

# 3

## **Livelihood Dilemmas on Some Small Islands in Milne Bay Province, Papua New Guinea**

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This chapter begins by exploring the way in which one group of small islands—the Bwanabwana group—became a focus of ethnographic attention during the brief period, from 2004 to 2006, when the Milne Bay Community-Based Coastal and Marine Conservation Project (MBCP) was being implemented by Conservation International. The rather limited nature of this attention and intervention is placed in the longer historical context of what is known about the lives and livelihoods of the islanders before they became the subjects of an externally funded conservation project that failed to achieve its own objectives. We then proceed to document what little we know about the further transformation of their lives and livelihoods in the wake of this failure. This leads us to reflect on some of the larger questions raised by the divergence of scientific and indigenous beliefs and practices relating to the conservation or exploitation of marine resources, both in Milne Bay Province and in other parts of Papua New Guinea (PNG).

The authors of this chapter have contributed to the findings in different ways. Martha Macintyre and Jeff Kinch have both undertaken long periods of fieldwork on particular islands in Milne Bay Province, while Simon Foale and Colin Filer have only been engaged, for brief periods, in the design and implementation of specific studies that were more or less connected with the MBCP and its aftermath. Macintyre's fieldwork was mostly conducted

on one of the islands in the Bwanabwana group (Tubetube), while Kinch's fieldwork was conducted on another island (Brooker) that is not part of the Bwanabwana group but is not too far away. Kinch was involved in the design of the MBCP because of his prior experience as an anthropologist in the area of interest, but was not part of the team that attempted to implement the project. Kinch and Foale have both been involved in the design and evaluation of another project, in another part of PNG, which is discussed towards the end of this chapter because the outcomes bear some comparison with the outcomes of the MBCP. Given the divergence in the nature of our contributions, we have generally avoided the use of the first person plural in the remainder of the chapter except where it serves to signal our agreement on the point being made.

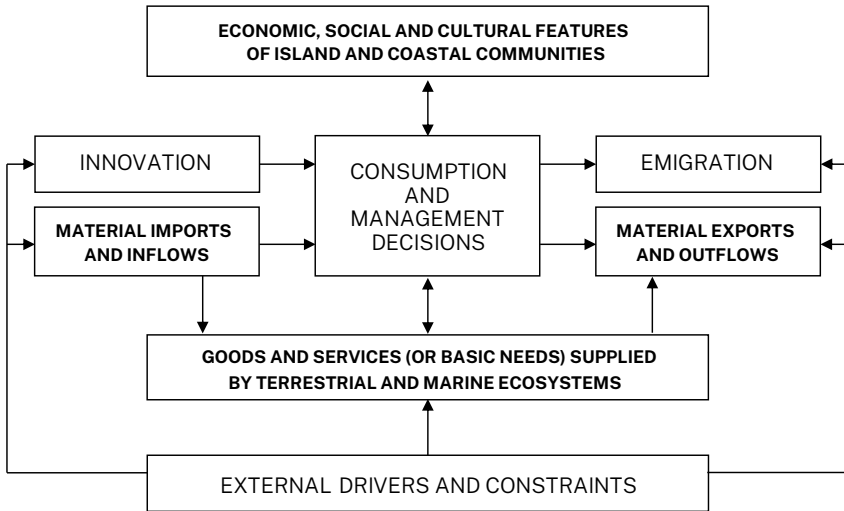
## Frameworks, Scales and Zones

As indicated in Chapter 1, the Milne Bay Small Islands in Peril (SMIP) Program was originally conceived in 2001 as a component of the MBCP. The program was included in the final design documents for the MBCP that were submitted to the Global Environment Facility in January 2002 and approved in May of that year.

The SMIP Program was meant to contribute to the fourth output of the first phase of the MBCP, which was that '[p]olicies on sustainable development and land use strategies for densely populated small islands are finalised, reflecting the nexus between environment, poverty and governance' (GPNG and UNDP n.d.: 6). It was not entirely clear whose policies might be 'finalised' within a five-year time frame, but the specific objectives of the SMIP Program were itemised as follows:

- To build a credible and feasible framework for the collection, analysis and synthesis of ecosystem-wide data for decision-making at the level of the local community and the province as a whole.
- To test this framework in community-based assessments of ecosystem services in the area(s) of interest to the MBCP.
- To address decision-making information needs at the provincial level by means of scientific analysis, scenario construction and policy advice.
- To build capacity to undertake integrated assessments of the relationship between ecosystems and socio-economic systems at local, provincial and national scales.

### 3. LIVELIHOOD DILEMMAS ON SOME SMALL ISLANDS IN MILNE BAY PROVINCE



**Figure 3.1: Initial conceptual framework for the Milne Bay SMIP Program**

Source: Filer 2002: 6.

The SMIP Program was understood from the outset to be a local or community-based ‘ecosystem assessment’ that would be part of the Millennium Ecosystem Assessment (MA). In 2001, it was already clear that it would need a conceptual framework that was broadly consistent with the one to be adopted by this global assessment exercise, but this exercise was still a work in progress. So Colin Filer came up with one that appeared to match what was already known about the circumstances of ‘densely populated small islands’ in Milne Bay Province, but which could also be seen as ‘a model of the interaction between ecosystems and socio-economic systems’ at different geographical scales or levels of political organisation (Figure 3.1).

This conceptual framework diverged in a number of ways from the one that was formally adopted by the MA in 2003 (MA 2003: 37). Instead of placing the relationship between ecosystem services and human well-being at the centre of the picture, it reserved this central location for the ‘consumption and management decisions’ taken by members of local communities, or possibly by other actors at higher levels of political organisation. These were taken to include decisions about human reproduction, and hence the rate of population growth, as well as decisions about the consumption and management of natural resources (or ecosystem goods and services). This conceptual framework paid less attention to the distinction between

direct and indirect drivers of change in the supply of ecosystem services, and more attention to the way that local consumption and management decisions, which are called ‘responses’ in the MA conceptual framework, are influenced by institutional factors that might be described as ‘internal’ rather than ‘external’ drivers.

Finally, this conceptual framework placed more emphasis on what were called the ‘boundary conditions’ of the social–ecological systems in which decisions were made. Material imports and exports would comprise the commodities that were bought and sold by community members, along with other objects that were transacted through traditional or non-market forms of exchange, reciprocity or customary obligations. Material inflows and outflows would include all the physical properties of material imports and exports, together with other ‘things’ that cross the boundaries of small island ecosystems, with or without the knowledge or encouragement of community members, like the African snails (*Achatina fulica*) that were invading and devouring local gardens, or the greenhouse gas emissions from the operation of outboard motors. The idea of a balance between ‘emigration’ and ‘innovation’ was based on the familiar choice faced by small island communities in which population growth places increasing pressure on available resources or ecosystem services. While the rate of emigration was likely to exceed the rate of immigration in these communities, it should not be assumed that this was invariably the case.

