between communities and government (Govan *et al.* 2009; Govan and Jupiter 2011). The role of traditional environmental governance or customary tenure is well documented in the management of coastal fisheries.

Traditional governance was included in the latest review of the State of Conservation in Oceania and its current status was rated as 'Good' noting also that:

though customary law is unwritten in most Pacific island countries, it is widely recognised and embedded in supreme law in most countries. Indigenous law plays a vital and influential role in the conservation of biodiversity across the region and is being increasingly recognised as doing so.

(SPREP 2016)

Subnational environmental governance

Decentralisation of governance is a logical step towards ensuring that government services for resource management are able to be delivered at the community level, which is particularly important for land and coastal fisheries management, as well as the enforcement of EIAs, forestry or mining codes of conduct and licences. However, with the exception of PNG, the other Commonwealth Pacific small states do not seem to provide adequate financial or human resources to empower provincial or district levels, particularly in the fisheries and environmental sectors (Govan 2013a,c, 2014a, 2015a, 2016, Govan *et al.* 2013).

5.3 Key issues

5.3.1 Fisheries

Offshore fisheries

Bigeye Stocks under threat and poor management of the high seas

Despite overfishing for more than ten years and recommendations in place to ease pressure on bigeye tuna stocks, current management measures appear to be insufficient. Unfortunately, small bigeye are being caught through purse seine fishing for the major skipjack fishery and larger bigeye are being caught by longlining in the countries that do not benefit from the skipjack fishery (e.g. Fiji, Tonga and Cook Islands) and a large proportion are caught on the high seas where there is a lower level of management rigour and accountability.³² Obtaining support from Distant Water Fishing Nations (DWFN) on effective management measures has so far proven elusive.

There are concerns that the current management measures for the high seas under the WCPFC are proving ineffective and, if repeated calls to implement specific management measures are ignored,³³ rather than seeking other global mechanisms for managing the high seas (as for instance those under discussion in the UN BBNJ Preparatory Committee process) it is more appropriate to give greater consideration to coastal state management of enclosed, substantially enclosed and adjacent high seas areas, or to closure of high seas areas for conservation management of highly migratory species³⁴.

Pressures on regional solidarity³⁵

The region has had several notable successes over the last four decades in banding together for the purpose of negotiating better terms with DWFNs who historically have preferred bilateral negotiations. Regional solidarity has been emphasised in various declarations and by lead agencies themselves. However, on occasions, foreign countries have successfully applied pressure on some countries to ignore regionally agreed terms and conditions.³⁶ The terms of bilateral agreements, on the other hand, are usually confidential. Maintaining regional solidarity and resolving differences between PICs in the interests of improving overall benefits is an ongoing concern (Gillett 2014; Aqorau 2016).

There are also pressures on regional solidarity from development and trading partners, particularly arising from the success of PNA, which has made impressive progress in recent years by developing a management system that maximises returns to countries and also promises sustainability of stocks (Toroa Strategy 2016; Tarai, 2015; Aqorau 2015; PNA, 2016a; Tarte 1998). In recent years, there have been some instances that have undermined the PNA arrangement (Aqorau 2016). With the success of the PNA, the US Treaty terms became less favourable. Almost all the efforts of the US fleet occur in PNA waters so PNA members wanted the US Treaty to apply the VDS management scheme with commercial market rates, and they also wanted the flexibility to apply national laws in their EEZs without US consent. However, as the US Treaty had a US Government aid component, shared between all the countries (PNA and non-PNA members), the stakes were very different for PNA and non-PNA countries. This tension placed the FFA, negotiating on behalf of its members (PNA and non-PNA), in an awkward position with its wider membership and the PNA Office. It inevitably put strain on regional solidarity and undermined the smooth functioning of PNA management arrangements and potentially the sustainability of stocks.³⁷

The negotiation of a regional Comprehensive Economic Partnership Agreement with the EU also provoked tensions within the region as there were differences in fisheries interests between the PNA, non-PNA, and the EU. PNA members were concerned about the EU's poor track record of conservation in other oceans as well as perceived attempts by the EU to use the Agreement's terms to exert control over the region's fisheries.

In addition, New Zealand in 2015 pushed for the development of a framework for a quota-based management system³⁸ at the Pacific Islands Forum Leaders Meeting. This caused consternation as the advantages of a catch-based management system over the increasingly successful effort-based system (VDS) had not been supported by independent studies. A Fisheries Task Force, chaired by the Pacific Islands Forum, considered the evidence and concluded that 'there is no need to change the management of the purse seine VDS in the foreseeable future'.³⁹

These examples demonstrate the vulnerability of existing 'regional' architecture to individual country interests, particularly if these are lobbied by external parties. This has led Aqorau (2015) to warn that wider regional approaches as opposed to subregional ones may not be appropriate in cases where resources or interests are not equally shared:

Having a single region arrangement is useful for some purposes, but not for others. It is clear though that single region arrangements are normally determined by the lowest common denominator. This is known as the Niue factor. In regional fora where decisions have been traditionally made by consensus, a small country such as Niue – with for example no US fishing in its waters and no trade with the EU – can prevent the best overall outcomes because their interests also have to be taken into account.

Illegal, unreported and unregulated fishing

IUU fishing is justifiably of concern in the crucial tuna fisheries. The results of a recent study (MRAG 2016) estimated that the total value of tuna lost by the region to

IUU is over US\$600 million, which has been widely reported in the media. A closer examination of the study reveals that while some activities are illegal, they may not necessarily result in direct losses to PICs, and of the risks quantified, the three forms of unlicensed fishing (i.e. what might be normally associated with ‘pirate’ fishing) collectively accounted for only around 3.4 per cent of total ex-vessel IUU value. The full value of the fish taken illegally would not be returned to PICs under normal circumstances and thus the actual rent losses to PICs are estimated to be around US\$150 million or less.

Countries and regional organisations are making progress in dealing with IUU. For example, an important benefit of the VDS, as currently structured, is that the vessel’s capacity to pay, and therefore the price received by countries, is influenced by the catch and profitability of the catching vessel. Therefore, as fishing companies compete for a limited number of VDS days, it is probable that the potential economic losses are actually captured by the market prices paid for VDS days, reducing the need for IUU fishing. This also highlights the value of the VDS system compared with the quota-based management system discussed above.

Mismatched tools: protected areas in the context of migratory species

The energetic promotion of Large Scale Marine Protected Areas has potentially misled some decision-makers. For instance, President Anote Tong of Kiribati stated that:

*The closure of the Phoenix Island Protected Area will have a major contribution for regeneration of tuna stocks, not only for us but for our global community, and for generations to come.*⁴⁰

However, as tuna are a highly migratory species, protected areas are generally not considered the most suitable management tool⁴¹ and would have to be assessed along with other tools before protected area commitments were made. In one of the few cases where appropriate bioeconomic modelling has been carried out, it has shown that high seas closures have a negligible effect on the bigeye tuna biomass, and that the most efficient management policies relate to the control of FADs and restricting longline fishing in spawning areas (Sibert *et al.* 2012).

In the absence of integrated governance and management approaches that ensure the application of appropriate management tools in a zoned or spatially planned approach to meet the national and regional priorities, the promotion of LSMPAs poses very real risks to national income and the biological stocks from which these derive. As greater proportions of EEZs are enclosed, fishing effort has been observed to shift into adjacent high seas where, as noted above, the rules of fishing are less rigorous and vigorously applied and the rents do not accrue to PICs.⁴² There have so far not been any independent studies of the costs and benefits of LSMPAs compared to other management options, and this is part of a wider discussion pursued below.

Maximising rents

Pacific Islands Forum Leaders have identified areas where PICs can enhance the economic value of the tuna fisheries without increasing production; for instance, by

increasing the proportion of the value received in access fees for longline fisheries, which has been far lower than purse-seining, especially in recent years (e.g. 3-5 per cent for longline versus 7-13 per cent for purse seine).⁴³ Other suggestions (long reiterated) include increasing local employment by increasing tuna processing in Melanesia, prioritising supply to Pacific island processors, increasing the local crew for fishing vessels, seeking higher-value products for consumers willing to pay more for Pacific-branded sustainably caught tuna and progressive restrictions of fishing on the high seas by non-PIC vessels. To increase local fishing vessels, there are proposals for joint ventures with foreign vessels, but this may prove challenging, as local vessels may be older and thus less efficient. Of more concern, local vessels may soon face challenges complying with international agreements, such as MARPOL on ship-based emissions or the Montreal Protocol on older refrigerants, such as those used on older ships (R. Awira, PIFS, personal communication).

Coastal fisheries

There is generally consensus that coastal fisheries are reaching breaking point and in many places show signs of over-exploitation, especially in areas close to population centres and for fishery products in demand by the rapidly growing Asian economies (Gillett 2014; SPC 2013; Pauly and Zeller 2016). The coastal fisheries are also negatively affected by habitat degradation, which results from destructive fishing practices, pollution, siltation from mining/logging, urbanisation and other competing uses of the coastal zone (SPC 2008).

The lack of coastal fisheries statistics in most countries of the region reflects the minimal attention to and management of coastal fisheries. Aside from a wealth of anecdotal evidence, there are several factors that support urgent calls for more attention to be paid to coastal fisheries management.

Despite continued development efforts, coastal fisheries are likely close to their biological limits as overall production has not increased unlike in the offshore sector (Figure 5.10). In addition, given that coastal populations continue to increase, the per capita production of fish from coastal fisheries actually decreased at a rate of approximately 6 per cent in the period 2007-2014. This is considered a remarkable decrease in such a short period and has been described as a 'wake-up call' (Gillett 2016). Many of the commercially important export fisheries of coastal areas have gone through boom-bust cycles or collapsed, such as *bêche-de-mer*, trochus and pearl oyster.

In contrast to improvements in national and regional tuna fisheries management frameworks, there has been limited improvement, or even a decline in, management within the coastal fisheries sector (Gillett and Cartwright 2010; Gillett 2016). With a few exceptions (e.g. Samoa), governments have not invested in effective coastal fisheries management, although there has been some success in applying restrictions on high-value export coastal fisheries (*bêche-de-mer*, shark fin, trochus) (Gillett and Cartwright 2010; Govan 2015a).

