

7

Papua New Guinea

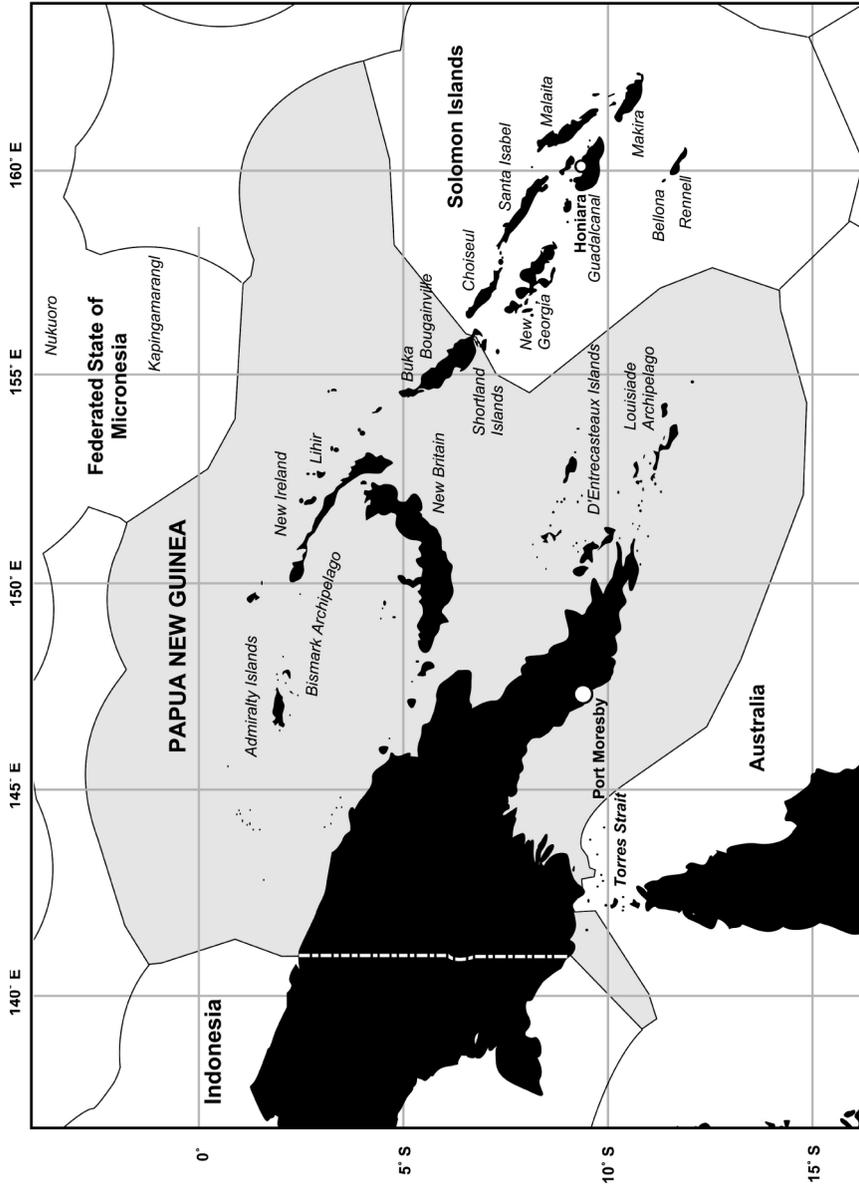
Population: 5,836,000
Land area: 426,840 km²
Sea area: 2,400,000 km²

Of the countries included in this study, Papua New Guinea is the largest in terms of land size and population. It is made up of one very large mountainous island shared with the Indonesian-controlled West Papua to the west, with numerous smaller islands to the north and east. The most striking characteristic of PNG society is its diversity. There are hundreds of distinct language and cultural groups, with differences in facial features and skin colour between peoples of the Highlands, south coast, the islands and Bougainville. Before World War I, the northern part of what is now Papua New Guinea was colonised by Germany. After the war, the whole of what is now Papua New Guinea was under Australian colonial rule, until independence in 1975.

Papua New Guinea has a formal capitalist economy—which is dominated by the government and a few large corporations in the mining and forestry sectors—and an informal economy. Some of the informal sector is also capitalist (such as stalls selling fresh fish by the side of the road or smoked fish in markets), but the bulk of it operates mostly without cash according to indigenous norms (such as village fish catches being distributed as per social obligations).¹ The formal economy has grown through resource-extraction industries—such as mining, forestry and fisheries—but it is widely felt that these industries have failed to bring benefits at the village level, except perhaps to a small proportion of landowners.

In the 30 years since independence, government services and infrastructure have deteriorated markedly (Manning 2005). The national government has undertaken a range of financial and economic reforms in recent years, but there continue to be serious concerns about governance, corruption and capacity. The investment environment remains erratic and high risk (Government of Australia 2005). Compared with other Pacific island countries, Papua New Guinea has far more agricultural, mineral and marine resources, as well as land, labour and potable water, but thus far it has been unable to convert this resource potential into sustained development gains for the majority of its population.

Map 7.1 Papua New Guinea



Source: Youngmi Choi, Secretariat of the Pacific Community, Noumea, New Caledonia.

Potential of tuna fisheries

The potential of Papua New Guinea's tuna resources is probably the best of any of the countries included in this report. Papua New Guinea's Exclusive Economic Zone (EEZ) includes some of the richest purse-seine fishing grounds, with the highest annual catch. While the longline-caught bigeye and yellowfin tuna in PNG waters do not have the value of the colder-water fish of the same species, the longline fishery is potentially very productive, especially to the north of the country. Furthermore, Papua New Guinea has relatively well-developed infrastructure, plentiful land, labour and potable water, and is close to important markets in Southeast Asia.

History of development

Early domestic industry development

In the 1970s, Papua New Guinea had a Japanese pole-and-line industry, as did many countries in the region. This fishery targeted skipjack, some of which was processed at an *arabushi* skipjack smoking facility in Kavieng.² The pole-and-line fishery peaked in 1974 with a catch of 74,649 metric tonnes. The fishery was based around Rabaul and Kavieng. The Japanese pole-and-line vessels caught fresh live bait each evening for the next day's fishing. There were difficulties with the bait fishery in Papua New Guinea, because it was under provincial government jurisdiction and the regulations were not uniform across provinces.

A Japanese distant water longline fleet had operated around Papua New Guinea until the mid 1980s, with a peak catch of 20,000mt in 1978. There were also US purse-seine vessels operating in PNG waters from the 1970s. The Japanese pole-and-line vessels and the US purse-seine vessels exported to Starkist canneries. Starkist promised to establish a cannery in Papua New Guinea. In order to encourage fishing companies to establish employment-generating onshore processing facilities and 'value add' in Papua New Guinea, the government introduced duties on exports of unprocessed tuna. At first the duties were 2.5 per cent but later they peaked at 15 per cent. The policy did not work as intended. Starkist never built a cannery. The Japanese pole-and-line fleets withdrew in 1986. Japanese longliners allowed the bilateral fishing access agreement to lapse in 1987 and ceased operating in PNG waters.

Throughout the 1980s and early 1990s, the main benefit Papua New Guinea derived from commercial tuna fisheries was the access fees paid by distant water purse-seine fleets, mainly from Taiwan but also from the Philippines and the United States. The fact that Papua New Guinea managed to capture only a small contribution to GDP in terms of revenue from its tuna resources via access fees from these fleets, and no employment or spin-off activities in the local economy, means that these were wasted years in terms of capturing wealth from tuna.

Reform and development since 1995

During the late 1990s and early 2000s, there was substantial restructuring of PNG fisheries administration under an Asian Development Bank (ADB) loan. The old Department of Fisheries and Marine Resources was downsized and reoriented from fisheries research and extension work, particularly in the provinces, to providing services for large-scale commercial fisheries. It became a self-funding (through access and licence fees), non-commercial statutory authority, the National Fisheries Authority (NFA).

Industry representatives interviewed as part of this study said the NFA administrative reforms had a positive influence on tuna business development in that policies became more transparent and therefore reliable. For example, several industry managers interviewed cited the introduction of transparent licensing procedures as encouraging their investment because they knew in advance what needed to be done to secure a licence and could anticipate what it would cost. Gillett (2003) also found that improved fisheries governance in Papua New Guinea in this period was one of the factors causing the growth in domestic tuna industries.

In the mid 1990s, changes in fisheries policy breathed new life into Papua New Guinea-based tuna fisheries. The duty on tuna exports was lifted and the new tuna longline industry, under a national management plan, became reserved for PNG citizens and local companies with only a minority (49 per cent maximum) foreign shareholding permitted. Local investors (mostly non-indigenous PNG citizen businessmen) moved into medium-scale longline fishing. At various stages, domestic longline vessels operated from Port Moresby, Lae, Kimbe, Kavieng, Wewak and Manus (Table 7.1). Vessels were all either locally or foreign owned under a 'bare boat' (or 'demise') charter to a local company. A cold-store facility was built at Port Moresby airport to store chilled fish before it was freighted out. Based on large catches adjacent to Papua New Guinea's EEZ in the north, the northern part of the EEZ appears to be the optimal longline fishing area. Longline wharves were provided under ADB loans in Kavieng and Lobrum (Manus) (Kumoru 2005). This area has only ever been lightly fished, however, due to difficulties freighting fish to sashimi markets from outside Port Moresby.