A conceptual framework does not constitute a hypothesis, and this one was simply intended as the first step towards the achievement of the SMIP Program’s first objective, since it would guide the ‘collection, analysis and synthesis of ecosystem-wide data for decision-making at the level of the local community’ and the province as a whole (Filer 2002: 5). But where would the framework be applied to the actual collection, analysis and synthesis of the data?

It was already known that Milne Bay Province contained about one-third of all the small islands in PNG that were initially identified as being under pressure or in peril because of their crude population densities at the turn of the millennium. It was also known to contain a more extensive set of coral reef ecosystems than any other coastal or maritime province in PNG, and was, therefore, a natural magnet for conservationists looking to escape from the shadows of their failure to convince PNG’s ‘rainforest people’ to

resist the temptations of large-scale resource development. However, these small islands and coral reef ecosystems were widely distributed within the province, so geographical priorities would have to be established.

The design of the MBCP divided the province into four zones and set out a plan to mobilise provincial and local stakeholders to support the establishment of a network of community-managed marine protected areas in Zone One during the first (five-year) phase of the program, and then to extend this effort to Zones Two and Three during the second (three-year) phase. In the period that elapsed between the initial design of the MBCP and the abbreviated implementation of the first phase between 2004 and 2006, there was some debate about whether the boundaries of these four zones should be demarcated by reference to the distribution of coral reef ecosystems or should match the political and administrative boundaries of districts and local-level government (LLG) areas (Allen et al. 2003; van Helden 2004; Baines et al. 2006). By 2004, Zone One encompassed the whole of Alotau District and two of the four LLG areas in Samarai–Murua District, which meant that it comprised approximately one third of the population of the entire province. However, many of the communities in Alotau District are not coastal communities, and many of the coastal communities are not associated with a coral reef ecosystem ostensibly containing the sort of biodiversity values that would merit the establishment of a protected area (Foale et al. 2016).

Some attempt had been made to develop criteria by which specific coastal and small island communities would be selected for the process of ‘community engagement’ (Kinch 2001), but the eventual choice appears to have been made by individual program staff for reasons of their own (Baines et al. 2006). As implementation of the first phase of the MBCP was compressed into a period of less than three years, the staff concentrated most of their efforts on a group of just three small island communities in the Maramatana LLG area, which is part of Alotau District. Since the few hundred members of these communities were somewhat overwhelmed by the sudden burst of attention from what amounted to a whole community of conservationists based in the provincial capital, the SMIP Program was pointed in a different direction in order to avoid any addition to this new source of pressure. And that is how the SMIP Program’s conceptual framework came to be applied to the collection, analysis and synthesis of information about the way that resource management decision were being made in a different collection of small island communities within the boundaries of Zone One.

## The Bwanabwana Language-Island Group

The name Bwanabwana is applied to a language, to the people who speak that language, to the islands that they inhabit and to the LLG in which the islanders are represented.<sup>1</sup> This can be a source of some confusion, since the Bwanabwana people or speakers account for less than 25 per cent of the people represented in the LLG of the same name.<sup>2</sup> Here we use the name in its narrower sense, to refer to the people who speak the language or the islands that they occupy. The islands that they occupy are all very small or miniscule, according to the criteria adopted in Chapter 2, since none has a surface area of more than 10 km<sup>2</sup>, and some have a surface area of less than 1 km<sup>2</sup>. They are part of the Louisiade Archipelago and lie to the east of the medium-sized island of Basilaki (or Bwasilaki), which is itself part of the LLG area but is occupied by people who speak other languages. Most of the Bwanabwana islands were collectively known as the ‘Engineer Group’ during the colonial period because they were given the names of the engineers or crew members of HMS *Basilisk*, under the command of Captain John Moresby, when it sailed through the area in 1873. Some of these ‘engineering’ names are still present in the national census or other government records, while others have largely been forgotten. The Bwanabwana people have their own names for each of the islands in the group, and these are the names that will generally be preferred in the following discussion (see Figure 3.2).

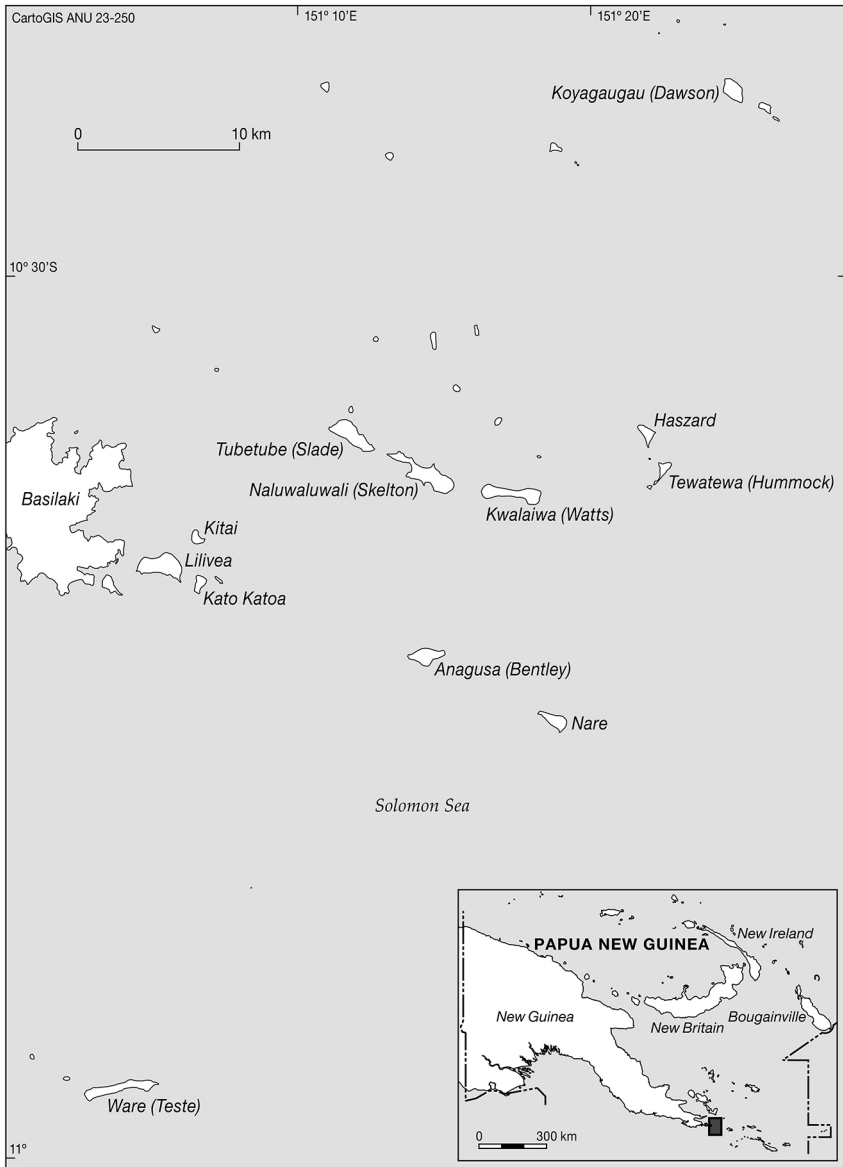
At the centre of this cluster of islands is a string of three very small (but not miniscule) islands whose local names are Tubetube, Naluwaluwali and Kwaraiwa, and whose engineering names were Slade, Skelton and Watts. Tubetube and Kwaraiwa (sometimes spelt Kwaiwa) are generally known by their local names, but Naluwaluwali (which literally means ‘Their place in the middle’) is still called ‘Skeleton Island’ in the national census, following the apparent corruption of its original engineering name, Skelton.<sup>3</sup> Tubetube and Naluwaluwali belong to a single council ward that also bears the name of Tubetube, while Kwaraiwa is a separate council ward.