Issues confronting effective government contributions to coastal fisheries management include (Gillett 2016; Govan 2013, 2015a; Gillett and Cartwright 2010; SPC 2013):

- Promotion of coastal fisheries ‘development’ (e.g. expensive fisheries centres or provision of boats and gear) without due consideration for sustainable management.
- Disproportionate government attention (budgets and staff) to offshore fisheries management compared to coastal fisheries management.
- Lack of support for decentralised government resource management, i.e. at island council, district or provincial level.
- Promotion of aquaculture, reef ranching and reef enhancement as a management tool with little evidence to suggest that this is an effective substitute for basic fisheries management actions.
- Promotion of ‘alternative livelihoods’ instead of less popular, but probably inevitable, restrictive management.
- Tendency for projects on current hot topics (e.g. marine protected areas or shark conservation) to divert attention from first establishing mundane but broader coastal fisheries management.
- An imbalance towards developing more policies without providing for the government institutional structures or resources necessary for implementation.
- Erosion of customary rights and traditional governance that forms a mainstay of current coastal fisheries management in many countries.

Traditional and local management forms the mainstay of current coastal fisheries management. Customary ownership or rights over the inshore area, whether legally acknowledged or not, have provided the basis for village leaders to restrict or control fishing effort from those outside the community and by community members. However, traditional management is eroding and facing possibly insurmountable challenges in the form of increases in population pressure and commercialisation of nearshore resources. In response, communities have been supported (mainly by NGOs, with the exceptions of the governments of Samoa and Tonga) in carrying out local or community-based management and by 2015, nearly 8 per cent of the region’s more than 11,000 coastal communities, primarily in Fiji and Samoa, were documented as having received support to practise ‘community-based’ management.

Aquaculture

An independent review commissioned by SPC (Hambrey *et al.* 2012) concluded that:

Despite substantial efforts and large injections of research and development finance, mariculture development in Pacific Island nations has been very limited. This is explained by the nature of mariculture [its often demanding/high risk attributes], the manner in which mariculture has been promoted, and a range of more specific practical and economic constraints.

Based on past experience, there does not seem to be significant potential for marine aquaculture. However, for areas that may still have potential, there needs to be a

fundamental change in approaching mariculture development, such as impartial and context-specific assessment and planning that includes more thorough and realistic market appraisals, estimates of production, distribution and marketing costs and specifically (based on Hambrey *et al.* 2012):

- better development planning of mariculture within the wider processes of economic development planning and/or integrated coastal management;
- more objective and informed project preparation and appraisal; and
- a greater role for the private sector as a key partner in any government or aid-promoted development project.

On the other hand, there is potential for freshwater aquaculture in supplementing marine fisheries production, particularly for subsistence (e.g. tilapia, given its apparent success in PNG). In addition, technical challenges are not expected to prove significant and climate change may favour production. For example, higher temperatures and rainfall may make tilapia farming feasible at higher altitudes in high islands, as well as some atolls. Therefore, freshwater aquaculture should be given priority attention. However, improved data and better assessments are still needed to determine with confidence the role that freshwater aquaculture might play in supplementing marine fisheries production (Bell and Taylor 2015; Bell *et al.* 2016).

5.3.2 Transport

Tanker, cargo, fishing and cruise shipping operate in different areas of the Pacific but with sometimes substantial areas of overlap. The expected continued growth in shipping increases the likelihood of interactions between the sectors and the risk of use interactions and subsequent oil or ship-based pollution (Kinch *et al.* 2010).

Port activities have land-based impacts, as well as placing pressures on the surrounding areas from chronic and accidental spillages, which most countries are ill-equipped to regulate. Contaminated ballast water⁴⁴ and encrusting organisms on ships present the risk of introducing invasive and alien species, of which the risks and mechanisms are an increasingly serious, but poorly understood, concern throughout Oceania (SPREP 2016).

There are particular concerns on cruise shipping compared to other shipping, as their routes pass through different, and often more pristine, locations than other major shipping. This poses different sets of risks related to invasive species or routine and accidental emissions of pollutants. Despite moves from the industry to self-regulate, the amount of solid and liquid waste produced by cruise ships is far higher than for other shipping, making it challenging for Commonwealth Pacific small states to monitor and regulate (Luck 2007; Kinch *et al.* 2010).

Historically, the motivation for registering ships in foreign open registries was avoiding stringent safety and environmental regulations in their own countries. However, a recent study (UNCTAD 2015) found no generalised difference between open and national registries, as far as the ratification and implementation of relevant international conventions were concerned.

The performance of Pacific Island Flag States in enforcing their environmental regulations on registered vessels has been either poor or unsatisfactory. This is mainly due to lack of resources, technical complexity or lack of political will. Unless Pacific Island Flag States agree to exercise their jurisdiction over such vessels, it could undermine the enforcement of MPAs and other arrangements for the conservation and sustainable use of EEZs (and ABNJ).⁴⁵

Registries with a good track record usually host far younger fleets and keep a close eye on the compliance of ship-owners with international regulations. The registries with the youngest fleets among the top 35 flags were Hong Kong (China), the Marshall Islands and Singapore. However, the Marshall Islands registry has received mixed reviews, and concerns have been raised over its capacity to enforce its flag state responsibilities. There are also concerns regarding the benefits to the country in terms of cash or investment from the Registry, which is managed by a foreign company (Manoni 2012; Buchanan 2012).

Tuvalu has also faced issues with its ship registry. In 2012, after initially registering Iranian oil tankers under its flag, Tuvalu subsequently deregistered them to avoid international sanctions by the US and EU, who at the time had sanctioned Iran's oil exports due to its nuclear policy. Tonga, on the other hand, closed its registry in 2002 when it faced the same criticisms over flagging North Korean vessels involved in arms and drug smuggling.

Where major open registries are located, emissions from maritime transport are of increasing concern as it is difficult to regulate emissions and other environmental impacts, such as ballast water. Therefore, while PICs will continue to be attracted to the economic opportunities of open registries, given the substandard practices associated with them, it raises the risk of a major maritime mishap, unless registration requirements are standardised and benefits to countries are maximised (Buchanan 2012). In the meantime, more consideration needs to be given to maritime disaster response.

Nevertheless, there are opportunities for reputable registries, whose vessels will be less targeted by port state control authorities, making these registries more attractive to ship owners. In addition, registries with younger and better maintained ships will be better able to comply with regulations and, if the IMO lowers global limits on carbon emissions (as has been called for by Pacific Leaders with the notable exception of Cook Islands⁴⁶), PICs that have younger fleets will have a competitive advantage over others.

5.3.3 Tourism

Tourism growth may increase pressures on coastal or ocean resources, requiring improved planning processes and environmental regulation to reduce the risks of habitat degradation and overdevelopment. Land-based impacts on coastal resources are already serious concerns and increased pressures from tourism will be hard to control in many of the countries with already strained regulatory systems. In light of such impacts, concerns relating to the equitable distribution of benefits from tourism to local communities require further consideration.

As tourism grows, the expansion of cruise shipping will introduce a series of environmental and socio-economic considerations, which may have disproportionately adverse effects in relatively small and fragile island settings. Cruise ship environmental impacts may include (Johnson 2002; Thomas 2015):

- Infrastructure impacts (e.g., degradation of coastal/marine habitats due to the construction of terminal facilities, use of local natural resources for construction, dredging and dumping of spoil).
- Operational impacts (e.g., consumption of local resources by ships, water and air pollution, and damage caused to marine ecosystems by ships).
- Distribution impacts (e.g., associated with passenger travel and industrial supply chain logistics);
- Use impacts (e.g., cultural impacts on the local community, as well as disturbances to wildlife and natural environments);
- Waste impacts (e.g., from garbage, oils, sewage and other hazardous waste generated by ships).

In addition, the economic benefits of cruise shipping need to be carefully balanced against the risk of undermining social and cultural assets. Therefore, it will be important to learn from the Caribbean experience, as the Caribbean has had a longer history of cruise shipping than the Pacific.

5.3.4 Emerging sectors

Deep sea minerals

The feasibility and potential economic benefits of DSM are uncertain. Likewise, the potential environmental and social impacts, and risks, of DSM are also uncertain.

Environmental impacts are expected to vary depending on the phase of development and type of activity: DSM prospecting is expected to have minimal impact, DSM exploration is expected to have minimal to moderate impact (when test mining is considered), and DSM exploitation is expected to have severe and potentially permanent impacts at the mine site (SPC 2016d)⁴⁷. It will be important to also account for the impact of waste, increased shipping and spillages, as well as the impact on other economic resources, such as tourism or fisheries. The impact of DSM on the globally important Pacific tuna fisheries or the locally vital coastal fisheries is under preliminary assessment.⁴⁸ PICs are not anticipated to invest in deep sea mineral processing due to the substantial water and energy requirements, which many PICs will find difficult to meet.

Unknown or potential environmental impacts on livelihoods (e.g. fisheries or tourism) might lead to social impacts and risks. Concerns have also been voiced over the types of jobs and dependencies created, although these may be relatively unfounded given the small numbers of jobs envisaged.

Given experiences with land-based natural resource extraction, particularly in PNG, there are noteworthy concerns related to the governance and distribution of DSM

revenues within society and with future generations (SPC 2016e; World Bank 2016c; Blue Ocean Law 2016). Most PICs lack the adequate fiscal regimes to ensure that they maximise the benefits while minimising the risks; namely the so-called 'resource curse', which can harm national export industries and lead to overspending and corruption, if revenue streams are not adequately safeguarded. In addition, there is limited institutional capacity to deal with DSM issues. Establishing the institutional capacity and regulatory framework for DSM is also very costly (in the order of US\$2 million), with projected annual operational expenditures of around US\$200,000 (World Bank 2016c). To put this into context, the total fishery department budgets in Commonwealth Pacific small states (excluding PNG) range from US\$0.5 to US\$2 million. Even increasing the budget allocation for coastal fisheries management has made slow progress in almost all countries (World Bank 2016c; Govan 2015a) and it would likely be even harder to meet the costs of DSM activities.

Environmental impact assessments will also be vital in the management of DSM and it is important to learn from the experience of land-based development to avoid its pitfalls: insufficient quality control exercised over EIA reports; weak compliance monitoring and enforcement; and low levels of public engagement and participation in EIAs (Bradley and Swaddling 2016). Many PICs have relatively weak environmental regulation so those that are exploring DSM development must ensure a better understanding of the role of EIA, apply EIA rigorously and continually improve EIA systems to maximise the positive development outcomes of DSM.