Papua New Guinea's catch in 2004 was 3,918mt, made up mostly of yellowfin (47 per cent), bigeye, albacore and others. Albacore was more common in the Coral Sea area. According to longline company interviewees, the best way to deal with their catch is to fly the A-grade tuna to the Japanese sashimi market. The next best product is sold in the Australian and Southeast Asian sashimi markets. B and C-grade product that cannot be profitably sold as fresh chilled sashimi was then further processed and packed as chilled or frozen loins or tuna steaks. These are exported to Australia, the United States and Asia. There is demand for these products in Europe, but the logistics of sending fresh chilled or frozen product to Europe from Papua New Guinea are difficult, largely because of a lack of scale (Paru, pers. comm.). Airfreight is expensive and the routes and schedules of passenger flights have not been appropriate for fresh-fish markets. Frozen product could be shipped, but Papua New Guinea's sea freight has been controlled by one international

Table 7.1 Papua New Guinea: indicators of domestic development, 2001–2002

	Locally based vessels active	Cannery/loining facilities	Sashimi packing facilities	PNG nationals jobs on vessels	PNG nationals jobs on shore	Frozen tuna exports (mt)	Fresh tuna exports (mt)	Cases canned tuna
Latitude 8	9 longline	0	1	102	34	42	1,050	0
Neptune	9 longline	0	1	95	35	256	360	0
Coco	6 longline	0	0	22	20	166	0	0
Other companies	16 longline	0	5	130	70	32	600	0
RD	10 purse-seine	1	0	25	2,500	15,888	0	1,464,158
Frabelle	5 purse-seine	0	0	60	23	9,092	0	0
South Seas								
Tuna	5 purse-seine	0	0	7	20	26,975	0	0
Fair Well	3 purse-seine	0	0	15	2	0	0	0
Pacific Blue								
Sea	1 purse-seine	0	0	4	3	5,080	0	0
Total	40 longline 24 purse-seine	1	7	460	2,707	2,010	59,532	1,464,158

Notes: Other companies included: Equatorial Marine Resources (EMR, a joint venture with Sanko Bussan), Blue Haven, Kidu Kidu, Longline Tuna, Manus Provincial Government, MAPS Tuna, Molina, Nako, Niugini Islands Sea Products, Yuwan Fisheries and PNG Fresh Tuna. There was a discrepancy between the NFA reported exports of fresh tuna for 2001 (1,745mt) and the FFA report of imports of PNG fresh tuna in the Japanese market for that year (2,015mt).

Source: Gillett, R., 2003. *Domestic tuna industry development in the Pacific islands. The current situation and considerations for future development assistance*, FFA Report 03/01, Pacific Islands Forum Fisheries Agency, Honiara, Solomon Islands:70.

Table 7.2 Papua New Guinea: export values of marine products, 1996–2002 ('000 kina)

	1996	1997	1998	1999	2000	2001	2002
Tuna	3,584.02	14,066.67	85,703.49	76,553.65	100,339.30	156,629.43	220,875.38
All marine products	25,880.22	37,150.44	138,172.60	124,583.80	157,544.70	218,749.18	282,855.64

Notes: Data for 2002 are provisional. All marine products: tuna, various crab products, crayfish products, various fish products (non-tuna), various shark products, frozen shrimp and 'sedentary' resources including *bêche-de-mer* and shell products such as buttons, pearl etc.

Source: Gomez, B. (ed.), 2005. 'PNG's robust tuna industry', in *Papua New Guinea Yearbook*, Yong Shan Fook, Port Moresby.

consortium. In addition to the price inflation caused by this monopoly, inefficiencies in ports and the low volume of shipping make sea freight expensive.

Raw packaged tuna loins and steaks can be further processed with ‘gas’ or ‘tasteless smoke’. In this process, carbon monoxide is injected to preserve the red colour of the flesh, which makes the product look fresh (red tuna meat turns brown after exposure to air or freezing). Companies in Lae and Kavieng using this process in 2004 were trading with a Dutch company Anova. The process is controversial because it can be used to mask substandard product, so is banned in many markets. For that reason only some PNG operators were anticipating using gas processing in future.

Several of the longline companies had sashimi packing and fresh-tuna loining facilities. In addition, there were some facilities not owned by longline companies. These included

- an NFA-owned facility in Kavieng, built with AusAID funding, which was being used for tuna in 2004 until the local longline fleet ceased operating in early 2005, and is currently used primarily for deep-water snapper and reef fish
- the Frabelle facility in Lae, completed in early 2005
- a facility planned for Lae to be built with Chinese aid money (to be owned by the NFA)
- a facility planned for Madang, intending to process handline catch (private investment by a company called Japan Foods).

In addition to the domestic longline tuna industry, since the mid 1990s distant water purse-seine companies have been enticed to base some of their fleets locally and to establish processing facilities in exchange for being licensed as ‘domestically based foreign-owned’ vessels. Being licensed as domestically based instead of distant water brought two main benefits to purse-seine fishers: i) they avoided access fees, and ii) distant water fishers who were not included in the 205-vessel cap on distant water purse-seine vessels in the region set by the Parties to the Nauru Agreement (PNA) would, as locally based vessels, be preferentially included in the cap under the FSM Arrangement.

By 2002, Papua New Guinea was looking like a model for development of commercial tuna fisheries. Since the domestication policy was introduced in the mid 1990s, annual export revenue from locally based tuna companies grew from K3.6 million to K221 million. Fisheries exports exceeded the value of forestry exports for the first time (Lewis 2005). The RD tuna cannery, established in 1997, was profitable and employed about 2,500 people in Madang (see Table 7.2). Several other processing facilities were planned for Lae, Manus, Kavieng and Wewak.

Export destinations for PNG tuna were as follows: chilled tuna to Japan and Australia; frozen tuna to the Philippines, Japan and Taiwan; canned tuna to Germany, the United Kingdom and small amounts to Melanesian Spearhead Group trading bloc countries; loins to Europe and the United States; and fish meal to Australia and Japan (Kumoru 2005).

Papua New Guinea was a site for tuna trans-shipment, especially Port Moresby. There were net-mending facilities at Lae and Madang, with a facility being built in Manus. Vessels trans-shipped at Kavieng, with provincial fisheries staff monitoring their activities.

Decline of domestic longline industry since 2002

The value of tuna exports for Papua New Guinea peaked in 2002 at about US\$64 million, then declined in the next few years by 10 per cent. The domestic tuna longline fleet, which had grown since starting in 1995 and suffered a downturn after 2002. There were several years of poor catches with small fish not suited to the most valuable Japanese market (Brownjohn, pers. comm.). It is possible that PNG longline fisheries were thus suffering the catch per unit of effort (CPUE) decline noted for the region as a whole for bigeye and yellowfin—the species targeted by sashimi-oriented longline fisheries. In addition, fuel cost increases and increased airfreight costs in the aftermath of the 11 September 2001 terrorist attacks hit the domestic longline fishers hard. During 2004, it became uneconomical to do tuna longlining from anywhere in Papua New Guinea other than Port Moresby, because of the extra leg of transport required to get the tuna to Port Moresby before it was sent overseas. By early 2005, all tuna longliners outside Port Moresby targeting the sashimi market had ceased operating (some longliners remained, targeting shark).

While airfreight and fuel costs had stifled the industry outside Port Moresby by 2005, longlining based in Port Moresby was still viable, although most companies had wound back operations due to decreased margins. One company, Equatorial Marine Resources (EMR), was expanding. It was a joint venture between a local businessman with a background in logistics, Blaise Paru, and Sanko Bussan, a Japanese longline sashimi-tuna company with 30 years' experience. All of EMR's product was pre-sold through Sanko Bussan's connections, meaning it avoided the risks of auction. EMR had a new processing facility on its wharf in Port Moresby, and had invested in a freezer vessel to collect catch from the fishing vessels to enable them to stay fishing (Paru, pers. comm.).

Air Niugini bears some responsibility for the collapse of the longline fishery outside Port Moresby. When Australian airline Ansett collapsed in 2001, Air Niugini also nearly folded and since then it had focused on profitability, charging as much as it could for its services and trying to maintain its monopoly status. As well as being expensive, schedules and the size of the planes operating in regional centres meant Air Niugini was not able to provide a suitably speedy and reliable service for sashimi-tuna exporters. Even from Port Moresby, Air Niugini's service was not ideal for sashimi exports to Japan because it could not get tuna to market quickly enough. When tuna exporters tried to bring in chartered freight flights, Air Niugini lobbied relevant government departments to refuse approval, arguing that Air Niugini had the capacity to do tuna airfreighting.

Eventually EMR in Port Moresby achieved approval for regular charter flights and was using this service successfully in 2005, but by this time the operators outside Port Moresby had already withdrawn from the fishery. Air Niugini prevented EMR using any of the cold storage or loading equipment at the airport (*The National* 2005b; Paru, pers. comm.).

The domestication policy of the 1990s was being rethought in 2005, in light of the stagnation of the domestic longline industry in 2004 and 2005. Even in its heyday, the domestic fleet had not taken the nominal annual total allowable catch (TAC) of 10,000mt, so the banning of distant water longline fleets could be seen as a missed opportunity in

terms of revenue (Gillett, Preston and Associates 2000). With the decline in the domestically owned industry, the NFA board agreed in 2005 to allow limited access by foreign longline vessels (Kumoru, pers. comm.). A new access agreement for the Japanese fleet was signed in 2006. It was hoped that having distant water longliners in Kavieng would build the fisheries sector in the area, thus enabling domestic fisheries enterprise (Barnabas, pers. comm.).