1 In documents relating to the design of the MBCP, the name was also applied to the whole of Zone One, including the whole of Alotau District, which made no political sense to any of the local stakeholders.

2 The national census counted 8,894 citizens as residents of the Bwanabwana LLG area in 2000.

3 Naluwaluwali is also shown on some maps with the alternative local name of Naunalualua, which should probably be spelt as Nuanaluwaluwa to accord with local usage. The term *luwaluwa* (‘in the middle’) occurs in both versions of the local name.

### 3. LIVELIHOOD DILEMMAS ON SOME SMALL ISLANDS IN MILNE BAY PROVINCE



**Figure 3.2: Map of the Bwanabwana region**

Source: CartoGIS Services, College of Asia and the Pacific, The Australian National University.

To the south of this central string of islands is the island of Anagusa, and to the east is the island of Tewatera. Anagusa was given the engineering name of Bentley, while Tewatera was called Hummock by Captain Moresby, and that might not be the name of a crew member but rather an allusion to its physical appearance. Anagusa and Tewatera belong to a single council ward that also bears the name of Anagusa. To the southwest of Anagusa Island lies the island of Ware (sometimes spelt Wari), which constitutes a separate council ward. Its engineering name was Teste, but this has long since been forgotten. To the northeast of the central string of islands is the island of Koyagaugau, which is still known by its engineering name, Dawson, in national census records. This also constitutes a separate council ward. Finally, to the west of the central string is the miniscule island of Kitai, located off the eastern coast of Basilaki Island. Kitai Island is now part of the Bedauna council ward, and the other residents of this ward speak the Tawala language and live in Bedauna village on Basilaki Island.<sup>4</sup>

Table 3.1 shows the number of villagers recorded as residents of each of the eight Bwanabwana island census units in 2000, along with an estimate of their population density at that time. Although these eight islands were the ones designated as separate census units in 2000, there was a somewhat larger number of islands in the Bwanabwana group that boasted some inhabitants at that time. For example, the census unit known as Dawson Island actually consists of a group of three islands, sometimes known collectively as the Laseinie group, and two of these islands, Koyagaugau and Ole, were certainly inhabited at that time. Some of the other census units in the Bwanabwana group also consist of more than one island, but there is no clear evidence that people recorded as residents of these census units were normally living on more than one of the islands in the group. The most likely exception is the census unit known as Kwaraiwa at the time of the 2000 census. By the time of the 2011 census, this had been divided into five census units, at least one of which was a miniscule island distinct from the main island. This means that the population density figures shown in Table 3.1 need to be treated with a measure of caution, since the land areas specified in that table refer to the size of islands that were known to be inhabited in 2000.

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4 It is not clear whether this is still a bilingual council ward or whether one of the two languages has now come to predominate.



**Table 3.1: Bwanabwana islands recorded in the 2000 national census**

Island census unit	Residents in 2000	Land area (km <sup>2</sup> )	Density in 2000
Koyagaugau (Dawson)	187	1.4	133.6
Tubetube	184	2.4	76.7
Naluwaluwali (Skeleton)	282	2.8	100.7
Kwaraiwa	358	1.9	188.4
Tewatewa	78	0.6	130.0
Anagusa	85	1.3	65.4
Ware	707	2.2	321.4
Kitai	177	0.5	354.0
TOTAL	2,058	13.1	157.1

Source: PNG national census data.

Table 3.2 shows the growth of the resident population of each of the eight island census units over the period in which they have been counted in the national census. Although the most recent (2011) census is said to have been a failure at the national level, the figures for small island populations in Milne Bay Province are probably as accurate as those collected in previous headcounts. Table 3.2 shows some very high rates of population growth between 2000 and 2011 on some of the islands in the group—most notably Tubetube and Ware. As we shall see, this is most likely explained by the boom in the *bêche-de-mer* fishery that took place during the first half of this period.

**Table 3.2: Growth of the Bwanabwana island population, 1980–2011**

Island census unit	1980	1990	2000	2011
Koyagaugau & Ole	118	141	187	247
Tubetube	104	224	184	311
Naluwaluwali	132	138	282	256
Kwaraiwa	218	296	358	474
Tewatewa	59	58	78	91
Anagusa	70	72	85	119
Ware	498	558	707	1,250
Kitai	99	142	177	183
TOTAL	1,298	1,629	2,058	2,931

Source: PNG national census data.

Two of the baseline studies conducted for the MBCP included some information on the lives and livelihoods of the people resident on this group of islands at the time of the 2000 national census (Kinch 2001; Mitchell et al. 2001). Given the prospective focus of the MBCP on the establishment of marine protected areas, much of this information related to the exploitation of marine resources by the islanders, but some of it related to other economic activities or access to public goods and services. The first social scientist to gather such information was anthropologist Cyril Belshaw, who conducted fieldwork on Ware Island in 1951 (Belshaw 1955). Forty years later, demographer Geoff Hayes conducted three successive household surveys on the same island (Hayes 1993). Meanwhile, anthropologist Martha Macintyre had conducted several months of fieldwork on Tubetube Island between 1979 and 1981, and subsequently made a number of return visits to the same island (Macintyre 1983, 1987, 1989). She also travelled to other islands in the Bwanabwana group as part of her investigation of social and economic relationships between the different island communities (Macintyre and Young 1982; Macintyre and Allen 1990). A survey of local agricultural systems was undertaken in 1994 as part of the nationwide Mapping Agricultural Systems Project funded by the Australian aid program (Hide et al. 2002).