Given the above uncertainties and challenges, there is a strong case for a precautionary approach to DSM, with improved/appropriate stakeholder participation, including from civil society, customary owners and indigenous peoples (Blue Ocean Law 2016). Long range planning, better fiscal management and appropriate financial models for rent distribution are needed to ensure permanent benefits, as well as avoid the risks that windfall resource wealth can have on the economy. Sovereign wealth funds or similar mechanisms are strongly recommended (SPC 2016d; World Bank 2016c), but will require wider consideration in the context of national governance.

The emergence of DSM, among other factors, makes the case for moving towards integrated ocean planning and management at the national and even regional scale. However, this will require national capacity development and, at the regional level, appropriate mechanisms that may offer the pooling of technical capacity.

There is reported to be increasing PIC interest in formalising regional co-operation and support for various aspects of DSM. This could build on aspects of the successful regional management of tuna, where regional technical agencies and political island groupings have been able to maximise returns. Although the differences between managing living and non-living resources are significant, there are still strong arguments for ensuring a level playing field in terms of robust environmental, social and fiscal provisions and the rigorous application of a precautionary approach.

The structure and function of formal regional co-operation are yet to be broached with leaders and aspects such as whether such an arrangement should have a regulatory function or be limited to technical co-operation service provision, will need to be assessed (World Bank 2016c).

Bioprospecting and marine genetic resources

Genetic resources found within the EEZ (the water, soil or subsoil) are subject to national jurisdiction, including access and benefit sharing (ABS) laws and regulations. Their conservation and sustainable use also fall under CBD and the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilisation.

The Nagoya Protocol sets out legally binding core obligations for its parties to take the necessary legislative, administrative or policy measures in relation to access to genetic resources, benefit-sharing and compliance, but there are very few specific laws dealing with bioprospecting and ABS in SIDS (Commonwealth Secretariat 2014; Vierros *et al.* 2016), and only Fiji, Samoa and Vanuatu of the nine Commonwealth Pacific small states have ratified the Nagoya Protocol to date (CBD 2016).

Marine genetic resources sourced from ABNJ are not covered by the Nagoya Protocol. Biodiversity in this part of the ocean falls outside the jurisdiction, ownership and protection of any one state or international agreement. It is conceivable, however, that the genetic diversity within the high seas pockets and on the margins of the Pacific island EEZs will be biologically related to that of its surrounding states. Therefore, these areas beyond national jurisdiction could represent a legal loophole when considering place of origin and the respective sharing of benefits, which will need future consideration.

The development of a new implementing arrangement under UNCLOS that will cover biodiversity beyond national jurisdiction is an area where Pacific SIDS are encouraged to actively participate. MGRs may well occur across multiple jurisdictions (Oldham *et al.* 2013), as well as in the ABNJ. This suggests the need for increased technical support and possibly the creation of regional regulatory and institutional ABS frameworks which also consider revenue-sharing and will also be of use for the development of ABS regimes in the ABNJ under UNCLOS. To this end, the CBD Secretariat and SPREP have initiated capacity-building at a regional level.

It is worth pointing out that there is little evidence of systematic commercial scale development of MGR from ABNJ to date and that this is dwarfed by the commercialisation of marine biodiversity from shallower waters, primarily within areas of national jurisdiction. While the potential for development has been widely stated, a more realistic appreciation of this potential awaits further studies and commercial trials and experiences (IUCN 2013), but it is nevertheless appropriate for PICs to ensure that they maintain access either to direct or non-monetary benefits, such as bioprospecting/biodiscovery collaborations at institutions (e.g. USP and UPNG) or involvement of communities in the collection aspects (Aalbersberg in Vierros *et al.* 2010). The samples collected during DSM exploratory activities may subsequently be found to have scientific interest and perhaps ultimately commercial value, highlighting the cross-cutting nature of the need to safeguard PICs' rights to such benefits, regardless of how the samples were obtained.

5.3.5 Environmental pressures and threats

The status of marine and coastal environmental indicators for Oceania is mixed or deteriorating (SPREP 2016; Center for Ocean Solutions 2009; Chape 2006; Kinch *et al.* 2010). Most pollution in the ocean originates from sources on the land - increased nutrients in run-off and coastal waters causes algal blooms, reduction in water quality, and disease outbreaks, and affects key ecosystems, such as coral reefs, and consequently, related food webs. Sewage (both domestic and from livestock) has been a problem, particularly in tourism-dependent areas and may contribute to algal blooms, as may increased nutrients from other sources, such as leached fertilisers from agriculture.

Runoff from deforestation and unsustainable land use is also a concern. Although it is less of an issue in Polynesia and Micronesia, commercial logging is a major cause of deforestation in Melanesia. Deforestation, combined with agricultural activities, increased coastal development, land reclamation and increased cash cropping throughout Oceania, causes sedimentation and habitat degradation in the coastal and marine environments. This reduces coastal protection and lowers fisheries productivity.

Oil spills and other chemical pollution from land is an increasing but little-documented threat, although there is evidence of ocean dumping of sludge from canneries (Gillett 2014). In addition, poor waste disposal practices on land result in the accumulation of waste, such as plastic in coastal areas and even in the deep ocean. Plastic affects marine life directly through ingestion, and indirectly, as plastic absorbs and amplifies existent toxins, which build up in marine animals.

Marine sources of risk include oil spills and other routine or accidental discharges associated with shipping, including anti-fouling chemicals, and concerns over the introduction of marine invasive species in ballast waters.

5.3.6 Geopolitical interests

Notable geopolitical forces are at play in the region, which may result in the projection of China's influence out into the Pacific through territorial claims and increasing naval strength and the reorganisation of United States military and political strategies to counterbalance this and secure the vital Pacific trade routes (Winchester 2015).

The larger geopolitical context may also include national defence and border security interests of lesser world powers, such as Australia, and access to the region's natural resources. This mixture of foreign and regional interests may provide explicit opportunities, such as joint patrolling for illegal fishing vessels while also monitoring the movement of immigrants or illicit drugs.

Geopolitics may influence apparently unrelated areas, such as the declaration of large MPAs or tuna management and licensing arrangements (Giron 2016), often with undesirable consequences for the PICs, as noted in the case of the US Tuna Treaty negotiations. Geopolitical interests may exert more pressure as management frameworks for sustainable exploitation for DSM or MGRs are developed. The worsening environmental security of PICs in the face of climate change, population growth or resource degradation may be considered as security risks for some of the larger regional neighbours. Calls to ensure that maritime boundaries and baselines

of PICs are all legally registered stemmed from potential legal implications should any of the islands constituting such baselines be totally submerged by sea level rise (Pratt and Govan 2010). The rationale for this is strengthened by recent examples of maritime claims being asserted via construction of artificial islands.

The development of free trade agreements does not always explicitly recognise the region's major natural assets. Notably, ocean and environmental considerations were a key issue in negotiations with the EU for a Comprehensive Economic Partnership Arrangement. However, similar considerations let alone broader environmental impact assessments were not explicitly considered during negotiations and studies for the proposed Pacific Agreement on Closer Economic Relations (PACER Plus) trade agreement between Australia, New Zealand and the PICs, despite a baseline study specifically highlighting environmental concerns (Nathan Associates 2007). The constraints on national and regional organisations in dealing with these situations are dealt with below.

5.3.7 Gender perspectives

With regard to gender perspectives on ocean resources, most studies relate to the fisheries sector, which can provide insights for consideration in other sectors. In addition to the obvious concerns about fairness, equal opportunity and discrimination, the role of women in the development and management of the fisheries sector needs to be taken into account (Tuara and Passfield 2011). Three areas of women's participation are deemed of particular importance: village-level fishing, general employment and employment in fisheries management

The participation of women in coastal fishing seems to vary substantially depending on country and culture. For Commonwealth Pacific small states, women's participation in coastal fisheries varies from equal participation (e.g. in PNG and Fiji) to only around 20 per cent (e.g. in Tuvalu and Samoa). The general perception is that at the village level, fishing for fish is led by men, while fishing for invertebrates is the domain of women. However, this may not represent the reality on the ground, especially in rapidly evolving societies. For instance, women in the Solomon Islands do a great deal of fishing, accounting for well over half of the subsistence catch and, increasingly, fish to generate income through market activities (Krushelnytska 2015). It is without doubt that women's fishing is crucial for a coastal community's food security and, increasingly, for cash incomes.

However, women are under-represented in decision-making, which reduces the available pool of expertise and knowledge for fisheries management. Although NGOs that facilitate community-based fisheries management usually include women in planning and decision-making, more than 90 per cent of coastal communities undertake traditional or local fisheries management without the presence of NGO support (Govan *et al.* 2009; Govan 2015). There is also reason to believe that, at least in some cases, women are strongly discouraged from contributing overtly to decision-making (Morgan *et al.* 2012 (re Solomon Islands); Kruijssen *et al.* 2015). Therefore, women's participation and status may not change in the long term or in the absence of NGOs.

In addition, the importance of women in fisheries employment appears to be frequently inaccurately reported, for instance by downplaying secondary activities or lumping fish processing with the manufacturing sector (Gillett 2009). Case studies (Tuara and Passfield 2011) in Solomon Islands, Tonga and the Marshall Islands showed that women made up 25 per cent of the total number of staff working in government fisheries, environmental institutions and environmental NGOs. However, over 60 per cent of the women were employed in administrative and clerical roles rather than in technical areas.

Men and women are both involved in all aspects of the tuna industry, with most women involved in processing (small-scale and commercial) and local marketing, while most men are involved in the capture and commercial marketing areas (Demmke 2006). While the positive impacts (such as earnings) of the industry are common to both men and women, the negative impacts (balancing domestic and work responsibilities, poor working conditions in processing factories, alcohol and drug abuse) weighed more on women.

Clearly, improving women's participation in Pacific fisheries, as well in other ocean-related sectors, merits much greater attention.

5.4 Promising responses

5.4.1 Pacific advocacy and leadership in the global arena

In recent years, Pacific SIDS (PSIDS) have made a significant impact in negotiations on key international UN frameworks, punching far above their weight. Their efforts have been recognised in advocating for a standalone Oceans goal during the SDGs, and support for the Implementing Arrangement on BBNJ under UNCLOS, and PSIDS have been instrumental in the Paris Agreement climate change negotiations (Fry and Tarte 2016; Quirk and Hanich 2016). Changing regional dynamics and groupings have sometimes emerged in which powerful non-island partners are not included (e.g. Australia, the United States or New Zealand on climate change).