Another planned change is that ultra-low temperature (ULT) freezing vessels will be allowed to work in PNG waters.³ The high technology and high cost of these vessels means they are not easily localised so they had been banned under the old domestication policy. Industry interviewees outside Port Moresby, however, for whom airfreight was such a problem, said the ban on ULT freezers was a constraint on the domestic longline industry.

Purse-seine fishery

In terms of volume and value, the purse-seine fishery has been the biggest in Papua New Guinea, making up about 99 per cent of the commercial catch. Eighty per cent of the PNG purse-seine catch was recorded as skipjack, with the rest being yellowfin (Table 7.3).

Papua New Guinea's purse-seine fishery is made up of a distant water access fleet and a locally based foreign-owned fleet. In 2005, the distant water fleet licensed to operate in Papua New Guinea's EEZ included 98 active purse-seine vessels (several of the US vessels were licensed for but did not operate in Papua New Guinea) (Kumoru 2005). In 2005, 19 purse-seiners were regarded as domestic; 12 of these were non-Papua New Guinea-flagged vessels operating from Siar near Madang, supplying the RD cannery. There were 18 locally based foreign vessels, mostly Vanuatu flagged, which fished around the region under the FSM Arrangement (taking about 30 per cent of their catch in Papua New Guinea's EEZ). The domestic and locally based foreign proportion of the PNG catch has

Table 7.3 Papua New Guinea: tuna exports by volume, value and product, 2000–2004

	Total catch		Chilled tuna		Frozen tuna		Canned tuna		Tuna loins		Fish meal	
	mt	US\$	mt	US\$	mt	US\$	mt	US\$	mt	US\$	mt	US\$
2000	282,005	5.1m	1,196	13.5m	33,004	18.1m	10,298	18.1m	0	0	1,690	0.4m
2001	162,999	8.2m	1,857	22.2m	34,656	17.6m	9,858	17.6m	0	0	1,438	0.5m
2002	170,175	8.4m	2,106	30.4m	33,908	23.4m	12,214	23.4m	0	0	1,670	0.6m
2003	374,542	9.3m	2,092	16.5m	31,275	28.0m	13,753	28.0m	0	0	1,791	0.7m
2004	313,027	9.6m	2,111	7m	10,968	35.3m	15,252	35.3m	1,724	0.9m	2,973	1.2m

Notes: The total catch included distant water as well as local fleets, while the exported amounts were from the local and locally based fleets only. Canned tuna is not usually measured in metric tonnes but in cases of 48 cans. It is possible the figure for volume of exports of canned tuna referred to the amount of whole fish put into exported cans.

Source: Kumoru, L., 2005. Tuna Fisheries Report—Papua New Guinea, First Meeting of the Scientific Committee, Western and Central Pacific Fisheries Commission, Noumea, New Caledonia.

been more than 30 per cent in recent years (Kumoru 2005). Since 2000, the PNG purse-seine catch averaged about 260,000mt annually, making up about 20 per cent of the total Western and Central Pacific Ocean purse-seine catch.

The 1990s' domestication policy operated differently in the purse-seine fishery than it did in the longline fishery. Purse-seine vessels are larger, more high tech and much more expensive than longline vessels, so local businesses did not move into purse-seining. Rather, the domestication approach was to encourage foreign fleets to base some of their vessels in Papua New Guinea and establish a PNG-registered branch of their company. Since purse-seiners stay out at sea for months on end, import most of their inputs and are not slipped and repaired in Papua New Guinea, simply having purse-seine vessels based there is not economically better than having them based overseas and paying access fees as a distant water fleet. Locally based foreign vessels employed up to five PNG nationals on each vessel and there were some benefits from having company finances go through Papua New Guinea's economy, but these would not offset the loss in access fees.

The PNG government aimed to gain from having purse-seiners based in Papua New Guinea by tying their licences as 'locally based foreign' to commitments to develop onshore processing facilities, and to supply fish to those facilities (Kumoru 2005). Under the PNG Tuna Management Plan, licences for locally based foreign purse-seiners required the fishing company to own part of a large capacity (greater than 60 metric tonnes a day) processing facility and/or to supply an 'approved portion' of its catch to a local processing facility (Government of Papua New Guinea 2004). By 2005, this policy had resulted in the RD cannery in Madang (established in 1997), the South Seas Tuna loining plant in Wewak (established in 2004) and the Frabelle cannery and loining plant (which opened in Lae in 2006). Other processing facilities were being planned, including a 200mt-a-day cannery to join RD in Madang (Kumoru 2005) (Table 7.4).

Papua New Guinea's domestically based fleet tended to be made up of smaller purse-seine vessels that fished around fish aggregating devices (FADs) (Kumoru 2005). The domestically based purse-seine fleet could therefore feel directly the effects of any management measures aimed at restricting purse-seine catches from FADs to protect juvenile bigeye and yellowfin stocks that might arise in the Western and Central Pacific Fisheries Commission (WCPFC). The PNG government thus has an interest in regional management measures that could affect this domestic development initiative, such as changes to the FSM Arrangement from the 205-vessel cap to the Vessel Days Scheme (VDS).

Canneries and loining plants supplying tuna ready for canning were the central pillar of government aspirations for development from tuna resources in Papua New Guinea. Domestically based purse-seine vessels started off exporting about half of their catch in the mid 2000s but gradually landed more and more of the catch to local processing plants such that, according to government figures, the volume exported dropped to about 10,000mt in 2004 (Kumoru 2005). This figure seems very low. Solomon Islands' NFD manager, Adrian Wickham, estimated that the FCF purse-seine vessels (Taiwanese owned, Vanuatu flagged) supplying the South Seas Tuna loining plant each caught about 6,000mt a year—a total of 72,000mt for the fleet of 12. The loining plant had a throughput of 100mt

Table 7.4 Papua New Guinea: indicators of tuna development, 2004–2005

Company	Domestic vessels: no. and type	Processing facilities: no. and type	Jobs for nationals: no. and type	Annual exports: volume and type	Annual domestic sales: volume and type
Latitude 8	10 longline (7 active)	1 sashimi packing	-		Sold non-export-grade fish in Port Moresby shops
Neptune Equatorial Marine Resources (EMR)	3 longline 19 longline	0 1 sashimi, fresh loin/steak, packing	- 105 fleet 105 shore	Whole chilled and frozen fish, fresh loins/steaks	
Other companies	- longline	-	-		
RD	12 purse-seine	1 cannery	35 fleet 3,000 shore		
Frabelle	7 purse-seine	1 cannery 1 fresh loin	35 fleet 80 shore		
South Seas Tuna	12 purse-seine	1 cooked loin	- fleet 1,400 shore	2,800mt frozen loins	
Pacific Blue Sea NFA	- purse-seine 0	- 1 small smoking, fresh fillet/loin, packing	- -		
Total	42 longline (39 active) 23 purse-seine (D) 19 purse-seine (LBF)	>2 fresh loin >3 sashimi packing 3 cannery/cooked loin	>4,760	Fresh chilled and frozen, whole or cut up, cooked loins, cans	Fresh chilled/frozen fish

Notes: D: domestic; LBF: locally based foreign. Other domestic longline companies included: Coco, Molina, Fair Well, Gensbel, Longline Tuna, PNG Fresh Tuna and Kidu Kidu. Of EMR's vessels, nine were owned by Sanko Bussan, a Japanese company in joint venture with EMR, and 10 were owned by other companies. Neptune's vessels were targeting shark and frozen tuna for export to Taiwan, not sashimi tuna.

Sources: Interviews and personal communications 2005. Kumoru, L., 2005. Tuna Fisheries Report—Papua New Guinea, First Meeting of the Scientific Committee, Western and Central Pacific Fisheries Commission, Noumea, New Caledonia.

Table 7.5 **Purse-seine catches in Papua New Guinea's EEZ, 2000–2004**
(metric tonnes)

	2000	2001	2002	2003	2004
D and LBF	52,184	53,178	72,275	107,001	101,300
DWFN	217,137	104,378	92,223	254,043	205,743
Total	269,291	157,556	164,498	361,044	307,043

Notes: D: domestic; LBF: locally based foreign; DWFN: distant water fleet

Source: Kumoru, L., 2005. Tuna Fisheries Report—Papua New Guinea, First Meeting of the Scientific Committee, Western and Central Pacific Fisheries Commission, Noumea, New Caledonia.

a day; if it operated six days a week, 52 weeks a year, this would consume 31,200mt. So Wickham felt that the locally based foreign fleet supplying South Seas Tuna alone was probably exporting more than 35,000mt annually; and the locally based foreign fleet as a whole would still have been exporting more than half of its catch (Wickham, pers. comm.). According to manager, Pete Celso (pers. comm.), RD processed almost 100 per cent of its catch and had tried to buy more locally caught purse-seine catch from other companies but most companies were tied into contracts to supply Thai processors.

In order to preserve Papua New Guinea's tuna resources for the long term, as well as to alleviate damage being done to bigeye and yellowfin stocks now, Papua New Guinea's purse-seine fishery will have to be carefully managed. Commentators who believed there were governance problems with the NFA's licensing procedures were concerned that Papua New Guinea could give out too many licences under pressure from foreign purse-seine companies, undermining the long-term sustainability of the fishery (Brownjohn, pers. comm.; Lewis 2005).