From these sources, it is clear that periodic droughts are a major threat to local livelihoods. Macintyre (1983) observed that crops failed on average once every decade. She witnessed the effects of a severe drought in 1981, and this was followed by events of equal severity in 1991, 1997 and 2015 (Kinch 2020).<sup>5</sup> As noted in Chapter 2, Milne Bay Province is also vulnerable to the occasional cyclone, though not to the same extent as some Pacific island nations (McAlpine and Keig 1983; Skewes et al. 2011). The maritime trading networks that traditionally connected the Bwanabwana islands with other coastal communities helped to mitigate the locally uneven effects of such extreme weather events (Macintyre and Allen 1990). That is not only because they enabled some islands to specialise in the production of artefacts that could be exchanged for foodstuffs, but also because they enabled the people themselves to circulate between communities at various intervals (Macintyre 1983). Elements of this traditional form of circulation are still present, but have now been supplemented by more distinctively modern forms of migration in what Hayes (1993: 166) described as a ‘two-circuit system of mobility’.

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5 Milne Bay Province also had unusually long dry seasons in 2005, 2009 and 2013.

This might seem to be at odds with the observation made in Chapter 2 about the unusually low proportion of Milne Bay island populations recorded as being absent from their island homes at the time of the 1980 census. However, the absentee rates were considerably higher in the Bwanabwana islands than in other parts of the province (see Table 3.3). In his own demographic survey, Hayes (1993) found that almost half of the household heads on Ware Island had spent part of their lives living somewhere else, either in another rural community or in an urban centre. Hayes was primarily interested in the extent to which the modern form of migration helped to sustain the livelihoods of people still living on Ware Island through the delivery of remittances by community members living elsewhere. He found that remittances in cash accounted for roughly one-third of the average household income of 660 kina per annum in the early 1990s,<sup>6</sup> but was unable to measure the value of additional remittances in kind or 'cargo' that migrants brought back to the island. He also reckoned that subsistence production based on the harvest of terrestrial and marine resources supplied an average of about one-third of the food required by the islanders living at home, although the composition of this package of ecosystem services would have varied from year to year because of changes in the weather.

**Table 3.3: Absentees in the Bwanabwana island population, 1979–1980**

Island census unit	Residents in 1980	Absentees in 1979	Absentee rate (%)
Koyagaugau (Dawson)	118	10	7.8
Tubetube	104	26	20.0
Naluwaluwali (Skeleton)	132	26	16.5
Kwaraiwa	218	34	13.5
Tewatewa	59	17	22.4
Anagusa	70	26	27.1
Ware	498	95	16.0
Kitai	99	22	18.2
TOTAL	1,298	256	16.5

Source: PNG provincial data system and national census data.

<sup>6</sup> At that time one PNG kina was worth about the same as one US dollar.

Aside from remittances, the islanders were able to make up the balance through the export of various goods and services. Changes in the composition of this package of exports had much less to do with climatic cycles than with medium- and long-term changes in the market for different commodities. In the early 1950s, the Ware Islanders were making money by cutting copra, building boats and selling or trading the pots that were an island speciality (Belshaw 1955). By the early 1990s, the export of trochus shells accounted for 15 per cent of average household incomes, while the export of *bêche-de-mer*, the sale of local pottery, and boat charters (rather than boat construction) each accounted for roughly half that proportion (Hayes 1993). By 1991, only one household was still selling copra, and production of this commodity had ceased altogether by 1994 (Hide et al. 2002). Copra was still the most significant of the commodities exported from the Bwanabwana islands in the early 1980s, but trochus and *bêche-de-mer* were more significant sources of cash income throughout the region by the mid-1990s, when surplus coconuts from senile plantations were more likely to be fed to the local pig population (Macintyre 1983; Hide et al. 2002). Copra production from islands aside from Ware has been sporadic since the 1990s as the price of copra has fluctuated from one year to the next (Foale 2005; Kinch 2020).

However, there is more to the economic and social history of these islands than a tale of the rise and fall of different commodities, even if the definition of a commodity is expanded to include the wide variety of products that passed through traditional trading networks, as well as those bound for the world market (Macintyre 1983; Macintyre and Allen 1990). Martha Macintyre's investigation of the historical record indicates that the population of Tubetube Island when Methodist missionaries first arrived in 1892 was almost four times the population that was living there at the time of the 1980 census, while the populations of the neighbouring islands of Naluwaluwali and Kwaraiwa were less than half the size of the populations counted in 1980. She ascribed this demographic divergence to an erosion of the relative power of Tubetube, both as a trading hub and a community of warriors, following the imposition of colonial rule (Macintyre 1983: 21–2). If that is the case, it would exemplify the need to treat the social and cultural features of island communities, and the distribution of power and influence within a network of such communities, as an independent variable in accounting for the way that islanders manage the consumption of ecosystem services or for patterns in the circulation of material objects

and their human producers (see Figure 3.1). The decisions made by island households therefore reflect a mixture of environmental, economic and institutional factors that are not easily disentangled.

## The Bêche-de-Mer Boom

In the baseline studies undertaken for the MBCP it was already clear that the main challenge to the success of the project would stem from the reliance of local communities on the cash incomes obtained from the rapid depletion of specific marine resources or ‘ecosystem services’. The most significant of these were the various species of sea cucumber, known in Milne Bay as *buvoki*, that were being extracted from shallow coastal waters, then processed onshore to become the commodity known as bêche-de-mer.<sup>7</sup> The commodity was then purchased by local trading companies that exported most of it to buyers based in Hong Kong, with smaller volumes traded to Singapore and Malaysia. Chinese traders had been visiting the Bwanabwana islands to purchase bêche-de-mer back in the nineteenth century (Russell 1970), but the local trade in this commodity was quite limited for most of the century that followed because it has no value beyond the limits of the Asian markets. The recent boom began in the 1990s, as a rapid growth in demand from China led to an equally rapid increase in the prices paid to local producers and traders. By 1997, bêche-de-mer accounted for 28 per cent of the value of all marine commodity exports from Milne Bay Province, whereas trochus accounted for 25 per cent (Mitchell et al. 2001). However, the growing predominance of bêche-de-mer was already much greater in some parts of the Louisiade Archipelago, including the Bwanabwana islands (Kinch 2001).