Leaders of PICTs, with the encouragement of international NGOs and philanthropic foundations, have also taken early global leadership in establishing LSMPAs, as for example Kiribati, which established the Phoenix Islands Protected Area and World Heritage Site in 2006. These actions have raised the public profile of conservation and protected areas to the world and have arguably catalysed the declaration of ever-larger LSMPAs by other nations, but ensuring that this political will results in significant benefits for the people of the region will require further planning and analysis.

5.4.2 Regional Oceans Policy commitments

There is a burgeoning of regional policy commitments on the sustainable use and management of the ocean since the PIROP in 2005 and the FPO in 2010. There have also been various declarations by Pacific Islands Forum Leaders and ministers. Recognition of the need to sustainably manage fisheries (as opposed to previous decades of promotion of fisheries development) has been repeatedly stated by leaders and reflected in regional and subregional policies. Donors have often been quick to

align their programmes with the policy guidance. For example, the World Bank and Australia have supported key priorities under the FPO and there has been continued and refocused bilateral and multilateral support for fisheries by Australia, New Zealand and the EU.

There is also increasing evidence that this very healthy body of regional policy is having some influence over the development of national policies (e.g. draft coastal fisheries policies in Solomon Islands and PNG). However, the utility of these usually non-binding policies will depend on the degree to which they result in action or operational change on the ground.

In emerging areas, regional agencies and forums continue to assist countries to develop policy in areas such as DSM exploration and exploitation. Moves to integrate international agreements in regional implementations are also developing, particularly for the SDGs, CBD's Strategic Plan for Biodiversity 2011–2020, Aichi Biodiversity Targets and the SAMOA Pathway.

5.4.3 Optimising the region's tuna resources

Tuna governance and management arrangements have evolved rapidly over the past decade with the establishment of the Western and Central Pacific Fisheries Commission in 2004 as the internationally recognised body to govern tuna stocks. Frustratingly slow progress in the industry-dominated WCPFC has been offset by the emergence of the PNA, a highly promising model of subregional co-operation. The PNA countries and Tokelau have worked together to develop a practical approach to ensuring that purse seine access to their waters happens on more beneficial terms to the host nations, while allowing conservation limits to be set, and this has resulted in a significant increase in revenue.

Achieving such a complex fishery arrangement in the face of considerable opposition from powerful lobby groups suggests that the real success story lies in the adroit design and implementation of Pacific island consensus-building processes and choosing the appropriate constituency to invest in – namely those resource-owning countries with the most to offer and the most to gain. The outcomes were sufficiently impressive for a regional high-level review (Morauta 2013), to recommend investigation by PIFS of the merits of reforming the management of the Southern Albacore fishery and establishing a self-funding secretariat to assist PICs with the development of seabed mining along similar lines.

5.4.4 Community-led natural resource management

The region's communities have traditionally managed their inshore marine areas and resources under systems of customary tenure by which access to outsiders is strictly controlled and resource utilisation may be regulated at community level. These traditional systems still provide the mainstay of effective resource management in most countries, particularly as national agencies are challenged in providing the necessary services.

In recent years, the erosion of these traditional mechanisms (customary rights and traditional governance) has been somewhat counterbalanced by support from NGOs, with hundreds of coastal communities practising fisheries closures, protected areas and applying other management rules. However, to sustain effective systems of coastal fisheries and resources management that secure food supplies and other benefits for the island nations, it will be necessary to put in place co-operative management arrangements that support much more communities than currently is the case (only 8 per cent of coastal communities are recorded as receiving coastal fisheries management support (Govan 2015a)).

Although there is little information on the precise outcomes of these interventions, communities have embraced the approach and leaders have readily included it as the way forward in regional coastal fisheries and environmental policies.

5.5 Looking to 2050

The previous sections have explored the context, issues, challenges and promising regional responses which set the scene in identifying potential pathways to the achievement by the Commonwealth Pacific small states of the SDGs and the Forum Leaders' Vision for the Pacific region. This final section highlights areas that may constitute major obstacles, outlines key strategies and concludes with recommendations.

5.5.1 Major challenges

Some of the major obstacles to sustainable management and development of the ocean are externally driven, such as commercial and political pressures, not always unconnected, that can undermine regional and national processes. Climate change is also externally driven, in many cases by the same countries exerting the aforementioned commercial and political pressure.

Regional and national challenges include high population growth, largely unregulated exploitation of land-based and coastal resources and low national prioritisation and spending on land and ocean environmental management. The policy commitments to environmental management will need to result in similar paradigm shifts at the operational and financing levels for there to be a solid basis upon which to build sustainable development.

Response to foreign pressures

Pressures from both the extractive and conservation industries highlight the need for improved regional processes to respond to external pressures that may even be offered as assistance or best practice. These pressures can be expected to increase, perhaps very rapidly, if their geopolitical⁴⁹ dimensions continue to develop. The impressive success of the PNA and partners in maximising the benefits for a majority of the PICs from their main ocean resource, tuna, has been greeted with less acclaim on the global stage than one would expect. In fact, the basis and viability of the PNA's tuna management approach has been undermined and put under pressure

by development partners (often members of the CROP agencies), such as the EU, USA and New Zealand, at least in some cases in response to overt pressure from the private sector (USA). Financial and political incentives may be brought to bear to fragment regional blocs, exploiting differences in interests between the members, and pressuring regional agencies.

The negotiation of free trade agreements also falls into similar dynamics, sometimes explicitly over access to natural resources, such as tuna (the case of the Economic Partnership Agreement negotiations), or completely ignoring the potential impact on the natural resource base, such as in the development of PACER Plus – which has proceeded without any comprehensive social and environmental assessments. Trade preferences enjoyed by several PICs with the European Union may well be reduced in coming years, new free trade agreements may bring new opportunities and pressures, reduction in subsidies by foreign fishing nations may be slow, and the role of national processing may introduce challenges that require regional discussions on trade and foreign relations.

In addition, philanthropic conservation organisations and international bodies have encouraged PICs to make commitments to set aside 10-30 per cent or more of their jurisdictions for marine protected areas.⁵⁰ However, the advantages of such a target-driven approach are disputed (Agardy *et al.* 2016; De Santo 2013, Souto *et al.* 2014), and ensuring that these declarations result in actions that direct scarce resources and political will to managing the issues of primary concern in each jurisdiction (e.g. tuna) or priority threats may require skills that are not nationally available. Whether externally driven declarations align with or could be cost-effective contributions to national and regional aspirations to sustainably utilise their ocean asset base for sustainable development and poverty alleviation, are debates that are by and large yet to happen in Commonwealth Pacific small states. Despite promised external assistance, these commitments ultimately have national costs, which should be weighed publicly against the national or societal benefits compared to focusing on higher-priority threats or unmet resource management needs.

The 2012 Cook Islands Marine Park declaration may represent a model for achieving integrated ocean management and conservation through inclusive processes of consultation and spatial planning. On the other hand, Palau's closure of 80 per cent of its EEZ to extractive activities is not a model that less developed and more populous Commonwealth Pacific small states could afford to follow. Community groups have called for governments to focus on first achieving 100 per cent management of the marine area,⁵¹ and these whole-of-jurisdiction approaches are the focus of the region's policies on oceans and coastal fisheries, but are generally unsupported by international lobby groups.

Recent experiences, such as lobbying for climate change action at the Paris conference and the PNA management of tuna, demonstrate the importance of ensuring the appropriate membership of regional groupings. In the former case, the developed country members of some regional groups have very different interests and positions to island states as do, in the latter, island countries with low tuna stocks or distant water fishing nations, compared to the tuna-rich islands. The very term 'regional

group' is a misnomer in this regard as WCPFC, with its wide membership from outside the Pacific islands, so far appears to have produced less beneficial action for the Pacific islands region than a so-called 'subregional' group in the form of the PNA. This suggests that groupings need to be designed fit for different purposes more akin to 'communities of interest'.

DSM may benefit from a regional approach but this will depend on whose interests dominate, and it would probably not be appropriate for developed countries to be included on an equal footing. In some instances, the lack of national in-house technical expertise and systems should not be replaced by regional technical agencies, or at least without firewalling the Pacific island community of interest. Providing balanced advice on ocean governance options has so far been a major challenge and countries tend to rely on NGOs or international lobbying. Identification of environmental risks associated with trade deals is a complex area and probably beyond the capacity of most national environmental agencies and yet, apparently, too politically sensitive for regional agencies to flag for appropriate impact assessments.

Emerging models of regionalism or 'communities of interest' will have to develop with care, in order to afford more regionally appropriate responses that maximise and sustain the benefits to countries from the limited natural resource assets at countries' disposal.

Lack of national investment in environmental management

Despite regional and national commitments to sustainable resource management, these expressions of goodwill are by and large not prioritised for implementation at national level, and would likely not even be feasible with the available capacity (Gillett and Cartwright 2010; Govan 2015a,b). The currently poor regulation and management of land-based extractive industries gives little reason for optimism in emerging industries, such as DSM.

In addition, despite their importance, the sustainability of coastal fisheries has been neglected by most national governments. Population growth, increasing commercial pressure and potential impacts of climate change mean that it is increasingly urgent to ensure that robust management systems are in place. Despite regional policies, inertia at ministerial level and outright lack of commitment to resource management is reflected in very low recurrent budgets and staffing levels.

National financial and human resource investment in routine management of the economically important tuna resources is low (except in PNG). Environment departments are also similarly under-resourced and, in most cases, lack the independence and 'teeth' necessary to be able to regulate and enforce environmental safeguards essential to the practice of sustainable development or 'green growth' to which most countries subscribe.

Land-based threats should not be excluded from consideration as the ocean will not make up for lack of arable land, vanishing water tables, unproductive forests and gardens, unmanaged waste and so on. Poor management on land has negative impacts on inshore resources, and as the example of plastics demonstrates, increasingly in the

open ocean. Poor care of home islands bodes ill for stated intentions of caring for ocean resources that are far out of sight.

The small size of many island states and the immense challenges facing governments in delivering environmental management services across their wide jurisdictions provide a strong argument for integrated island management. At the community level, but also at the level of national and provincial service provision, joint service delivery or indeed amalgamation of diverse agencies with resource management mandates to provide more ecosystem-wide services would be more efficient and cost-effective (Govan *et al.* 2011; Jupiter *et al.* 2013).

Capacity development will need to meet a series of challenges for scaling ocean and coastal management across jurisdictional boundaries and to the appropriate scales – from local to subnational to national to regional, but also in the very specific context of the diversity of Pacific islands (IASS 2016).