RD

In 1995, the NFA signed an agreement with the Philippines company RD, whereby it could establish a locally based foreign purse-seine fleet after 75 per cent completion of a large cannery on the outskirts of Madang. The fleet and the cannery started operating in 1997. The cannery at Siar became profitable within a few years and, in 2004 and 2005, expanded production capacity from 100 to 150 metric tonnes a day (Celso, pers. comm.). Average throughput was 130mt a day (Kumoru 2005). The RD cannery was the first fully private-sector, profitable, large-scale, onshore processing facility in the Pacific. Government revenue was forgone in the incentive package negotiated with RD, but no government or aid donor money was used to build RD's facilities, and the government was not involved in management or direction of the company. In 2005, RD employed about 3,000 PNG nationals in the cannery, and contracted various spin-off businesses owned and run by PNG nationals for catering, security, stevedoring, transport and so on.

According to management, RD Tuna Cannery's profitability was completely dependent on preferential trade access to the European Union under the Cotonou Agreement.⁴ Preferential access for PNG products was negotiated on a five-year basis. RD's viability was vulnerable if the European Union dropped or reduced the 24 per cent tariff on canned tuna as a result of continuing pressure to liberalise trade, or if the quotas of tariff-free product from non-ACP Southeast Asian countries were increased. In either of these cases, PNG product would have to compete on a level playing field against product from Thailand, the Philippines and Indonesia, and since production costs were higher in Papua New Guinea, this would mean the end of Papua New Guinea's tuna processing industry.

Production costs are high in Papua New Guinea in a range of areas, particularly freight. In 2005, it cost US\$2,500 to send a container from Papua New Guinea to Hamburg—RD's main export destination—whereas sending a container from Bangkok to Hamburg cost US\$1,000 (Celso, pers. comm.). The lack of competition in container shipping in Papua New Guinea was part of the problem with freight costs, but it was also a matter of scale. In order to address these issues, RD had been promoting a marine industrial park scheme to attract other marine-product export enterprises to set up near the cannery, using the wharf facilities developed by RD. Despite promoting the scheme internationally for a couple of years, RD was still operating alone in 2005.

Other areas where production costs are higher in Papua New Guinea than elsewhere relate to labour. Wages rates were competitive and no manager suggested that the hourly wage rate was a cost they wanted to reduce, but the productivity rate was low. RD wages were above the legal minimum wage at about K0.70 an hour, they included an attendance bonus of K20 for working 10 days in a fortnight, and there were subsidised meals offered at the RD canteen (*The Nation* 2003a). The yield rate (the amount of export-grade flesh retrieved from each fish), however, was lower than in Southeast Asia, and there were such high levels of absenteeism it restricted production on some days, and meant the company had to employ more cannery workers than it needed (Celso, pers. comm.). In addition, whereas in competitor countries employees organise and pay for their own commuting costs, the custom in Papua New Guinea is for employers to provide transport to and from the place of work. To get about 3,000 employees to and from the base across two shifts six days a week cost RD almost K50,000 each week (Celso, pers. comm.).

Production was also constrained by an unreliable power supply and insufficient water supply.

Since starting up, RD has been dogged by social opposition. In 2005, the company had court proceedings against people it felt had slandered the company. There was a web site apparently authored by some local people calling for a boycott of RD's products (Friends of Kananam c.2003). The company had a scandal in 2004 when fishers who went on strike were charged with the serious offence of 'mutiny' when they returned to Philippines (Stinus-Remonde 2004). It is commonly believed that RD has not allowed a union, although according to management Papua New Guinea's labour laws guarantee that all workplaces must have a union, so RD has an in-house union (Celso, pers. comm.).

Landowners felt they had not been adequately recompensed for what they saw as the illegitimate use of their land (Sullivan et al. 2003).⁵ On the other hand, some interviewees with an independent perspective and knowledge of fisheries in Papua New Guinea said that, on the whole, RD was a socially responsible company that was contributing to Papua New Guinea's economy (Kinch, pers. comm.; Walton, pers. comm.).

RD has undertaken improvements to waste management at the cannery over the years (*The Nation* 2003a, 2003c). Some environmental problems around Sek Harbour are also the responsibility of national and provincial government environmental monitoring and regulating agencies, which, like most PNG government departments, have serious capacity problems. A 2003 World Wide Fund for Nature report into water quality in Madang Lagoon, including Sek Harbour, found that while the lagoon as a whole was relatively pristine, samples from coastal and river areas showed higher than permitted bathing levels for faecal coliforms—indicating sewerage management problems in villages—as well as abnormal readings around Siar village—indicating some pollution being caused by RD's factory (Benet Monico 2003).⁶

Other tuna processing

Apart from a short-lived *katsuobushi* factory in Kavieng in the 1970s, no tuna smoking had been tried on a commercial basis in Papua New Guinea as of 2005. The NFA factory in Kavieng was suitable for gourmet, small-scale processing to produce cold smoked fish, tuna jerky and tuna ham, but no private operator was using the factory for this purpose. The factory had been provided under the AusAID National Fisheries College refurbishment project. In 2004, the facility was used for loining and gassing tuna, but with the collapse of the Kavieng longline fishery the facility was processing reef fish only. A similar kind of facility was planned using Chinese aid money in Lae.

Small-scale coastal

Tuna, along with other pelagic fish, have long been fished and consumed by coastal communities in Papua New Guinea. For many villagers, tuna is important in the informal sector as a food fish and as a product to sell at markets. Coastal fisheries target tuna, among other species, and are an important source of nutrition and income for Papua New Guinea's rural coastal areas. Many aid projects have targeted small-scale fisheries, and the government focus in the past has been on extension services to train coastal small-scale fishers in a range of fishing techniques. There had been persistent problems, however, in small-scale rural coastal fishers moving into more commercial kinds of arrangements. The constraints in Papua New Guinea seemed to be similar to those listed for other Pacific island countries: the high cost of producing fish and getting it to urban markets from rural areas compared with the prices it is sold at; logistical difficulties getting fresh fish to market in time; infrastructure not being maintained; village fishers' lack of experience with (or interest in) commercial business principles; and villagers' prioritising of other social obligations higher than business commitments.

In 2005, there were two large continuing aid projects working on small-scale coastal fisheries in Papua New Guinea: the EU-funded Rural Coastal Fisheries Development Program and an ADB loan-funded Coastal Fisheries Management and Development Project, which collected and analysed socioeconomic survey data for village fisheries in several rural coastal areas. The EU program, based in Madang but also operating in Lae, Port Moresby and Kavieng, represented a new approach to rural small-scale fisheries development, based on commercial principles rather than the charity model. Participants had to devise a business plan and take out a loan at commercial rates for the vessel provided by the program. Established private-sector partners—RD in Madang, MAPS Tuna in Lae—then administered the loan. The private-sector partners bought fish from the participants, setting a portion of the sales money off against the loan, and subtracting costs for ice and fuel purchased through the private-sector partner. The program was running into problems in Madang (Kinch et al. 2005), but had worked quite well in Lae in 2004 (until MAPS Tuna scaled back operations when it stopped its own tuna fishing), and was working quite well in Kavieng (Marriot, pers. comm.; Paka, pers. comm.).

Near-shore FADs are a way to boost the production of tuna and other pelagic species for small-scale coastal fisheries. Papua New Guinea's reef fisheries appear to be under pressure in heavily populated areas, so redirecting effort to pelagic species could be advisable. By concentrating stocks, FADs can make targeting pelagic species more viable for small-scale fisheries. This was one of the strategies being considered by the EU program (Kinch et al. 2005).

Bait fishing to supply industrial tuna fleets is another potential opportunity for rural coastal fisheries. A bait fishery existed in Papua New Guinea for the Japanese pole-and-line fleet in the 1970s and early 1980s. There is the potential for a commercial bait fishery to supply domestic longline fleets, and also distant water longline and pole-and-line fleets if they start to operate in Papua New Guinea in the future, although there would likely be difficulties in governing coastal waters under customary tenure and provincial jurisdiction.⁷

Game fishing was not mentioned as having great economic development potential by interviewees or in reports on Papua New Guinea's potential for development from tuna resources. Papua New Guinea's small tourist industry has some game fishing, mostly trolling using lures. As with the other Pacific island countries covered by this report, Papua New Guinea had small active game-fishing clubs in each of the major coastal towns, holding regular tournaments (Chapman 2004b).

Handline/pump-boats

This category was included in the 2004 revision of the Tuna Management Plan, to encourage the development of small-scale commercial tuna fisheries in coastal regions (Government of Papua New Guinea 2004).

The idea behind the pump-boat plan was to emulate small-scale tuna fisheries in the Maldives, Samoa and the Philippines, which had enabled small-scale village-level fishers to enter the commercial tuna fishery. Thus far, small-scale village-based fisheries in Papua

New Guinea have been unable to participate significantly in commercial tuna enterprises due to: i) fuel inefficiencies for small-scale operators; ii) the difficult logistics of getting perishable tuna from remote villages to commercial centres in good condition; and iii) the cultural economies of villages not being suited to fishers making continuing full-time commitments to a single cash-earning activity.

Pump-boats are small wooden outrigger vessels with inboard diesel engines that carry crews of less than 10 using handlines around FADs. In 1996–97, a feasibility study was conducted around Milne Bay. The trial was not very successful, apparently due to an unexpected El Niño effect meaning tuna fishing in that region was below usual productivity, but interest remained high. A second trial was conducted in 2003 by the PNG company Popiyacop Ltd (Go, pers. comm.).

Initially, the pump-boats are to be operated by experienced Filipino fishers in partnership with local fishers (the vessels must be owned by PNG citizen companies), but it is intended that the relatively low cost and low technology, ‘learn-by-doing’ nature of the fishery means it will be quickly taken up by PNG fishers.