By 2001, Milne Bay Province alone accounted for 43 per cent of the total value of PNG’s exports, which meant that the province obtained an income of 7.8 million kina from the export of 210 metric tonnes of bêche-de-mer (Kinch 2002). By that time, prices were 30 times higher than they had been in 1990 (Kinch et al. 2008).<sup>8</sup> But the windfall had come at an ecological price. A stock assessment in 2001 found that sea cucumber populations had

7 Most sea cucumbers belong to the class Holothuroidea in the phylum Echinodermata. Strictly speaking, bêche-de-mer is the dried body wall of the sea cucumber, but the former name is sometimes applied to the living organism.

8 This was partly because the value of the kina had fallen substantially in comparison to the value of the US dollar.

fallen by 50 per cent over the previous decade, that population densities were already well below those found in the Torres Strait, and the extent of the decline was proportional to the market value of different species (Skewes et al. 2002). At that juncture, the two most valuable species—sandfish (*Holothuria scabra*) and black teat (*H. whitmaei*)—had already been harvested to the point of virtual extinction. Fishers had moved on to lower value species that were still relatively abundant. The boom of the 1990s therefore seemed to entail what Kinch (2002) described as the transformation of a low-volume high-value fishery into a high-volume low-value fishery, or what others have described as ‘fishing down the price list’ (Scales et al. 2006). However, the prices paid for low-value species towards the end of the boom could still match or exceed the prices paid for high-value species when the boom started.

The communities engaged in this form of commodity production responded to the growing scarcity of the resource in two ways: they intensified their fishing effort by adopting new technologies while seeking to establish more exclusive property rights over the ecosystems that harboured the resource (Foale et al. 2011). The process of technical innovation began with the substitution of fibreglass dinghies and outboard motors for traditional sailing canoes (known locally as sailaus),<sup>9</sup> and continued with the deployment of underwater diving gear to reach sea cucumbers at greater depths and electric torches to find them at night (Sabetian and Foale 2006). The owners of the dinghies were able to manipulate traditional ties of kinship and marriage between different communities to travel greater distances in search of fishing grounds that had not yet been depleted, but this, in turn, had the effect of creating new incentives for community leaders to demarcate and defend their maritime territorial boundaries against uninvited incursions, so the net result was an increase in the frequency and intensity of territorial disputes (Fabinyi et al. 2015; Kinch 2020).

By 2001 the National Fisheries Authority had introduced a national bêche-de-mer management plan in an effort to limit the damage that was being done. This established an annual ‘total allowable catch’ for each of the maritime provinces. The limit for Milne Bay Province was set at 140 tonnes, but the actual volume of exports in 2001 exceeded this limit by 50 per cent. The plan prohibited any harvest of sea cucumbers during the spawning season, between October and December, and prohibited

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9 Sailaus are wooden-planked, single outrigger sailing canoes between four and 12 metres long (Smaalders and Kinch 2003).

the use of underwater diving gear and electric torches at any time of year, but both of these rules were flouted by some of the fishers in the province (Kinch 2002). The rules were still being flouted when implementation of the MBCP began in 2004.

## **Bwanabwana Livelihoods in 2005**

Our own assessment of the relationship between ecosystem services and local livelihoods in the Bwanabwana islands involved a number of field trips between April 2005 and February 2006. The first field trip involved an assessment of local fishing practices and attitudes to marine resource management in six of the island communities—Tubetube, Naluwaluwalu, Kwaraiwa, Ware, Anagusa and Koyagaugau. The second was intended to collect information on the incidence of disputes over access to marine ecosystems and resources. The third aimed to discover the way that the *bêche-de-mer* boom was affecting the traditional circulation of people and goods between island communities, with particular attention paid to the islands of Tubetube, Naluwaluwalu, Ware and Koyagaugau. The final field trip involved a more detailed study of the harvesting of sea cucumbers by residents of Ware Island. Further inquiries should have continued until 2007, but the process of investigation was cut short by the evaporation of the MBCP budget, including the part that was earmarked for the SMIP Program (Baines et al. 2006; Balboa 2013).

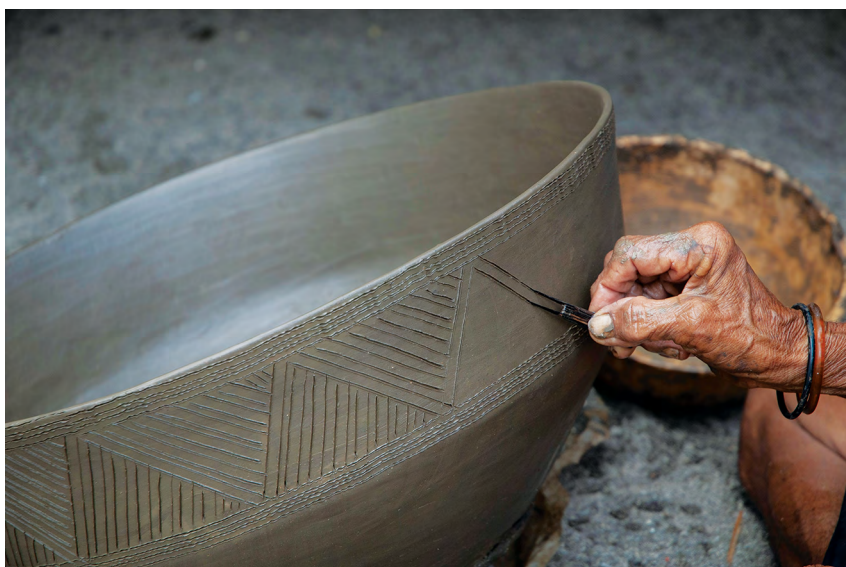
We did not conduct the kind of household survey that Hayes had conducted on Ware Island in 1991 and 1992, so we did not manage to establish the distribution of cash incomes from different sources on each of the islands included in our sample. Indeed, we found that people were reluctant to share information about the income and expenditure of their own households, which may have reflected a more general concern about the incidence of economic inequality. However, it was quite clear that *bêche-de-mer* still accounted for most of the money that flowed through the local economy (Figure 3.3), although this was now supplemented by the incomes that some of the islanders were obtaining from the sale of dried shark fins. Evidence for this observation was obtained from interviews with the owners and operators of local trade stores, fibreglass dinghies and traditional sailing canoes.





**Figure 3.3: Assortment of bêche-de-mer on Koyagaugau Island, 2005**

Source: Photograph by Simon Foale.



**Figure 3.4: Decoration of clay pot on Ware Island, 2005**

Source: Photograph by Simon Foale.