In short, despite a tendency to focus on the Pacific as a region, there is an increasingly urgent need to consolidate what is of use at regional and subregional levels, and shift attention to the national levels - ensuring that national progress is strategic, tailored to individual country needs and results oriented.

Inadequate fiscal regimes and revenue management options

Revenue from living and non-living natural resources can fluctuate, particularly in the case of living resources, or accrue as a windfall, as may occur through mining. Ensuring the intergenerational distribution of benefits, reducing the impact of fluctuations on small island economies, and ensuring the equitable sharing of the benefits across society, are or should be of particular concern to Commonwealth Pacific small states.

A first step to managing the fluctuation of revenue from exploitation of living resources and ensuring they benefit future generations is investing in resource sustainability through sound management and regulatory regimes. Windfalls, such as those expected from DSM, and extreme fluctuations, such as recent increases in tuna access fees, require revenue management measures. These can include public trust and sovereign wealth funds, funding investments to promote long-term growth, reducing fiscal deficits, or combinations of these. Indeed, recent experiences in the Pacific suggest that there are instances where increased tuna revenue has been used to replenish sovereign wealth funds, such as Kiribati's Revenue Equalisation Reserve Fund, and to develop resource management policies. There are also indications in some countries of increased revenue leading to increased short-term government expenditure (Boumphrey *et al.* 2016; Reid *et al.* 2016).

The windfall nature of potential DSM revenues, and the possible reductions in catches owing to the projected eastward shift in tuna stocks in a warming ocean, suggest the need for forward thinking. Concerns over the lack of public participation in the DSM sector highlight the need for more transparent and accountable consultations on natural resources management issues generally, including the appropriate strategies for investing in resource sustainability to secure long-term and equitable inter-generational benefits.

Population growth

The pressure placed by countries on ocean and coastal resources to cater for their development needs, both for extractive uses and as the recipient of waste and other impacts, is directly linked to population size. The overall population of the Commonwealth Pacific small states (around 10.2 million in 2015) is expected to increase by over 80 per cent by 2050⁵², equivalent to an additional 8 million people. This trend will pose extreme development challenges in countries such as Solomon Islands, PNG, Vanuatu and Kiribati that are expected to face significant population growth and is likely to be the greatest threat to Commonwealth Pacific small states' ocean resources (Haberhorn 2008; Bell *et al.* 2015).

Based on projected population growth rates, combined with estimates of the maximum coastal fisheries production that may be expected for each country, it is estimated (Bell *et al.* 2009) that six of the nine Commonwealth Pacific small states will exhibit major deficits by 2035 and the remaining three will find it difficult to redistribute fish available rurally to the centres of populations (Table 5.4).

An important consideration, given the economic and other roles that coastal fisheries play, is what the cost of providing these services will be in scenarios where production cannot keep up with demand or collapses. The reduction in income (from coastal fisheries) would be compounded by the need to import higher-cost sources of food.

Table 5.4 Estimates of the maximum coastal fisheries production to 2020 and 2035

	Coastal fish production	2020		2035	
		Fish needed for food	Surplus/deficit (-)	Fish needed for food	Surplus/deficit (-)
GROUP 1: COUNTRIES EXPECTED TO HAVE A FISH DEFICIT					
PNG	81,260	81,860	-600	108,500	-30,090
Solomon Is	27,610	25,400	2,210	35,600	-7,990
Samoa	14,000	15,600	-1,600	15,700	-2,190
Kiribati	12,960	10,900	2,060	13,400	-890
Vanuatu	3,730	10,800	-7,070	14,000	-10,400
Nauru	130	700	-570	800	-670
GROUP 2: COUNTRIES EXPECTED TO HAVE DIFFICULTIES REDISTRIBUTING FISH TO URBAN CENTRES					
Fiji	77,000	31,100	45,900	33,700	40,610
Tonga	17,430	3,600	13,830	3,900	12,920
Tuvalu	9,530	1,300	8,230	1,500	7,700

Note: Indicative quantities of fish needed for food in 2020 and 2035 (as tonnes/year), and surpluses or deficits (-) in coastal fish supply, relative to the recommended 35 kg per person per year or traditionally higher levels of fish consumption, for two groups of Commonwealth Pacific small states based on expected population growth.

Source: Bell *et al.* 2009 and modified from Bell *et al.* 2015

Ensuring that population growth receives priority consideration in national policy in Solomon Islands, PNG, Vanuatu and Kiribati is as critical for the state of the ocean as it is for sustainable development and achieving the SDGs

Climate change

The impacts of climate change will vary markedly between islands, but some approximations and implications of the projected effects of climate change for the ocean and related sectors are shown in Table 5.5.

Table 5.5 Potential climate-induced changes on key Pacific island ocean resources by 2050 and 2100

	2050	2100
CORAL REEFS AND COASTAL HABITATS		
Together with the effects of ocean acidification (Johnson et al. 2016), ocean warming will result in degradation of coral reefs, reducing their ability to support fish. Stronger cyclones and heavier rainfall will damage reefs more frequently. Mangroves and sea grasses will likely be affected as well (SPREP 2016)	Coral reefs: almost all will be rated as threatened, more than half high, very high or critical. Seagrasses: 5–30% loss across the region by 2035	Mangroves: Decline in area of 13%
COASTAL FISHERIES		
Coral reef fish, nearshore pelagic fish (mainly tuna) and shellfish will be affected by habitat degradation; reduced spawning success owing to higher temperatures and impaired calcification of invertebrates including coral reefs owing to ocean acidification	WP: 10–20% decline in total production EP: 5–10% decline in total production	WP: 20–35% decline in total production EP: 10–30% decline in total production
TUNA		
Ocean warming and reduced productivity will make the Warm Pool less suitable for spawning, and an eastward shift in the convergence zone between the Warm Pool and Pacific equatorial upwelling is likely to drive redistribution of skipjack	WP: 1% increase in skipjack tuna biomass EP: 12% increase in skipjack tuna biomass	WP: 17% decrease in skipjack tuna biomass EP: 8% increase in skipjack tuna biomass
Aquaculture		
Freshwater aquaculture such as tilapia may be more feasible in elevated areas such as in PNG, but most types of mariculture will likely be less efficient		

Note: WP - West of 17°E (includes Nauru, PNG, Solomon Islands, Vanuatu). EP - East of 17°E (includes Fiji, Kiribati, Samoa, Tonga, Tuvalu).

Source: Bell et al. 2011, 2013, 2016; Bell and Taylor 2015; Johnson et al. 2016; SPREP 2016

In summary (Bell and Taylor 2015), the effects of changes to the atmosphere and ocean on fish habitats and fish stocks underpinning fisheries and aquaculture across the region are expected to result in winners and losers. Tuna are expected to be more abundant in the east, and freshwater aquaculture is likely to be more productive. Conversely, coral reef fisheries could decrease by 20 per cent by 2050, and coastal aquaculture is expected to be less efficient, while skipjack (and possibly other species of tuna) may increase in the EEZs of PICTs east of 170°E and decrease marginally within the EEZs west of 170°E by 2035 and 2050. By 2100, biomass of skipjack tuna is projected to decline substantially in the EEZs of most PICTs, except those in the far east-southeast of the region (i.e. Cook Islands, French Polynesia and American Samoa), which is projected to gain biomass of skipjack by 2050 (11-16%) and 2100 (up to 41%). However, it is estimated that the major shortfalls of fish for food in larger countries in 2050 and 2100 will be a result of population growth, albeit exacerbated by the effects of climate change (Bell *et al.* 2013).

The projected impacts of climate change are important to incorporate in medium- to long-range planning. However, as outlined previously, most Commonwealth Pacific small states lack adequate resource management systems to deal with more pressing short-term priorities and unless these core systems are strengthened and adequately financed over the long term, the merit of many of the current climate change investments is open to question.

5.5.2 Ways forward







The preceding sections serve to support what was best expressed by Epeli Hau'ofa (Hau'ofa 2008):






The importance of our ocean for the stability of the global environment, for meeting a significant proportion of the world's protein requirements, for the production of certain marine resources in waters that are relatively clear of pollution, for the global reserves of mineral resources, among others has been increasingly recognised.

The Pacific region's resources have vast tangible and intangible value globally as well as from a purely utilitarian perspective, gauged in terms of approximate dollar value received by PICs or foreign nations (see Table 5.6). Fishery resources are the core asset for the moment and this is likely to be the case in the long term, with coastal fisheries being of almost equal importance as the offshore fisheries to the inhabitants of PICs. A healthy and attractive island and oceanic environment underpins the substantial potential of the other main industry, tourism, in various forms. Of note is the relatively low value, to island inhabitants of the much talked about DSM and, to a lesser extent, marine aquaculture.

Given the challenges outlined in the preceding sections, not forgetting the looming threats posed by climate change and population growth, the global importance of ensuring the sustainable management of the Pacific Ocean is a heavy responsibility, especially if we recognise the primary role of Pacific island countries acting in concert as asserted in the region's overarching ocean policy, 'Our Sea of Islands,

Table 5.6 Indicative yearly value of Pacific Ocean resources as received by PICs and non-PICs

	\$\$ to non-PICs/\$\$ to PICs	Potential	Risks and challenges
Oceanic fisheries		Some: increasing rent capture and domestic fleets and employment.	Short-term national interests or DFWN influence destabilises regional sustainable management.
Coastal fisheries		Small: sustainable management of some commercial stocks and improvements in marketing/processing may increase returns.	Highly susceptible to unregulated commercial pressure. Current management inadequate.
Tourism		Substantial in some locations. New markets such as China and retirement homes.	Lack of environmental regulation could undermine the resource base and inequitable distribution of benefits.
Cruise		Good for home-based cruise ships and improved shore services.	Challenges in regulating various environmental pressures and capturing revenue locally.
Marine aquaculture		Limited to small depending on location, support infrastructure, market access and government policy.	Inadequate planning and understanding of business models and market chain, increase in severity of climate events.
Deep Sea Minerals		Some: some countries may receive relatively modest to medium incomes over short to medium periods.	Unknown environmental impacts and lack of capacity to enforce regulation. Inequitable distribution of benefits.
Marine Genetic Resources	-? -?	Small: mainly for participation in scientific capacity-building and partnerships.	Equitable access to benefits.