The handline method can catch larger tuna suitable for fresh (chilled or frozen) loin markets. Frabelle in Lae and another planned loining facility called Japan Foods in Madang (Celso, pers. comm.) hoped to utilise this kind of catch from the pump-boats.

Challenges facing the nascent handline tuna fishery include

- developing appropriate legislation for licensing
- establishing a management plan that will prevent overfishing and other negative environmental impacts from the fishery
- maintaining export quality in vessels with no refrigeration capacity, by fishers with no experience or training in commercial food handling
- safety issues for small vessels operating on the open sea
- achieving localisation when most previous attempts to establish small-scale commercial fisheries owned and operated by PNG nationals have failed for logistical and cultural reasons.

The pump-boat initiative in Lae as at early 2006 was progressing with a total of seven vessels taking good catches of yellowfin and bigeye, which were being landed and processed at Frabelle. A number of the challenges outlined above are being overcome, although it will be some time before the model can be declared a success.

Governing tuna industries

The meteoric rise of tuna fishing and processing industries in Papua New Guinea in the past decade was largely the result of improvements in governance. Better administration led to better policies, and the great potential of Papua New Guinea’s tuna resources began to be realised. The NFA’s administration has been as good as that in any sector in Papua New Guinea. As a statutory authority, the NFA has been in a position to pay its employees better than normal public servants and to expect a higher standard of work from them. The NFA offices are equipped to a standard similar to government departments in wealthy

countries. Each year, the NFA collects tens of millions of kina in distant water fleet access fees and domestic fleet licence fees. After deducting its operating costs, the NFA gives the remaining tens of millions of kina to central revenue in publicised ceremonies.⁸

Improved governance under the NFA resulted in increased revenues. According to the former managing director of the NFA, improved negotiations for distant water fleet access meant that, in 2002, it secured about K40 million (US\$9.1 million) (Lewis 2005). This was a great improvement from 1999, when the estimated total access fees were only US\$5.8 million (Gillett and Lightfoot 2002).

One of the lessons to be drawn from the NFA experience in Papua New Guinea, however, is that administrative improvements in one sector can be limited if governance as a whole remains problematic. The problems of corruption in Papua New Guinea, within the context of a generally high level of crime in society, are well known. Improved profitability in the sector and the NFA's revenue-raising capacity unfortunately meant that political interference became visible in tuna fisheries soon after the change of government in 2002. A former managing director of the NFA estimated that on the basis of the large purse-seine catch in 2003, access fees of K60 million should have been generated, but by late 2004 only about K25 million had been deposited into consolidated revenue, and it was unclear what had happened to the balance. According to Antony Lewis (2005), the NFA's governance problems included

- licences came to be approved 'in principle' without going through the recently established transparent NFA licensing procedure
- politicians pressured the NFA to issue licences for foreign purse-seine vessels in contravention of the NFA's rationale for licensing taking into consideration regional efforts to limit purse-seine effort
- the NFA board, which was supposed to be a safeguard for governance reforms, was 'dysfunctional' by the end of 2003
- the stakeholder meetings that had helped keep the NFA in tune with various stakeholder perceptions as well as to disseminate information became infrequent and irregular
- concerns about fisheries governance at the most senior level of the NFA and Cabinet led the major donor in the sector, the ADB, to withhold funds in 2003 and 2004.

Interviewees in 2005 (names withheld) suggested a range of areas in which they thought corruption might be extant

- issuing of fishing licences
- launching of policies (one draft of a policy being negotiated among stakeholders then a different draft being signed off by the NFA or relevant politician)
- monitoring activities (observers on vessels and officials checking compliance with environmental or safety regulations around onshore and waterfront facilities).

It should be pointed out that the existence of corruption *per se* need not prevent capitalist development (China is a case in point), although it has been argued that it has costs in terms of economic development (Rose-Ackerman 1999). Managers from tuna industries

interviewed for this project, however, all cited corruption as one of the constraints on development of their industry. The reasons they gave were that corruption added to uncertainty about costs and reliability of government services, and uncertainty about resource sustainability (for example, corrupt officials might not make the necessary decisions about managing purse-seine fisheries to conserve stocks).

Industry interviewees said some of the concrete effects on their businesses after the post-2002 decline in governance included problems with over-zealous enforcement, such as longliners being taken to task for not complying with rules intended to govern the purse-seine fleet. In some cases, annual licences applied for long before the expiration date did not arrive until months after the expiration of the old licence, leaving operators open to prosecution for operating without a licence. Such situations clearly contain the potential for unofficial 'fees' to be requested or proffered. Governance issues also seem to have contributed to the slow-down in private-sector onshore investments during 2003 and 2004; investors were wary of the security of their investments in the less transparent environment (Lewis 2005).

In the past few years, several initiatives have been undertaken to address problems connected to corruption in Papua New Guinea, such as the passing of the *Organic Law on Political Parties and Candidates* to try to stem tendencies to cross the floor and topple governments by stabilising party membership (Baker 2005), the creation of the Independent Commission Against Corruption and the Australian government-sponsored Enhanced Cooperation Package. In addition, the first-past-the-post electoral system, which had been identified as a contributing factor in poor behaviour by politicians (Pitts 2002), was changed to a preferential system in 2005 (Reilly 2005). The Papua New Guinea chapter of the non-governmental organisation (NGO) Transparency International has an active leader in Michael Manning. Manning has been talking to tuna-industry people about how to address problems in their sector (Paru, pers. comm.). Continuing government efforts, as well as personal efforts by Papua New Guineans and foreign investors to contribute to good governance through their voting patterns and relations with government officials, are needed to remove the constraints of corruption on economic development.

According to Maurice Brownjohn, a longline fishing company owner and chairman of the Fisheries Industry Association, the decline in governance since 2002 distorted the domestication policy that saw such dramatic improvements in the GDP generated from Papua New Guinea's tuna resources from the mid 1990s to 2002. Carefully prepared and negotiated agreements in the early years of the policy saw a totally domestic longline fishery emerge, and substantial domestic economic engagement from foreign companies such as RD through facilitating domestic licences tied to processing. Brownjohn feels that recent agreements, however, have not been scrutinised to ensure that foreign companies will significantly contribute to the PNG economy in return for being licensed as 'locally based'.

Notwithstanding some backsliding since 2002, fisheries administration at the national level in Papua New Guinea was still much better resourced and organised than in some other Pacific island countries covered by this study.

When asked about problems in the NFA, manager, Norman Barnabas, said he felt there had been a lack of consistency in leadership in a period of major change. Since the late 1990s, the NFA has had no less than seven different managing directors, each with a distinct management style that altered the way the organisation functioned. He said there was a need to develop and maintain a consistently strong senior management team within the NFA to ensure stability and well-developed policies (Barnabas, pers. comm.).

It is possible that another reason why some of the NFA reforms have not 'stuck' is that some of these managing directors were non-nationals. According to interviewees, the non-nationals were highly competent managers (as were the national managing directors) who were effective in achieving positive reform and organisational change, while they were in position. One of the main problems noted with development projects in the Pacific in the past three decades is sustainability after the project funding ceases and the technical advisors leave. While non-nationals have less attachment to the status quo and have no cultural ties that can complicate governance issues, when the leaders have been non-nationals Pacific islanders tend not to take ownership of projects, meaning any changes might not survive in the long term. While better governance in fisheries helped Papua New Guinea's tuna industries take off, broader and deeper fisheries administration and policy improvements would help them develop even further.

Industry representation was secured on the board of the NFA. Since 1991, Papua New Guinea has had an active Fisheries Industry Association (FIA), which has participated as a stakeholder in policy forums. Papua New Guinea has correspondingly had fewer of the problems that other Pacific island countries have in terms of misunderstanding private-sector needs and priorities by the government (Gillett 2003). Nevertheless, the relationship between industry and government is not as healthy as it could be.

Government administration is particularly important for sustainable fisheries. Logsheet data on the longline catch was poor until 2002. The first Scientific Committee meeting for the WCPFC in August 2005 highlighted that bigeye and yellowfin were being overfished (WCPFC 2005). Good management of purse-seine fishing in Papua New Guinea's EEZ will be crucial in the coming years. Papua New Guinea's EEZ has accounted for about 20 per cent of the regional purse-seine catch since 2000 (Kumoru 2005). Its domestically based purse-seine fishery, which by 2005 made up more than 30 per cent of the purse-seine catch in Papua New Guinea's EEZ, was mostly taken around anchored FADs. This kind of fishing was identified as one of the main causes of damage to bigeye and yellowfin stocks. Observer data from Papua New Guinea indicated that as much as 60 per cent of the FAD-associated purse-seine sets might be bigeye and yellowfin (Kumoru 2005).⁹

In 2004, Papua New Guinea's observer program employed 87 observers on 168 trips, funded by access agreement levies and direct cost recovery. Observers were stationed at major landing posts to cover purse-seine and longline vessels, trans-shipments and FAD deployments (Kumoru 2005).

Port sampling, observer, monitoring and enforcement activities were undertaken from provincial fisheries departments as well as the NFA. Provincial governments have on the whole been less well run than the national government and the provincial fisheries offices

visited for this project in Madang and Kavieng had not been allocated their operating grants for some years. There were staff, whose salaries were paid, and they had offices, but there was no money for office supplies, computing or fax equipment, or fuel for cars or boats to do extension work. So provincial fisheries officers had been unable to do much work for several years. In order for provincial fisheries officers to be able to undertake monitoring and enforcement work, the NFA had utilised a legislative initiative to improve connections between provincial governments and the national government to devolve these duties to the provincial level, and also to set up a user-pays system whereby the NFA paid fisheries departments directly for tuna-related activities. This was revitalising provincial fisheries departments.