By 2005 the open season for the sea cucumber fishery had been reduced to six months, from January to June, and closure of the fishery for the remainder of the year was having a considerable impact on a range of other economic activities—not just the volume of commodities imported and sold through local trade stores, but also the volume of goods exchanged through traditional trade between island communities. That was partly because the open season coincided with the time of year in which subsistence garden produce was in short supply, so more cash was required to purchase imported foodstuffs, while the period of closure left people with more time to engage in traditional forms of exchange, or for the Ware Islanders to compensate for the shortage of cash by selling their pots instead of selling *bêche-de-mer* (Figure 3.4).

There were 26 fibreglass dinghies distributed between the six islands that were surveyed in April 2005, though some appeared to be idle because they lacked an outboard motor. At that time, the average price of a new dinghy was 6,000 kina, while the average price of a new 40-horsepower motor was 9,000 kina.<sup>10</sup> To afford these prices, dinghy owners would commonly incur debts to the trading companies which then had to be paid off with earnings from the sale of *bêche-de-mer* and other marine commodities. Many of the dinghy operators travelled all the way to Alotau, the provincial capital, to sell their catch, returning with fuel, food and other goods that they purchased with the proceeds from their sales. In this respect, the dinghies had taken on some of the functions of the diesel-powered workboats that had long been the primary means of transporting people and goods between coastal towns and villages. However, the fuel efficiency of the dinghies was much lower than that of the workboats, which may help to explain why dinghies based on Ware Island were mainly used for fishing and their catch was then loaded onto workboats, a number of which were based on the island.

Ware Island is not just remote from other islands in the Louisiade Archipelago; it also has an unusually high population density and had an unusually high rate of population growth after the beginning of the *bêche-de-mer* boom. The extent of population pressure on the island's cultivable land was reflected in an apparent shortening of the fallow period in the local agricultural system from more than five years in 1994 to less than three in 2005 (Hide et al. 2002: 53; Foale 2005: 9). It might have been expected that this apparent degradation of the island's terrestrial resources would

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10 At that time, one kina was worth about 45 Australian cents.

result in an intensification of land disputes between resident members of the island community. But what seems to have happened instead—or at least initially—is that the islanders simply intensified their exploitation of the marine resources available to them and invested more of the income from this harvest in the provision of public goods and services as well as the purchase of imported commodities to meet their household food requirements. Foale (2005) thought this association of increasing population pressure with a greater amount of ‘social capital’ marked a somewhat paradoxical difference between the Ware community and the other Bwanabwana island communities, but acknowledged the need for further research to establish the relationship between the ecological, economic and institutional dimensions of this difference.

The ecological dimension of the difference did not extend to a greater appreciation of the need for sustainable management of the marine resources on which the Ware Islanders were increasingly reliant, nor did the institutional dimension extend to a greater willingness to collaborate with members of other island communities in the establishment of a more inclusive management regime. From interviews conducted in the six island communities in April 2005:

What emerged repeatedly was an overriding concern about the *rights of access* to resources, and relatively little concern about *sustaining* the income. Many people expressed annoyance at the use of [underwater diving] gear by a minority of fishers, reasoning that the increased access that this equipment gave to these men was unfair as it allowed them to make large amounts of money and at the same time remove [sea cucumbers] that would otherwise be fishable by the majority who were forced to dive on breath-hold. It was clear that people were mostly *not* thinking about a) the rate at which depleted resources would recover, b) how the process of stock recovery actually worked (i.e. spawning, fertilisation, larval dispersal and settlement), and c) the impact of removal of a given species or group of species on the rest of the ecosystem.

(Foale 2005: 19, italics in original)

It could certainly be argued that the Ware community would secure a greater benefit from the establishment of a marine protected area, given the spatial extent of the marine ecosystems to which its members had access and the degree of their reliance on the sale of marine commodities to maintain their livelihoods. Furthermore, members of this community were more united in their opposition to the use of underwater diving gear to harvest

sea cucumbers. However, this opposition could be explained by their desire to limit the opportunities for some individuals to profit at the expense of others who could not afford the new technology, or else by their desire to exclude members of other island communities from what they regarded as their own territorial waters.<sup>11</sup> There was little evidence to indicate that they or any of the other Bwanabwana islanders were prepared to make the consumption and management decisions that would halt the degradation of marine resources.

Aside from the incidence of extreme weather events, the main source of pressure on local livelihoods in the Bwanabwana islands was the increase in the resident population combined with a growing scarcity of starchy foods and raw materials for house construction. Additional starch was traditionally obtained by means of barter with neighbouring islands, but was now more likely to be purchased with the cash obtained by harvesting sea cucumbers and shark fins. The overharvesting of these marine resources had become another source of pressure, but the high prices paid for these marine commodities were partly responsible for the rate of population growth. Instead of responding to these pressures by imposing or accepting limits on the size of their catch, the islanders were taking out a form of insurance against the likelihood of future stock depletion by maintaining traditional social relationships with people on larger or less densely populated islands to keep open the option of resettlement. Our survey of four Bwanabwana islands in November 2005 found that nearly all the islanders thought they had an option to migrate to another island or coastal community in the event of a drought or severe depletion of currently lucrative marine resources. But this in turn meant that islanders had less incentive to take management decisions that would halt the process of depletion.

The future effect of this behaviour on the biodiversity values of coral reefs or other marine ecosystems was hard to determine. It could well be argued that the activities of foreign fishing vessels were a bigger threat to these values (Kinch 2001). However, the MBCP was driven to treat local people's attitudes and behaviour as the main source of pressure because it was a 'community-based' program, and therefore had no mandate to regulate the large-scale commercial fishing industry (van Helden 2004). At the same

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11 Oddly enough, it was the Ware ward councillor who encouraged divers from Tubetube and Kwaraiwa islands to use underwater diving gear on a reef system that the Ware Islanders regarded as their own territory. It appears that the councillor had lost his own authority within his own community and had gone to live in the provincial capital.

time, the MBCP was locked into a managerial conceptual framework that made it very difficult to deal with a mixture of territorial and jurisdictional disputes, not only between neighbouring island communities or their individual members, but also between different levels of government and different agents or agencies at each level of political administration (Fabinyi et al. 2015; Kinch 2020). The conceptual framework adopted by the Millennium Ecosystem Assessment did not cast much light on this political dynamic (Filer 2009). However, it is not obvious that another conceptual framework would have made it any easier for an organisation like Conservation International to rein in the local entrepreneurs who were organising the export of the marine commodities. The former governor of Milne Bay Province, who had invested some of his own political capital in the MBCP, was defeated by one of these entrepreneurs in the 2007 national elections, and he had some reason to blame his defeat on the cancellation of the project that he had supported. But that was not the end of the political story, because the National Fisheries Authority imposed a nationwide moratorium on the harvest of sea cucumbers and the export of *bêche-de-mer* in October 2009.