Note:  ~US\$100 million to non-PICs;  ~US\$100 million to PICs;  Potential to non-PICs;  Potential to PICs;  Non-PIC/PIC distribution of value unclear

Source: Authors' calculation estimated from data presented in previous sections on landed value, contribution to GDP, tourism receipts, access fees and taxes.

Our Livelihoods, Our Oceania - Framework for a Pacific Oceanscape', which in turn encapsulates the words of Epeli Hau'ofa:

No people on earth are more suited to be guardians of the world's largest ocean than those for whom it has been home for generations.

No single country in the Pacific can by itself protect its own slice of the oceanic environment; the very nature of that environment prescribes regional effort and to develop the ocean resources sustainably, a regional unity is required.

The following section examines the concerted and individual actions that may be required to ensure that the value placed on 'integrity of our vast ocean and our island resources' realises the Forum Leaders' Vision under the Framework for Pacific Regionalism 'for a region of peace, harmony, security, social inclusion, and prosperity, so that all Pacific people can lead free, healthy, and productive lives'.

Shift the ocean paradigm from 'explore and exploit' to 'sustain and be sustained by'

The decades since the majority of Pacific island countries' independence have seen a heavy focus on national development based on discovering and mobilising national assets of global interest to generate much needed income – 'explore and exploit'. The increasing emphasis on Blue Economy and Blue-green Growth over recent years is held by some to prioritise the importance of maintaining a healthy natural resource base (Patil *et al.* 2016; Silver *et al.* 2015), but there are many, and not always compatible, interpretations. Although some promising signs are emerging in the region, it is by no means clear that there is a general shift in thinking, let alone action towards sustaining the resource base.

The shift in thinking required must not get bogged down in outdated views such as 'conservation versus development', but embrace more constructive visions of securing a stable natural resource base upon which to build sustainable development. The benefits of more proactively managing the shared tuna resource have become clear and it is important to draw the comparison that, though less obvious in terms of government revenue, management of coastal fisheries and related ecosystems has similarly obvious impacts at the community level and to the current and potential tourism development. Land-based resource management will need to be significantly improved, including more rigorous use of environmental impact assessments to avoid negative ocean impacts.

A genuine shift towards building the natural resource base for sustainable development would be reflected in actions such as ensuring that natural resource management is adequately financed and staffed with appropriate capacity. Although tuna management in the EEZs may currently be resourced, albeit with significant inputs from external partners, it may be appropriate to ensure more autonomy in the control of such a significant resource. Similar arguments can be made for future management of DSM.

Financing environmental management may be easily affordable in the offshore fisheries and DSM sectors, provided allowance is made for capturing an appropriate

proportion of the revenue. Coastal and island management undoubtedly requires re-prioritisation by most governments. However, options to reduce the burden may include capturing a proportion of the offshore revenues (such as in PNG), reviewing currently low commercial licensing fees and penalties, or more innovative approaches, perhaps establishment of long-term financing arrangement such as sovereign wealth or other trust funds, or perhaps capturing the increasing funds from climate change adaptation.

Although leaders may have to accept there will not be massive increases in revenue from ocean resources, there will likely be some, not least from better managed or rehabilitated stocks, and these improvements should more than offset management costs. Revenue management also raises issues of corruption and good governance which governments should continue to address as a priority.

Current progress in improving the proportion of benefits that remains in the Pacific through new or improved regional groupings may be applied to DSM and possibly cruise tourism or MGR. Where conservation actions have global benefits, or a disproportionate burden on island nations, it would be reasonable for these costs to be explicitly met from global sources. It would be interesting to explore similar arguments in the globally high stakes games of maritime transport or even defence.

Some of the region's intangible assets may tangibly improve sustainable development outcomes and should be recognised, supported and optimally used. A clear example of this is the reliance on traditional knowledge and customary rights over coastal areas and resources, which provide the current mainstay of coastal management in most countries.

This paradigm shift will also require a shift in capacity-building to support the region's approach to ocean and coastal management across jurisdictional boundaries and to the appropriate scales – from local to subnational to national to regional (IASS 2016 and Jeremy Hills, USP, pers. Comm).

Refining regional approaches to 'communities of interest' and reviewing the role of technical agencies

The regional architecture is rapidly evolving, with the emergence of new groupings with more select membership and also the expansion of existing regional groups to include more diverse members. Reviewing this experience should provide guidance on consolidating successful approaches, phasing out unsuccessful ones and developing appropriate new mechanisms.

The PNA successes illustrate the importance of defining the appropriate constituency or 'community of interest' in resource governance and ensuring that membership reflects the extent of shared stakes, which may be more important than political niceties or donor requirements (e.g. membership of the PNA). This will be a key consideration in decisions on inclusion of other tuna species in PNA type management arrangements, working with other major tuna resource users, such as Indonesia and the Philippines, or developing regional approaches to DSM.

The importance of process, as much as the outcome, is often overlooked by foreign agencies. However, it is intrinsic to the ‘Pacific way’, and some of the successful outcomes of regional groups may owe as much to the more appropriate way people interacted than to the membership or even legitimacy of the group. Ensuring that processes and spaces for interaction are appropriate and yet effective deserves far more attention in the evolving regional architecture.

The role of regional technical agencies remains important as in, for instance, the role of FFA in monitoring and surveillance, and SPC’s role in leading research on shared tuna stocks. However, the technical agencies have at times been constrained in pursuing the best interests of PICs owing to their wider membership, which includes the interests of partners that are sometimes regional competitors. In addition, the rationale for the creation of pooled regional technical support is in need of review, given the growth of the client countries, to ensure that these agencies only substitute, supplement or build capacity towards autonomy as appropriate to individual countries. In some of the larger countries, in-house technical capacity, particularly for land and coastal management, is markedly deficient.

Ensuring that regional commitments, agreements and policy guidance result in national implementation is a challenge. Recent moves to ensure contextualisation and streamlining of reporting on the SDGs, SAMOA Pathway and FPR indicate appetite for strategic approaches to working with partners to achieve national priorities and international commitments. Hopefully, the SDG 14 on Oceans will be reflected at the national level in an integrated way and as an integrated approach, which will stand a better chance of gaining national traction.

Whole-island and whole-ocean approaches

The interrelatedness between the various terrestrial and marine natural resources and all aspects of island life require a major shift from current models of serial and sector-driven depletion towards a whole-island/whole-ocean approach. Current tensions between the conservation and fishing sectors at oceanic scale, as well as the lack of integration of the wider interests of PIC society in this debate, illustrate the need for more inclusive and integrated approaches.

Planning processes across spatial scales and integrated approaches have been called for in regional policy, including the FPO. However, as acknowledged in that policy, the emphasis should be on providing a useful tool for countries that have clearly defined the need and a process and ongoing forum for inclusive discussion that may lead to action rather than adding to the burden of unimplemented policy and legislation. The importance of getting the process right and ensuring inclusivity of all interests, including less vocal but crucial stakeholders, such as coastal communities, churches or private sector, is vital but ill-suited to donor-driven projects and time frames.

The FPO and preceding ocean policy (PIROP) recognised the gaps between sectors and the need for processes of integration, and called for a dedicated and independent regional ocean commissioner and small secretariat. Unfortunately, owing to an initial lack of resources, the ocean commissioner is currently a part-time responsibility of the

PIFS Secretary-General. In view of this, there is still a need for the originally envisaged body, ideally serving the interests of only the independent Pacific island countries.

In advocating an integrated approach, the FPO also envisaged PIC rights and responsibilities over the adjacent high seas. This has currently gained further legitimacy in view of the inferior resource management of migratory stocks that global mechanisms exert over migratory species compared to the EEZs. The successful management of tuna by PICs has also shown practical benefits in terms of regulating fishing activities in the high seas, and there is potential to achieve conservation benefits in this notoriously hard-to-manage zone through these mechanisms or similar ones, such as those established for DSM.

Many PICs are too small to realistically separate environmental governance across different ministries and integrated management would afford many efficiencies and improved effectiveness. Moving towards single natural resource management agencies that are independent of day-to-day political oversight should be considered. Similar arguments could be made for the restructuring or integration of some, or parts of, regional agencies.

However, this review suggests that integrated ocean governance in the Pacific islands, if achieved, will resemble a mosaic of interlinked, nested, overlapping and continually negotiated resource management approaches adapted to sectoral and national interests. An overarching formal ocean governance mechanism not only seems very difficult to achieve but might be undesirable if it facilitates opportunities for interference from global powers.

Improving national service delivery and natural resource governance arrangements

Ultimately, the region's successful development and stability will depend on progress at the national level. There is a tendency in regional-level discussions to overlook or downplay the sometimes poor national service delivery, planning and accountability mechanisms.

The more populous PICs have predominantly rural populations and there is a need for more emphasis on increased support and environmental service delivery in rural areas through considerably better financed and supported subnational (provincial or island) governments. Although customary tenure and resource management that addresses key food security and resilience needs should be supported, other aspects of resource management require the more immediate presence of staff and services. Without the establishment of such mechanisms, there is little chance that national, let alone regional, policy will impact communities.

There is scope for the improvement of public participation in policy development and access to information in many PICs. This would improve the quality and relevance of policy and also improve the transparency and accountability of resource management decisions, particularly of high-value inshore resources such as *bêche-de-mer*, discussions on DSM development and tuna access arrangements.

5.6 Recommendations

5.6.1 Shift the ocean paradigm from 'explore and exploit' to 'sustain and be sustained by'

- Promote a shift in thinking at all levels and across sectors towards first securing a stable natural resource base upon which to build sustainable development. For action by regional agencies, national governments and civil society organisations.
- Prioritise government investment in long-term management of ocean resources. For action by national governments.
- Seek sustainable financing approaches to natural resource management at regional and national levels. For action by regional agencies, national governments and civil society organisations.
- Recognise, support and optimise the use of traditional knowledge and customary rights over coastal areas in resource management. For action by national governments and regional agencies/NGOs.
- Review and align capacity-building institutions and formal/informal curricula to the new paradigm and experiences. For action by academic institutions and training facilities in close co-operation with regional and national resource management institutions and NGOs.

5.6.2 Refining regional approaches to 'communities of interest' and reviewing the role of technical agencies

- Consider new or more flexible existing regional groupings and agencies with the appropriate constituency for the task at hand, aligned more with communities of common interest or stakes, with a primary emphasis on the island nations. For action by regional agencies, national governments and change agents.
- Emphasise improvements or consideration of the processes employed for achieving regional outcomes or groupings. For action by national leaders and governments.
- Review the constituency and rationale for regional technical agencies in light of the expected geopolitically sensitive issues to be managed. Also consider the appropriateness of regional pools of technical services for some of the larger countries. For action by regional agencies, donors and national governments.