Fish aggregating devices (FADs)

The National Tuna Management Plan included a FAD management plan, one of the first by any Pacific island country. Interviewees with experience in longline fisheries were concerned about the overall number of FADs, the positions of FADs being accurately recorded on charts, and deploying companies being held responsible for FADs when they eventually disintegrated and floated freely under the surface of the water (Brownjohn, pers. comm.; Kanawi, pers. comm.). It can be quite dangerous, and expensive, when longline gear becomes fouled in invisible floating FADs. In 2005, the government reiterated its commitment to manage FADs in Papua New Guinea's EEZ, by restricting the number deployed, and by restricting the purse-seine effort around FADs, as this seems to be having negative impacts on bigeye and yellowfin stocks (Kumoru 2005).

Conclusion

In terms of the full range of raw materials and infrastructure required for successful domestic industry development, Papua New Guinea is in the best position of any of the Pacific island countries included in this study. In addition, Papua New Guinea's tuna resources are so rich it can make a great deal of money from distant water fleets. While some impressive progress had been made, one main factor constraining Papua New Guinea from achieving its development aspirations was the incapacity of the government to improve the business environment.

Proving the domestication model is possible despite a challenging competitive environment, RD has been more commercially viable than previous attempts by Pacific island countries to trade access fees for onshore development. The company has not relied on aid money and its taxation holiday finished in 2002. RD, however, still relies on preferential trade deals to offset competitive disadvantage. Continuing improvements to the business environment will consolidate RD's position and facilitate further investment along these lines.

Of particular concern to legitimate industry and investors has been the uncertainty surrounding governance, in particular the management and politicisation of decision-making at the NFA. The other main factor affecting Papua New Guinea's ability to capture wealth from tuna is implementing sound management of the fishery for its long-term sustainability.

Development aspirations and tuna

Overall development aspirations

The PNG government's general development aspirations are contained in the *Medium Term Development Strategy 2005–10 (MTDS)* (Government of Papua New Guinea 2005). The cover of the *MTDS* document includes photographs of a child washing under a tap, a child studying at school, some policewomen, a woman selling produce at a market and a road-construction scene. From these images, one could deduce that the government sees sanitation, education, law and order, grassroots income generation and transport infrastructure as development priorities, and that women and children are at the forefront of these goals. This image is reinforced in the subtitle of the document, 'Our plan for economic and social advancement'. The first couple of pages of the *MTDS* list 10 guiding principles. This list conveys a somewhat different vision of development from that communicated by the cover images

- private sector-led economic growth
- resource mobilisation and alignment
- improvements in the quality of life
- natural endowments
- competitive advantage and the global market
- integrating the three tiers of government
- partnership through strategic alliances
- least-developed areas intervention
- empowering Papua New Guineans and improving skills
- 'sweat equity' and Papua New Guinean character.

This list prioritises economic growth driven by the private sector, through engagement with global markets, in areas in which Papua New Guinea is competitive, and through coordinated mobilisation of Papua New Guinea's resources. National cohesion is raised in three of these principles—in terms of integration between levels of government, partnerships between institutions within society and evening out development benefits across the country by targeting least-developed areas. Health and education services and the informal sector are only implied in these principles.

The picture shifts slightly again on page iii of the *MTDS*. Here, its role is identified as providing a guiding framework for expenditure in line with the government's Program for Recovery and Development, characterised as comprising good governance, export-driven economic growth, rural development, poverty reduction and empowerment through human resource development (in that order). Further down the page, the government development strategy is described as incorporating these features, plus the promotion of sustainable agriculture, forestry, fisheries and tourism. The expenditure priorities listed on this page return to the vision of development in the pictures on the cover of the document

- rehabilitation and maintenance of transport infrastructure
- promotion of income-earning opportunities

- basic education
- development-oriented informal adult education
- primary health care
- HIV/AIDS prevention
- law and justice.

The general development aspirations that emerge from the *MTDS* are about improvements in material standards of living for Papua New Guineans. The document prioritises a range of public services, it notes the importance of promoting national cohesion and good governance, and it accords a central role to private-sector capitalist activity as an engine for economic growth. Special mention is made of internationally competitive export industries making sustainable use of Papua New Guinea's natural resources.

Development based on tuna resources fits within the *MTDS* vision as generating economic growth through exports and providing opportunities for Papua New Guineans to generate income and learn new skills. The role and nature of government in tuna development includes the notion that different levels of government should be coordinated, and should include stakeholders from various sectors of society in policymaking. The *MTDS* does not indicate that government should drive enterprise, rather it should facilitate the private sector to generate and run businesses. This marks a change from previous decades when Papua New Guinea and other Pacific governments felt it was appropriate to own or manage tuna businesses (Gillett 2003; ADB 1997).

Specific aspirations for development using tuna resources from the PNG government perspective are spelled out in the National Tuna Management Plan, section 2.4 'Objectives' (Government of Papua New Guinea 1999)

- encourage development of the tuna fishery, with optimal development of onshore processing and downstream value-adding processing, so as to maximise economic and social benefits to Papua New Guinea from sustainable use of its tuna resource
- foster the development of an economically viable domestic tuna-fishing industry while ensuring that the utilisation of Papua New Guinea's tuna resources is sustainable and that commercial tuna fishing has minimal impact on the marine and coastal environment and on customary and subsistence fishers
- meet Papua New Guinea's regional and international obligations to the management and conservation of tuna resources, while holding Papua New Guinea's interests paramount
- maximise Papua New Guinean participation through the wise use and development of fisheries resources as a renewable asset.

The picture of development aspirations that emerges from this list prioritises the generation of wealth from tuna resources in the PNG economy through fishing and processing industries, while minimising negative social and environmental impacts, and maximising the involvement of Papua New Guineans in these industries.

Government capacity

Although ‘governance’ is often used simply as a euphemism for corruption, it is a very broad term. Good governance encompasses a range of issues raised in the *MTDS*, the Tuna Management Plan and by interviewees from all levels of society. It includes the obvious factors of transparency and accountability in government, but also of creating an enabling environment for development, consultative processes that enable civil society to participate in government and setting in place measures to mitigate social and environmental problems that could emerge from economic development. In Papua New Guinea, aspirations for development from tuna also touch on improving coordination between national and provincial levels of government, and informal community governance systems.

In order to achieve this kind of governance, government departments must be adequately resourced, bureaucrats adequately skilled and systems of government must encourage best practice from officials. The NFA is a good example of this relationship.

In Papua New Guinea, where responsibility for tuna fisheries lies with the national government, but the concomitant effects in related areas fall to provincial authorities, coordination between levels of government is extremely important. While some responsibilities related to tuna fisheries have been devolved to provinces, capacity has been a problem. Provincial fisheries departments have been starved of resources for some years, and have not been reoriented from extension services to deal with industry in the same way as the NFA staff.

Human resources in government departments are a large part of ‘capacity’. Several interviewees noted that PNG bureaucrats could benefit from further education in fisheries science, fisheries and business management and environmental monitoring. Interviewees involved in fisheries education and training were concerned that Papua New Guinea’s tertiary education facilities were not producing enough graduates with the range of skills necessary to work as fisheries bureaucrats, covering all the areas mentioned above (Munkaje, pers. comm.; Adani pers. comm.).

Economic viability

Since most expressions of aspiration for development from tuna involved private-sector businesses, the role of government in creating an enabling environment for private-sector development is important. Improvements in macroeconomic policy as well as other aspects of governance are needed to improve the economic viability of tuna businesses.

One example of how poor government involvement could damage development in tuna businesses is problematic development projects. Aid donors as well as governments have been at fault in these situations.

Policy stability

Political stability was cited by Mike Manning as one of the highest priorities for businesspeople in Papua New Guinea (Manning 2005). Interviewees for this project, however, had a slightly

different take: they were not really concerned with who was in government or whether the government changed frequently, but they were very concerned about stability of policies.

For example, in 2005 companies planning to use pump boats had been given information on how many licences were likely to be issued that was inconsistent with national legislation and provincial government plans. It is obviously costly for businesses to invest based on one policy direction, only to have it changed afterwards.

Government services

Related to policy stability as a concern for business were the reliability, effectiveness, transparency, accountability and cost-efficiency of government services. Many industry interviewees expressed frustration with the quality of government services—for example, the length of time it took to receive licences.

Current moves to balance the budget are likely to restrict government resources even further, although apparently World Bank and ADB projects in public service reform, along with the *Organic Law* in this area, have been working towards ‘right-sizing’ rather than just ‘down-sizing’ to try to develop government services that are effective as well as affordable (Manning, pers. comm.).

Taxation and incentives

The PNG government has used a combination of licence conditions with incentive packages involving tax holidays to attract international fishing companies to establish shore-based processing facilities. As of 2005, the policy seemed to be successful in that two plants were running profitably, employing nearly 5,000 people between them, another was almost complete and more were planned. A cost-benefit analysis would reveal whether these benefits outweighed revenue lost through incentive packages. A study of the economics of tuna fisheries in Papua New Guinea from 2000 suggested that during the period in which the incentives applied, the costs of concessions outweighed the benefits gained in terms of local employment, probably in the order of K12–14 million each year (Gillett, Preston and Associates 2000).¹⁰

One potential pitfall is that the incentives and licence conditions have skewed the economic behaviour of the foreign investors to invest in an economically unsustainable business. As it is, RD claims that if preferential trade access to the European Union were to disappear, it would cease to be financially viable (Celso, pers. comm.). Most commentators agree that preferential trade access to the European Union from ACP countries will be wound back at some stage, so it would seem prudent to treat incentives as an interim plan and work harder on improving the general business environment.