## School Fees, Fishing and Remittances

In March 2010, we investigated the effect of the *bêche-de-mer* moratorium on three of the Bwanabwana islands—Tubetube, Naluwaluwali and Ware. This involved a survey of 84 households spread across all three islands, semi-structured and unstructured interviews with many of the people included in the survey, and key informant interviews conducted with several *bêche-de-mer* fishers, two school headmasters (from Ware and Tubetube), two *bêche-de-mer* buyers and the Ware Island village enumerator.

Table 3.4 shows the primary source of income before and after the imposition of the moratorium. Prior to the moratorium, *bêche-de-mer* had been the primary source of income for 80 per cent of the households that we surveyed. Only 18 per cent of households had a second or third source of income while the fishery was open. After the moratorium, primary sources of income became more diversified, with copra being the most important (29 per cent of households), followed by clay pot manufacture (21 per cent, mostly on Ware), trochus (14 per cent) and shark fin (12 per cent). The proportion of households with a second or third source of income increased to 51 per cent, while the number with no source of income increased from one to six. The economic dominance of *bêche-de-mer* in the

decade prior to our fieldwork was due to significant increases in prices for most species during that time (Kinch 2007), and contrasts with the more modest position it occupied in the Ware Island economy in 1991 and 1992, when only one third of households engaged in the fishery (Hayes 1993).

**Table 3.4: Primary source of income before and after the moratorium**

Income source	Before	After
Bêche-de-mer	67	0
Trochus	3	12
Fishing	2	3
Shark fin	1	10
Smoked fish	0	1
Copra	1	24
Pots	1	18
Tobacco, betelnut	1	0
Vegetable sales	0	2
Trade store	0	1
Family support	1	0
Government employment	1	1
Other employment	0	1
Remittances	3	3
Tithes	1	1
Superannuation	1	1
None	1	6
TOTAL	84	84

Source: Authors' interview data.

A key objective of our survey was to find out what proportion of the population believed the fishery was not in fact overharvested and would continue to provide substantial economic returns. Of the 64 survey respondents who answered the question, 'Do you agree with the moratorium?' 40 (62.5 per cent) said they disagreed, while 24 (37.5 per cent) said they agreed. The Ware village enumerator said that a lot more people agreed with the moratorium when it was first announced,<sup>12</sup> and the main reason for the change in their views was that they had since run out of money.

<sup>12</sup> Staff of the National Fisheries Authority carried out an awareness campaign in affected areas when the moratorium was first announced.

**Table 3.5: Reasons why people disagreed or agreed with the moratorium**

<b>Disagree</b>	<b>27</b>
Income made people more equal; now there is more inequality	1
Main source of income	12
Can't pay school fees	10
Can't afford school fees, food, clothes	2
They should open it for abundant species	1
There are still plenty of bêche-de-mer (BDM)	1
<b>Agree</b>	<b>22</b>
To allow recovery	14
Awareness by National Fisheries Authority	1
Compressor users finished all the BDM — those of us in canoes had less to harvest	1
Resource is overharvested	5
Women doing less work in gardens because they could buy food with BDM money	1
<b>TOTAL</b>	<b>49</b>

Source: Authors' interview data.

Of the 40 who now disagreed with the moratorium, 27 gave a reason, and of these, just under half (12) cited the difficulty of paying school fees. One of the people who agreed with the moratorium also said that it was now harder to pay school fees (see Table 3.5). School fees are normally paid in January each year.<sup>13</sup> In 2010, primary school fees on Tubetube were 140 kina per year for Grades 1–5 and 150 kina for Grade 6.<sup>14</sup> Of the 53 households that had children in school, 46 had paid no school fees at all for 2010, while five had paid part, one had paid all and one was unclear.

An interview with the headmaster of the Tubetube primary school revealed that most parents had only paid, on average, a small fraction of their children's school fees even when the bêche-de-mer fishery was still open. The outstanding fees at the end of 2009 were 6,916 kina, which meant an average of 93.46 kina, or two thirds of the amount due for each of the 74 students (see Table 3.6). The headmaster, who was from Ferguson Island, a large island in the northwestern part of Milne Bay Province, observed that: 'Outstanding fees is almost a custom with this group of people. It's different

13 van Helden (2004) argued that the premature opening of the bêche-de-mer season in December 2000 was the result of pressure from villagers needing to pay the next year's school fees.

14 One kina was worth 37 US cents at the time of our fieldwork.

on Ferguson. It never goes over 1,000 kina on Ferguson.’ He said that the Tubetube school was able to survive on a small amount of money it received from the national and provincial governments, and they tried to manage the money so they could keep operating until the end of the year.<sup>15</sup>

**Table 3.6: Outstanding school fee payments for 2009 at Tubetube primary school**

Place of origin of students	Money outstanding (kina)	Number of students
Tubetube	3,255	35
Naluwaluwali	2,453	22
Koyagaugau/Ole	748	12
Anagusa	390	3
Kitai	70	2
TOTAL	6,916	74

Source: Authors’ interview data.

The school headmaster on Ware Island corroborated the Tubetube headmaster’s story by telling us that the government paid a small subsidy to the school, usually later in the year, to help them keep operating, and had told teachers to allow students to stay in school even if their fees had not been paid. In explaining the high rate of non-payment of fees by Ware parents he referred to the unfortunate timing of the moratorium, shortly before fees were due to be paid, but he also said that Ware people tend to be ‘not wise in spending’. The Ware village enumerator told us that the Ware school chairman had told him that most Ware families with children in school ‘did not pay a toea’ in school fees in 2009, while a small number paid in part and none paid in full. He also told us that the Ware school committee was busy selling clay pots in Alotau at the time of our survey to try to make up the shortfall in fees from 2009. When asked whether Ware villagers requested help with school fee payments from relatives living in urban centres, the enumerator said that about 40 Ware families were in the habit of doing this and typically made visits for this purpose. It is possible that parents were simply exploiting the generosity of the government in allowing their children to stay at school even if fees had not been paid, and we cannot know whether parents would have given a higher priority to school fee payments had the schools prevented students from attending if fees were not paid. But the village enumerator’s comment that the committee

<sup>15</sup> Teachers’ salaries were not affected by the deficit since they were paid directly by the government.

was struggling to make up shortfalls by selling clay pots—a highly labour-intensive product—suggests that non-payment of fees was not entirely unproblematic for the schools.