5.6.3 Whole-island and whole-ocean approaches

- Move towards establishing a full-time and independent Ocean Commissioner with an appropriate secretariat to fulfil the functions originally contemplated in the region's ocean policy. For action by the regional ocean commission and regional agencies.
- Pursue the ocean-wide and national integrated/cross-sectoral forums and processes and marine spatial planning, where appropriate, to ensure whole-ocean

integrated approaches including for the high seas. For action by the regional ocean commission and CROP agencies.

- Consider restructuring and amalgamating natural resource management agencies at national and even regional levels to ensure integration, especially in small and financially limited small island states. For action by national governments and regional agency analysis.

5.6.4 Improving national service delivery and natural resource governance arrangements

- Emphasise improving national support for resource management at community level through improved service delivery, increased resourcing of subnational government and decentralisation. For action by national governments, regional agencies, NGOs and donors.
- Improve national public participation in natural resources policy development and access to information to ensure transparency and accountability of resource management decisions. For action by national governments.

Notes

- 1 This chapter benefited from valuable comments from the Pacific Islands Forum Secretariat (Cristelle Pratt, Andie Fong Toy and Ribanataake Awira), University of the South Pacific (Jeremy Hills), Forum Fisheries Agency (Perry Head), Secretariat of the Pacific Community (Lindsay Chapman) and the Commonwealth Secretariat (Jeff Ardron, Rosemarie Cadogan, Hannah Lily and Resina Katafono).
- 2 American Samoa, Cook Islands, Federated States of Micronesia, Fiji, French Polynesia, Guam, Kiribati, Marshall Islands, Nauru, New Caledonia, Niue, Northern Mariana Islands, Palau, Papua New Guinea, Pitcairn Islands, Samoa, Solomon Islands, Tokelau, Tonga, Tuvalu, Vanuatu, Wallis and Futuna.
- 3 The Exclusive Economic Zone is a sea zone prescribed by the United Nations Convention on the Law of the Sea (UNCLOS) over which a state has special rights regarding the exploration and use of marine resources, including energy production from water and wind. The EEZ extends 200 nautical miles from a coastal baseline or to a lesser extent in the case of overlapping claims between adjacent states.
- 4 Data in the region are not always segregated by Commonwealth affiliation so reference is made to PICTs and PICs (nine Commonwealth Pacific small states plus Niue, Cook Islands, Palau, Marshall Islands and Federated States of Micronesia) where relevant.
- 5 Based on graphics by CartoGIS, College of Asia and the Pacific, Australian National University and calculations by Piers Dunstan/CSIRO. SPREP reports that Oceania has an area of ocean of approximately 62,761,420 km² including international waters.
- 6 This section draws mainly from Gillett 2016 unless otherwise stated.
- 7 Pacific region refers to PICTs.
- 8 Countries allow foreign-based fishing fleets to fish in their EEZs for a fee.
- 9 This section draws mainly on World Bank (2016b) which in turn draws substantially on FFA (2015) and Williams and Terawasi (2015)
- 10 The WCPO region includes both national waters as well as areas beyond national jurisdiction and extends notionally to the East Asian seaboard but does not include the South China Sea; the southern boundary extends to 60 degrees south and the northern extends to Alaska and the Bering Sea. In the east, the Convention Area adjoins the area of competence of the Inter-American Tropical Tuna Commission (<https://www.wcpfc.int/>). ISSF 2016
- 11 International Seafood Sustainability Foundation (ISSF) 2016, management recommendations from Harley *et al.* 2015

- 12 Maximum sustainable yield or MSY is, theoretically, the largest yield/catch that can be taken from a species' stock over an indefinite period. ISSF 2016 reports catches in 2015 were below an MSY of 1.892 million mt while Harley *et al.* report that in 2014 catches were slightly above an estimated MSY of 1.532 million mt.
- 13 FADs take advantage of the tendency of some species of fish, such as tuna, to congregate under floating objects. When naturally occurring objects, such as logs, are not sufficient, these FADs can be created artificially. The adoption in the 1990s of FADs by the purse seine fishery was instrumental in creating the world's largest tuna fishery in the Pacific. Although FADs are primarily used for the skipjack fishery, they attract as by-catch the more threatened bigeye tuna and juvenile yellowfin, raising concern over the increasing use of FADs.
- 14 The World Bank (2016b) estimates the WCPO convention area at 30 million km²
- 15 The El Nino-Southern Oscillation (ENSO) is an oscillation between a warm (El Nino) and a cold (La Nina) situation every 2–7 years in the tropical Pacific Ocean, which strongly influences distribution and abundance of tuna in the equatorial waters. Skipjack prefer warmer waters that extend farther to the east, correlated with ENSO events with higher purse seine catches in the central Pacific, e.g. Kiribati's Line Islands. After an El Nino productivity shifts, higher skipjack catch rates may occur in PNG and the Solomon Islands, particularly if a La Nina episode follows an El Nino. Longline catch rates of yellowfin and bigeye seem also to increase in regions of increased sea surface temperatures (Bell *et al.*, 2011).
- 16 This section draws from World Bank 2016a Tourism – Pacific Possible unless otherwise attributed.
- 17 Hawaii has very recently connected a small OTEC installation (Vyawahare 2015) and a small wave power unit (Bussewitz 2016) to the national electricity grid.
- 18 This section draws mainly on World Bank 2016c unless otherwise cited.
- 19 SIDS are a distinct group of developing countries facing specific social, economic and environmental vulnerabilities. They include the PICs as well as other countries from the Caribbean region and Africa, Indian, Mediterranean and South China Sea.
- 20 A more exhaustive list can be found in Pratt and Govan, 2010
- 21 See http://www.un.org/Depts/los/convention_agreements/texts/unclos/closindx.htm
- 22 See <https://www.wcpfc.int/>
- 23 The United Nations Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (in force as from 11 December 2001)
- 24 ABNJ, commonly called the high seas, are those areas of ocean for which no one nation has sole responsibility for management.
- 25 www.ffa.int, World Bank 2016b
- 26 MSG members: Fiji, New Caledonia, PNG, Solomon Islands, Vanuatu
- 27 <http://gsd.spc.int/regionalmaritimeboundaries/project-progress> and <http://www.un.org/Depts/los/LEGISLATIONANDTREATIES/depositpublicity.htm>
- 28 FSM and Tonga have not deposited information regarding their baselines, but have enacted legislation regarding their territorial sea and EEZ, concluded maritime boundary agreements and made submissions to the CLCS. <http://www.un.org/Depts/los/LEGISLATIONANDTREATIES/depositpublicity.htm>
- 29 Artack, E. 2016. SPC's Geoscience Division's Regional Maritime Boundaries Unit updates for the 17th MSWG – Friday 1st July 2016.
- 30 FSM and Tonga respectively have enacted domestic legislation Public Law 5-112 (FSM) and Act No. 30, Territorial Sea and EEZ Act, amended by Act No. 19 of 1989 (Tonga).
- 31 Cook Islands, Fiji, FSM, Kiribati, Palau, PNG, Solomon Is., Tokelau, Tonga, Tuvalu and Wallis and Futuna. http://www.un.org/Depts/los/clcs_new/commission_submissions.htm
- 32 Address by James Movick, Director General, Forum Fisheries Agency, 2016 New Zealand Washington Pacific Day Event. Washington, DC.
- 33 PNA press release. Majuro, Marshall Islands 25 November 2016. <http://www.pnatuna.com/node/376>
- 34 Address by James Movick, Director General, Forum Fisheries Agency, 2016 New Zealand Washington Pacific Day Event. Washington, DC.
- 35 Gillett 2014

- 36 For example, the Fisheries Partnership Agreement between the EU and Kiribati over the period 16.9.2012 – 15.9.2015 undermined the Vessel Day Scheme (VDS) and arguably produced a more favourable agreement for the EU. https://ec.europa.eu/fisheries/cfp/international/agreements/kiribati_en
- 37 The most recent outcome of negotiations seems to have made progress for the Pacific in terms of subjecting the US fleet to national laws of their EEZs and the terms of the VDS without exemptions but at a fixed price over 4 years without obligation on the US (PNA 2016b).
- 38 After many years of attempting to apply a quota-based system in which fishers are licensed to extract a predetermined amount of fish, the PNA countries have found that a system based on monitoring and restricting the effort in terms of time fishing in the zone or vessel day scheme is far more practical to administer and benefits the PICs more. <http://www.pnatuna.com/node/373>
- 39 Report of the Fisheries Task Force 29 June 2016, PIFS, Suva Fiji
- 40 <http://www.conservation.org/NewsRoom/pressreleases/Pages/Kiribati-Takes-Unprecedented-Action-to-Protect-Remaining-Tuna-Stocks.aspx>
- 41 Leenhardt *et al.*, 2013; Giron, 2016; ISSF, 2012. LSMPA declarations in the PICS did not result in reduced national tuna catch allocations in 2015 (Aqorau pers. comm.)
- 42 Address by James Movick, Director General, Forum Fisheries Agency, 2016 New Zealand Washington Pacific Day Event. Washington, DC.
- 43 FFA 2015b Regional Roadmap for Sustainable Fisheries, James Movick op. cite
- 44 Ballast water is water carried in ships' ballast tanks to improve stability, balance and trim. It is taken up or discharged when cargo is unloaded or loaded, or when a ship needs extra stability in foul weather. Plants and animals may be picked up in ballast water and discharged elsewhere. www.epa.vic.gov.au/your-environment/water/ballast-water
- 45 Canvassed positions and concerns from regional organisations in Govan 2014b
- 46 Newell *et al.* 2016, Wan *et al.* 2016, <http://www.hellenicshippingnews.com/shipping-emissions-pacific-countries-lead-brave-stand-in-imo-meeting/>
- 47 SPC 2016b
- 48 NIWA (draft). Assessment of the potential impacts of deep seabed mining on Pacific Island fisheries. Secretariat for the Pacific Community (SPC)
- 49 Aqorau, 2015, Leenhardt *et al.*, 2013 and Giron, 2016 note that negotiating access to tuna resources provides major nations with a strategic presence and influence in the region and encouraging countries to set aside large areas or resources also serves as a geopolitical counterbalance.
- 50 For example, World Conservation Congress Motion 53 of 2016. Charles *et al.*, 2016.
- 51 For example, FLMMA, 2015
- 52 See Figure 2.2.