Another problem with the incentives packages in Papua New Guinea is that they seem to have been negotiated individually for each fishery/processing business on an *ad hoc* basis, rather than as a standard set of incentives for all businesses in the sector (Celso, pers. comm.; Defensor, pers. comm.; Nidung, pers. comm.). The potential for corruption in individually negotiated incentives packages is obvious; at the very least, they contain

the potential for differential treatment by government of industry players. They lead to a situation in which companies are seen to be asking for special favours, which sets up an unhealthy relationship between companies and government.

Human resources development

To a certain extent, the private sector will furnish its own educational and training needs, but government also needs to provide general and specialist education and training. A report into the economics of the PNG tuna industry in 2000 found that lack of qualified and trained crew was one of the major constraints on development of tuna-fishing businesses, and recommended a 50 per cent increase in the numbers proposed to be trained by the National Fisheries College (Gillett, Preston and Associates 2000). Industry and small business-oriented fisheries education services have improved greatly in recent years with the refurbishment and reorientation of the National Fisheries College in Kavieng under an AusAID project.

One of the areas in which education could help is in developing business skills among Papua New Guineans. The lack of indigenous participation in management and ownership of businesses was in part culturally based, whereby social priorities had not facilitated Papua New Guineans' success in business, and partly historical, whereby the colonial system prevented Papua New Guineans from assuming leadership positions in trade and other businesses. Greater emphasis on financial literacy and education in business studies could help encourage more ethnic Papua New Guineans to own or manage businesses.

Minimising negative social impacts

Social problems associated with tuna industries are often treated as an add-on; consultants are hired to write reports about the problems, calls for measures to mitigate negative social impacts are made in policy documents, then little or nothing is done. Social discontent left untreated had disastrous consequences at Panguna in Bougainville in the 1980s. Nothing on that scale has happened in the tuna sector in Papua New Guinea, however, the public relations problems RD has faced in the Madang area show that even relatively minor social discontent can be a constraint to business. It is possible that RD's public relations problems have dissuaded other prospective investors from onshore processing in Papua New Guinea.

Where tuna industries are causing social problems, it is important for government to take the lead in resolving the problems and to make the public aware of these efforts. Where social problems are perceived to exist or exist but are being unrealistically blamed on particular businesses, government and companies need to work together to build awareness about the facts of the situation, rather than letting negative rumours flourish.

Consultative decision making and dissemination of information about issues of public concern are two strategies that would have a positive effect on improving the social problems arising around tuna industries.

Distribution of benefits

An important aspiration for development from tuna resources in Papua New Guinea was that benefits from development should be distributed across society. The geographic distribution of benefits from tuna industries is implied in the *MTDS* principle of ‘least-developed areas intervention’. One of the aspirations relating to the distribution of benefits was that tuna industries should generate benefits in villages, in part because coastal villagers are seen as oceanic resource owners (even though legally their customary tenure rights stop in coastal waters). Interviewees who have worked with coastal village communities said that the pervasive attitude about tuna industries in villages was that they had not benefited villagers (Aini, pers. comm.; Tamba, pers. comm.; Sibanganei, pers. comm.; Kinch, pers. comm.). In theory, increased revenue from tuna businesses, even distant water fleets, should lead to improved government services in rural areas, but in Papua New Guinea, government services in rural areas have declined. Not trusting the government to distribute development benefits on their behalf, people saw that villagers’ direct involvement in tuna industries, either through employment or through owning businesses, was the way to secure development benefits at the village level.

The EU Rural Coastal Fisheries Development Program was one of a range of rural coastal fisheries development projects that had been conducted in Papua New Guinea and other Pacific island countries in recent decades, to try to facilitate rural coastal fishers’ involvement in small-scale commercial tuna fisheries.

Notwithstanding the apparent short-term problems with the EU program at this stage, it is probable that some of the principles for economic viability contained in it could in the long term facilitate village fishers’ transition to more commercial ways of operating.

Another way for villagers to benefit from tuna industries in Papua New Guinea seems to have been developed in the mining industry, whereby local landowning villagers are given preferential access to jobs and spin-off businesses. Part of the conditions under which RD was set up was that the company undertook to contract with local landowning groups to provide stevedoring and other services to RD.

While most national government employee interviewees said governments were not good at doing business and should therefore not own or run tuna enterprises, some interviewees at the provincial level said there was a role for government in assisting small-scale operators at the village level (Sibanganei, pers. comm.; Tamba, pers. comm.). They felt the commercial difficulties faced by small-scale village-based operators should be addressed by subsidies, in the form of government agencies buying their product at attractive prices and government vessels being used to travel to village fishing centres to pick up catches to transport them to urban markets.

One more way villagers could gain benefits from tuna industries would be if the NFA directed a small proportion of licence fees to a rural coastal development fund, and administered a cross-sectoral committee to allocate the fund to projects each year. This could improve public approval of industrial tuna fisheries, especially if it was combined

with bringing village stakeholders into consultative decision-making processes and more active awareness programs to disseminate accurate information about tuna industries.

As well as somehow spreading development benefits from tuna industries to rural areas, many interviewees' aspirations contained the idea that industrial tuna developments should be geographically spread. Several interviewees expressed aspirations along the lines of having tuna canneries or loining plants in every province. Recent developments have indeed resulted in large-scale tuna processing in Madang, Lae and Wewak, with longline centres in Port Moresby, Lae, Kavieng and Lobrum (Manus). The problem with this aspiration, however, is that it detracts from the economic viability of those developments.

Distribution of benefits versus economic viability: industrial hubs

RD interviewees stated clearly that high operating costs in Papua New Guinea detracted from the company's profitability in relation to Southeast Asian competitors, and was counteracted only by preferential trade access to the European Union. Many of the problems for tuna industries in Papua New Guinea's business environment were related to the cost and infrequency of freight, and the costs and reliability of infrastructure and government services. RD managers could see that a consolidation of similar types of business in the Vidar area north of Madang would bring these costs down, and thus had been trying to attract other marine production industries to Vidar, and lobbying the government to reserve the area as a marine industrial park (Celso, pers. comm.). The project manager of the EU program in Madang agreed that such an industrial zone could be beneficial for fisheries, including small-scale fisheries, especially if it were to be developed along environmental 'best practice' lines, with, for example, Marine Stewardship Council accreditation (Marriot, pers. comm.).

Industrial clusters or 'hubs' such as this proposal have been used to generate economic development in several countries, including China's 'special economic zones' and 'export processing zones' on the east coast around which spectacular economic growth has been generated. Concentrations of firms with related specialisations are able to generate operational synergies, with pooled infrastructure and human resources development (Bowman 2005). Greater volumes of freight alone would solve many of RD's cost problems. Changing commuting attitudes and structures, as well as working around the utility challenges, would be easier if a group of companies could work on it together.

In order to sustain the promising levels of growth in foreign direct investment in large-scale fishing and processing enterprises in Papua New Guinea, therefore, decision makers might want to rethink the policy of geographically spreading tuna developments, in favour of consolidating them.

Minimising negative environmental impacts

The National Tuna Management Plan (Government of Papua New Guinea 1999) identified ecological responsibility as a high priority among aspirations for development from tuna. The experiences of RD show how ecological responsibility in shore-based

developments is intimately related to social issues, and can also have an impact on economic issues. Some of the loudest social opposition to RD has been denouncing its environmental practices, claiming that polluted waterways, bad smells and swarms of flies have detracted from the quality of life and fishing opportunities of villagers living near the wharf and factory (Sullivan et al. 2003). While perceptions of RD's wrongdoing in this area seem to exceed RD's environmental perfidy, the fact remains that RD is seen widely as environmentally unfriendly and this perception has various social, political and economic repercussions.

One of the ways government, NGOs and aid donors could contribute to improving awareness of environmental issues around tuna industries would be to conduct baseline studies of the effects of tuna fisheries and onshore processing on coastal environments and food-fish stocks. These activities could be incorporated into continuing monitoring by the Department of Conservation. The results of monitoring could then be disseminated to local communities in a digestible manner, such as short pamphlets or speaking tours.

The other side to this coin is that being perceived as environmentally friendly can have economic benefits in RD's target markets. Ecological responsibility is an important marketing advantage in high-end seafood markets in the European Union and the United States (Marriot, pers. comm.; WWF 2005).

Some interviewees expressed concern about the management of commercial tuna fisheries, specifically whether licences were being managed for the long-term economic and ecological sustainability of the fishery, or whether they were being allocated on principles of short-term financial gain. Some commentators have expressed doubt about transparency, accountability and the following of 'proper processes' in licence approvals (Brownjohn, pers. comm.; Lewis 2005).

Domestication

The biggest aspiration for tuna development in Papua New Guinea, as for the other Pacific island countries covered in this project, was the notion of domestication: capturing more of the benefits from tuna fisheries by pulling tuna enterprises into the orbit of the domestic economy. The Medium Term Development Strategy indicates that the government intends to build on fisheries-sector growth by 'increasing the level of local participation' (Government of Papua New Guinea 2005:11). The National Tuna Management Plan aimed to encourage onshore processing—domesticating the value-added portions of the tuna commodity chain—and to foster the domestic tuna-fishing industry (Government of Papua New Guinea 1999). The aspirations of interviewees from all levels of society included ideas about domestication, often couched in terms of PNG nationals coming to be employed in, manage and own tuna businesses, and always containing the assumption that PNG nationals would contribute more to the economy than would foreign investors, managers and employees.

The main argument used to justify domestication policies is that having economic activity based in Papua New Guinea's economy generates growth at home, rather than overseas.

Some economists have argued against trying to bring tuna industries into the domestic economy, saying that Pacific island countries seem not to have competitive advantage in tuna fishing or processing, so they should instead maximise their access fees and use that revenue to facilitate economic development in other areas (Petersen 2002a).

Another take on this issue is that government involvement and inappropriate policy environments have been blocking comparative advantage by making the business environment unattractive and scaring off the private sector. According to this argument, if fisheries management and development policies are improved so that investors can trust a return on their investment, the private sector will invest in tuna fisheries. This concept fits events in Papua New Guinea since 1995, when government administration improved a great deal, until about 2002–03, and during this period the private sector boomed. Licensing conditions favouring companies making onshore investment were also a key factor. For the first time in the Pacific, Papua New Guinea has established large-scale onshore investments funded entirely by the private sector with no government ownership or donor support (albeit with tax incentives and coercion through licensing arrangements).

One of the problems with domestication policies is that often it is possible for foreign investors to fulfil the criteria for domestication but still not generate much activity in the domestic economy. Fisheries Industry Association chairman, Maurice Brownjohn, outlined a spectrum of potential locally based foreign fishing companies that could range from companies fully engaged and committed in the local economy to companies that were little more than agents for distant water fleets (Brownjohn, pers. comm.).

Even when companies do generate activity in the local economy, the quality of the activity is important. Fishing and processing industries tend to consume a high volume of imports, such as fuel, which pass through the local economy but generate few benefits, especially if there is a balance-of-trade problem.

One of the striking features of aspirations to domesticate tuna industries is the persistence of the belief that it is important for PNG nationals to work in, manage and own fishing companies. Tuna fishing is capital intensive and high risk. Wealthier companies in wealthier countries have moved out of fishing into processing and trading, and the companies that continue to fish also trade, which is presumably where they make their profit. In the words of RD's managing director, 'People think this business is all about fishing, but it's not' (Celso, pers. comm.). Papua New Guinea's aspirations for domestication include processing as well as fishing, but perhaps it would be pertinent to include marketing and trading as well.

Aspirations for domestication also include more than simply economic concerns. National self-esteem is at stake, no doubt stemming from the colonial experience. Sometimes the nationalist angle can lead to a preoccupation with complete domestication at all costs, when that might not be economically the most sensible strategy.

In the short to medium term, some business owners have expressed the opinion that preoccupations with domestication in PNG immigration regulations act as a constraint on businesses (Kingston, pers. comm.; Middleton, pers. comm.). Work visas for expatriate employees are expensive and time-consuming to apply for. The policy of encouraging

employers to hire and train locals rather than bring foreigners in was no doubt intended to further domestication aspirations, but, according to interviewees, the cumbersome nature of immigration requirements to acquire human resources that were not available in the local labour pool have instead had the effect of discouraging businesses from expanding or starting up at all.

That is not to say that national self-esteem factors should be overlooked as aspirations. To do that would risk adding to existing levels of social discontent with tuna industries. In other words, optimal domestication policies require complex juggling of recognition of the importance of national self-esteem in having indigenous role models in leadership positions, with recognition of the fact that even in the long term total indigenisation might not be the best economic outcome.

Value adding through processing

With the stagnation of the domestic longline industry in 2005, the main focus of PNG government aspirations for development for tuna resources was fishing tied to onshore processing. Papua New Guinea's aspirations for this sector were very high; it saw that with cooperation and co-investment from other Pacific island countries, Papua New Guinea could challenge Thailand as the world centre of tuna processing (Barnabas, pers. comm.; Celso, pers. comm.; Natividad, pers. comm.). The Forum Fishing Agency's (FFA) deputy director described Papua New Guinea's aspirations for development from processing as visionary; he saw Papua New Guinea as 'the most obsessed with domestic development' of all the Pacific island countries (Dunn, pers. comm.).

Since Papua New Guinea has land, labour, fresh water and abundant tuna resources, it is the most suitable of the Pacific island countries for large-scale onshore processing. Industry interviewees said they hoped other Pacific island countries might collaborate with Papua New Guinea in aspiring to become the world centre for processing tuna, by funnelling catches from their EEZs to PNG processing centres instead of to Southeast Asia (Natividad, pers. comm.). One reason why other countries might support this aspiration is that for many Pacific island countries, Papua New Guinea is closer than Thailand, so it could make their fishing grounds more economical in terms of steaming time to point of sale. But many questions remain. Will other Pacific island countries see their interests as lying with Papua New Guinea in developing its processing sector, or will they see its success as a threat to their own aspirations? Will other countries invest in PNG industries? Will Papua New Guinea allow nationals of other Pacific island countries to train and work in its industries, or will it want only PNG nationals to have access to these benefits?

Potential future additional developments in onshore processing mentioned by industry interviewees included fresh chilled or frozen loins for the EU and US markets, and fully prepared and packaged fresh fish for supermarket shelves in Japan. ULT freezer vessels were in 2005 to be allowed to operate in Papua New Guinea from the enactment of the next National Tuna Management Plan (Kumoru, pers. comm.). Another possibility would

be for Papua New Guinea's substantial agricultural potential to be directed to domestic production of materials needed for tuna industries. This could include ingredients for canneries, such as spices, vegetable oil and table salt. Industrial salt is also used in large quantities for brine freezers in fishing.

Recommendations

For Papua New Guinea to realise its aspirations as a leader in economic development from tuna in the Pacific, it will be important to work on governance issues within fisheries and cross-sectorally to ensure the transparent and consistent application of fisheries policies, plans and legislation. It will be important to continue with domestic processing initiatives while addressing the factors that make Papua New Guinea an uncompetitive (high-cost) business environment. For example, Papua New Guinea could develop industrial hubs rather than spreading developments around the country. Papua New Guineans themselves could improve their capacity to benefit from tuna industries by developing more self-sufficiency in attitudes towards large companies, for example, by establishing spin-off businesses independently rather than waiting for companies to make businesses for them. The government can help by continuing work on maintaining 'list-one' status for importing to the European Union.

Other factors that will sustain recent gains include addressing social and environmental issues through more consultative decision making, and carefully assessing the costs and benefits of taxation incentives. With reform to the taxation system individual tax holidays may not be necessary to help companies establish themselves. The administration of incentives for new companies could be made uniform across the sector and easier to apply for. The government could also work on ensuring locally based foreign activities, attracted by preferential access to tuna resources, fulfil investment requirements and are monitored to ensure that real benefits to the PNG economy are received. Finally, for long term sustainability it will be crucial to develop sound management for tuna fisheries in consultation with industry, including ensuring licensing guidelines are strictly adhered to, to improve business confidence in the capacity of government and the future of the industry.

Notes

- ¹ Some might call this part of the economy 'traditional' or 'subsistence'. Contemporary village fishing practices have changed a great deal since first contact with Europeans and use of the word 'traditional' can imply unchanged practices. By the same token, 'subsistence' can imply fishing only to have enough to eat, but village fishing has always been about social exchange and cultural practices in addition to getting enough to eat.
- ² According to a Japanese interviewee who worked at Nago Island, the *arabushi* venture in Kavieng was never very successful due to a lack of suitable timber to use as fuel for the smoke-drying process (Nakamura, pers. comm.).
- ³ ULT vessels freeze tuna to -60°C , which means the flesh does not oxidise and turn brown, which means it can still be sold as sashimi.
- ⁴ To protect canneries in Spain, Italy and France, the European Union has a 24 per cent tariff on imports of canned tuna. RD cannery's product fits within the Rules of Origin as an ACP (Africa Caribbean Pacific) product, which means it could avoid the tariff under an agreement originally set up during decolonisation to ensure Europe's continued access to the commodities of former colonies (the Lomé Convention).
- ⁵ RD management feels aggrieved by this belief and sees responsibility for the dispute lying with the Department of Lands. 'RD as an innocent party in good faith merely bought the land in question from the previous owner through an auction ordered by a court of competent authority' (Celso, pers. comm.).
- ⁶ RD management sees this report as unfair to the company because it was not given the opportunity to participate or comment on the testing procedures or results (Celso, pers. comm.).
- ⁷ For recent examples of disputes in coastal fisheries arising from customary tenure, see Kinch et al. 2005.
- ⁸ In Papua New Guinea, most government departments run at a deficit (Warner and Yauieb 2005) so the NFA's public demonstration that it not only balanced its books but contributed a substantial amount to consolidated revenue was a public relations coup.
- ⁹ RD management disputes this finding, saying that skipjack always makes up more than half of its catch, and also asserts that other methods could be catching large numbers of juvenile bigeye and yellowfin but that this mortality from other methods is not being picked up in logsheet reports (Celso, pers. comm.).
- ¹⁰ RD management disputes this conclusion, saying that employment benefits are not the only benefits that should have been considered in this equation. Others that could have been included are foreign exchange earnings, the kinds of taxes the company contributed in that period, such as the value-added tax and income taxes for employees, import substitution benefits and technology transfer (Celso, pers. comm.).