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Appendix 5.1 The Roles of Regional Organisations in Ocean Governance

The Council of Regional Organisations in the Pacific brings together the major regional intergovernmental organisations. Those primarily relevant to ocean affairs are listed in Table A5.1, along with their relevant function and membership. Table A5.2 lists other relevant intergovernmental regional organisations and Table A5.3 some of the most regionally active NGOs.

Table A5.1 CROP Agencies involved in Ocean Affairs

Name	Function and Membership
Pacific Island Forum Secretariat	<p>This is the premier political grouping in the Pacific. Its mission is to ensure the effective implementation of the Pacific Islands Leaders' decisions for the benefit of the people in the Pacific. PIFS assists with international negotiations, trade negotiations (which may include fisheries or marine aspects), and acts as co-ordinator and facilitator for the technical advice provided by other CROP agencies. PIFS provides oversight and reports to leaders on the fisheries related leaders' decisions under the Framework for Pacific Regionalism. PIFS currently hosts the independent Pacific Ocean Commissioner and Alliance.</p> <p><i>Members: PICs, Australia and New Zealand. Also Associate members, Special observers and Dialogue partners. Observer status at the UN.</i></p>
Forum Fisheries Agency	<p>FFA helps countries sustainably manage fishery resources that fall within their EEZs. FFA is an advisory body providing expertise, technical assistance and other support to its members who make sovereign decisions about their tuna resources and participate in regional decision making on tuna management through agencies such as the Western and Central Pacific Fisheries Commission (WCPFC).</p> <p><i>Members: PICs, Tokelau, Australia and New Zealand.</i></p>
Secretariat of the Pacific Community	<p>SPC provides technical and policy advice and assistance to its members. Among other technical divisions, SPC has a Geoscience Division for Maritime Boundaries and Non-living Resources; Division of Fisheries, Aquaculture and Marine Ecosystems (FAME) offshore fisheries program for tuna fisheries science, FAME coastal fisheries program for coastal fisheries science, management and aquaculture; Statistics for Development Division for statistics, and working on the SDG indicators, and a Climate Change Programme.</p> <p><i>Members: PICs, Australia, France, New Zealand, United States of America, American Samoa, French Polynesia, Guam, New Caledonia, Pitcairn Islands, Northern Mariana Islands, Tokelau, Wallis and Futuna</i></p>

(continued)

Table A5.1 CROP Agencies involved in Ocean Affairs (Continued)

Name	Function and Membership
Secretariat of the Pacific Regional Environment Program	<p>SPREP provides assistance to its members to promote co-operation and to provide assistance to protect and improve the environment and support sustainable development. SPREP maintains important programs in relation to EIAs, MGRs, pollution and migratory species.</p> <p><i>Members: PICs, Australia, France, New Zealand, United Kingdom, United States of America, American Samoa, French Polynesia, Guam, New Caledonia, Northern Mariana Islands, Tokelau, Wallis and Futuna</i></p>
University of the South Pacific	<p>USP provides undergraduate and postgraduate educational services to the peoples of the Pacific region. USP has a Marine Studies Program, Pacific Centre for Environment & Sustainable Development and an Institute of Marine Resources, as well as expertise relevant to Oceans in other departments such as Geography, Governance and Applied Science.</p> <p><i>Members: PICs except FSM, Palau and PNG</i></p>
South Pacific Tourism Organisation	<p>SPTO facilitates the sustainable development of the tourism sector in the South Pacific; to strengthen capacity within the region; and to sustainably plan, market and manage the development of the tourism sector.</p> <p><i>Members: PICs, American Samoa, Cook Islands, French Polynesia, New Caledonia, Timor Leste, and the People's Republic of China, as well as 200 private sector members.</i></p>

Source: Govan 2014b

CROP agencies co-ordinate activities under Working Groups, of most relevance to the Ocean is the Marine Sector Working Group (MSWG) and the Sustainable Development Working Group (SDWG):

- The MSWG is chaired by FFA and SPC on a rotational basis and includes representatives of the 5 regional CROP agencies that have a mandate in fisheries or marine related activities and a growing list of international organisations, NGO and donor observers.
- The SDWG is co-chaired by PIFS and SPREP to (i) support Pacific island countries and territories through provision of effective and well-co-ordinated advice on issues that relate to sustainable development, and (ii) facilitate an integrated and programmatic approach to sustainable development including matters relating to the SDGs.

NGOs are very active and large international, particularly US-based, philanthropic NGOs have considerable lobbying power and influence. Pacific civil society have far less influence or access to resources with a few exceptions (e.g. Pacific Network on Globalisation and Local Managed Marine Area Network). The churches are widely recognised as influential civil society links to communities and some of the umbrella organisations have been active in matters of climate change.

Table A5.2 Other relevant intergovernmental regional organisations

Name	Function and Membership
Office of the Pacific Ocean Commissioner and Pacific Ocean Alliance	Formed under the Framework for a Pacific Oceanscape, the role of the Pacific Ocean Commissioner is to provide the necessary high-level representation and commitment to ensure dedicated advocacy and attention to ocean priorities, decisions and processes. Currently the Secretary-General of PIFS fulfils the role of Pacific Ocean Commissioner in a part-time capacity and the PIFS provides support functions. The Pacific Ocean Commissioner facilitates a Pacific Ocean Alliance, launched in 2014, intended to provide effective, integrated ocean policy co-ordination and implementation, facilitate regional co-operation and collaboration, including for the high seas, as well as support for national ocean governance and policy processes when required.
Pacific Islands Development Forum (PIDF)	PIDF was inaugurated in 2013 and aims to be a representative and participatory platform promoting 'green economy'. The 4th PIDF Leaders' Summit in 2016 included commitments to improving ocean governance and the ocean-related economy and plays an advocacy role in ocean and climate related policy at international and regional levels.
Parties to the Nauru Agreement Office	PNA maintains a small secretariat and office, which has been active in regional ocean governance issues, including the submission of proposals for consideration under the Framework for Pacific Regionalism relating to DSM and regional management of tuna other than skipjack.
The Western and Central Pacific Fisheries Commission	Established by the WCPF Convention to implement the Provisions of the UN Straddling Fish Stocks Agreement.
Te Vaka Moana (TVM)	Under TVM, fisheries administrations of the Cook Islands, New Zealand, Niue, Samoa, Tokelau and Tonga work together to increase economic benefits and food security. TVM develops and implements robust fisheries governance frameworks, systems and processes, over high seas and in-zone fisheries, works to reduce IUU fishing, and ensures co-operation at a subregional (Polynesia) level.
South Pacific Regional Fisheries Management Organisation (SPRFMO)	SPRFMO is an intergovernmental organisation that is committed to the long-term conservation and sustainable use of the fishery resources of the South Pacific Ocean. The SPRFMO Convention applies to the high seas of the South Pacific, the main commercial resources managed are jack mackerel and jumbo flying squid in the Southwest Pacific and, to a lesser degree, deep-sea species associated with seamounts in the Southeast Pacific. The Organisation consists of a Commission and a number of subsidiary bodies. New Zealand hosts the SPRFMO Secretariat.

(continued)

Table A5.2 Other relevant intergovernmental regional organisations (Continued)

Name	Function and Membership
United Nations Food and Agriculture Organization	The FAO operates a Subregional Office for the Pacific Islands as a technical hub, which supports 14 countries in the Pacific. It is responsible for developing, overseeing and implementing programmes and projects to address food security, nutrition, agriculture and rural development priorities including a coastal fisheries component.
Melanesian Spearhead Group Secretariat	The MSG was established in 1986 and the Secretariat was inaugurated in 2008 adding capacity to further implement MSG decisions. Relevant decisions include the development of a Roadmap for Inshore Fisheries Management in 2012, Memorandum of Understanding on Coastal Fisheries and Aquaculture Development and a Declaration on Environment & Climate Change 2012.

Table A5.3 Regional NGOs operating in at least several PICs on ocean-related topics

Conservation NGOs	Community Development and Fisheries Management NGOs	Other NGOs
Birdlife International Conservation International Greenpeace The Nature Conservancy Wildlife Conservation Society World Conservation Union World Wide Fund Pew Charitable Trusts	Foundation of the Peoples of the South Pacific International Live and learn Locally Managed Marine Area Network Worldfish Centre	Oxfam Pacific Conference of Churches Pacific Islands Association of Non-Governmental Organisations Pacific Islands News Association Pacific Network on Globalisation World Vision

Appendix 5.2 Excerpt from the 2030 Agenda for Sustainable Development

Sustainable Development Goal 14: Conserve and Sustainably Use the Oceans, Seas and Marine Resources for Sustainable Development

- 14.1 by 2025, prevent and significantly reduce marine pollution of all kinds, particularly from land-based activities, including marine debris and nutrient pollution
- 14.2 by 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration, to achieve healthy and productive oceans
- 14.3 minimize and address the impacts of ocean acidification, including through enhanced scientific co-operation at all levels
- 14.4 by 2020, effectively regulate harvesting, and end overfishing, illegal, unreported and unregulated (IUU) fishing and destructive fishing practices and implement science-based management plans, to restore fish stocks in the shortest time feasible at least to levels that can produce maximum sustainable yield as determined by their biological characteristics
- 14.5 by 2020, conserve at least 10 per cent of coastal and marine areas, consistent with national and international law and based on best available scientific information
- 14.6 by 2020, prohibit certain forms of fisheries subsidies which contribute to overcapacity and overfishing, and eliminate subsidies that contribute to IUU fishing, and refrain from introducing new such subsidies, recognizing that appropriate and effective special and differential treatment for developing and least developed countries should be an integral part of the WTO fisheries subsidies negotiation
- 14.7 by 2030 increase the economic benefits to SIDS and LDCs from the sustainable use of marine resources, including through sustainable management of fisheries, aquaculture and tourism
- 14.a increase scientific knowledge, develop research capacities and transfer marine technology taking into account the Intergovernmental Oceanographic Commission Criteria and Guidelines on the Transfer of Marine Technology, in order to improve ocean health and to enhance the contribution of marine biodiversity to the development of developing countries, in particular SIDS and LDCs
- 14.b provide access of small-scale artisanal fishers to marine resources and markets
- 14.c ensure the full implementation of international law, as reflected in UNCLOS for states parties to it, including, where applicable, existing regional and international regimes for the conservation and sustainable use of oceans and their resources by their parties