While fees at the small island primary schools were relatively modest in 2010, fees for high school students in the provincial capital, Alotau, or at Bwagoia on Misima Island, reportedly ranged between 1,000 and 2,000 kina. Nevertheless, our overriding impression was that putting aside money for school fees was not a high priority among most of the people we surveyed and interviewed. Many fishers reported being able to make more than 1,000 kina with a good harvest of *bêche-de-mer*, but a large proportion of this money was commonly spent on fuel for the next fishing trip, while most of the remainder was spent on food and other store goods. The village enumerator and two other key informants emphasised that lavish expenditure on beer was mainly by young, unmarried men, and the most common expenditure items for most people were food and fuel.<sup>16</sup>

On less densely populated Tubetube and Naluwaluwali, the lack of money following the *bêche-de-mer* moratorium had less of an impact on food security because people had sufficient fertile land to be able to resume subsistence gardening, even though this was clearly not how they preferred to live. Comments by several survey respondents on Tubetube suggested that many people did less work in their gardens when the fishery was open because they could afford to buy all or most of their food. By contrast, on Ware, our 24-hour diet recall question revealed that a lot of people were only eating one meal a day after the moratorium, and several were resorting to eating the stems of young banana plants. The Ware village enumerator also said that people had been steadily leaving Ware, even before the moratorium, because of declining harvests and the increasing cost of the fuel required to reach unfished sea cucumber stocks. He estimated that the cost of living on Ware was now about 20 kina a day, and without this minimum amount of money, life was quite difficult because of the extreme shortage of land.

The 2011 national census found that the island's resident population had grown to 1,250, or 568 people per square kilometre (see Table 3.2). This meant that the population had grown by more than two thirds since the previous national census in 2000. This rate of growth is only consistent with the village enumerator's observation if we assume that the population

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16 Hayes (1993) also noted the importance of food, primarily rice and sugar, in his data on Ware Islanders' expenditure patterns in the early 1990s.



was even bigger at the height of the *bêche-de-mer* boom. Since the average garden fallow period had already been reduced to about two years in 2005, when there were 409 people per square kilometre, it appeared that the population had well and truly overshoot the agricultural carrying capacity of the island by 2010, and this was confirmed by the results of our survey of local diets. The village enumerator also noted that land disputes were now very common on the island, as some of the senior islanders had forecast in the early 1990s (Hayes 1993).

The data we present here probably raise more questions than they answer. Because we only became aware of the pattern of non-payment of school fees late in the course of our fieldwork, we did not have time to explore the issue further with more in-depth interviews or surveys. Many interviews with *bêche-de-mer* fishers, along with several key informant interviews, suggested that most fishers could easily afford to pay the relatively small fees for primary school students while the fishery was still open. One fisher told us he had been able to buy a dinghy, outboard motor and roofing iron with earnings from *bêche-de-mer*. Would most parents have found the money if schools had taken a harder line with their enrolment policy?

A useful clue to answering this question may lie with the changed pattern of remittance payments back to the islands by employed relatives living in towns. Our survey data and comments by the Ware village enumerator indicate that remittances flowing to the islands were few and small, both before and after the moratorium.<sup>17</sup> This contrasts with the earlier finding by Hayes (1993), who reported that cash remittances accounted for a third of average household incomes on Ware in the early 1990s, and that remittances in kind or ‘cargo’ were also significant, albeit of lower value than the cash contributions. Perhaps the more recent decline in the value of remittances is sufficient to explain the apparent lack of commitment to the payment of school fees. One possible (but inevitably partial) explanation is the likelihood that the boom in the *bêche-de-mer* fishery over the preceding two decades created an illusion among islanders that they no longer needed to bother investing in education as a means of long-term social reproduction on the islands.

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17 A sample survey conducted before the imposition of the moratorium found that wages and remittances from employment outside the agricultural and fisheries sectors accounted for 13 per cent of rural household incomes across Milne Bay Province as a whole (Kaly 2006).

At the same time, the boom appears to have distributed household incomes more widely among the islanders. Two fishers stated that they thought the *bêche-de-mer* fishery functioned as a great economic equaliser, and they lamented its closure for that reason. On Ware at least, several people commented that the benefits of the *bêche-de-mer* fishery tended to be shared around generously, so that many older people, particularly widows, also benefited. Although younger men with motor boats and diving gear were able to make more money from their fishing expeditions, this in turn gave rise to complaints that they were violating the egalitarian ethic that applied to the practice of harvesting sea cucumbers in shallow coastal waters without the aid of such technology (Fabinyi et al. 2015). If the benefits of the fishery were widely distributed through the islands, there would be no distinct group of households that got no benefit at all and would therefore have to seek alternative means to improve their livelihoods.

## Another Ecosystem Assessment

Although the MBCP was cancelled at the end of 2006 as a result of the mid-term review of its implementation (Baines et al. 2006), Conservation International (CI) did not completely abandon its own plans for the conservation of coastal and marine ecosystems in Milne Bay Province. Instead, they formed a partnership with the Commonwealth Scientific and Industrial Research Organisation (CSIRO), which was able to secure additional funding from the Australian Government's contribution to the Coral Triangle Initiative (CTI)—a regional marine conservation program, with multiple partners and funding sources, which was established in 2009. The overall aim of the CTI was to achieve biodiversity conservation, sustainable fisheries and food security through the establishment of marine protected areas and ecosystem-based approaches to fisheries management in the territorial waters and exclusive economic zones of six countries, one of which was PNG. The fourth goal of the CTI was to promote adaptation planning for small island ecosystems and communities threatened by climate change. The partnership between CI and CSIRO was meant to develop an 'adaptation planning process' for Milne Bay Province that would contribute to the PNG Government's National Plan of Action for the CTI (Butler et al. 2014), although the partnership is not actually mentioned in that national plan (GPNG 2010). The aim was therefore quite similar to that of the SMIP Program that had to be aborted in 2006, but there was a somewhat stronger emphasis on the need to build the capacity of local

government planners and managers, rather than members of small island communities, to ‘promote sustainable development, decrease poverty and avert disasters’ (Skewes et al. 2011: 31).

The CSIRO scientists involved in this exercise adopted a conceptual framework that was very similar to the one adopted by the Millennium Ecosystem Assessment (Skewes et al. 2011: 5). The main difference was the distinction now drawn between ‘ecosystem assets’ and the services that these things provide to human consumers. Ecosystem assets were divided between marine habitats, terrestrial habitats and ‘functional groups’, and the latter were divided between ‘harvested species’ (like sea cucumbers) and ‘biodiversity’ (as represented by the mix of species associated with coral reefs) (ibid.: 59). The services derived from each asset were divided into four categories—cash income, food, regulating and cultural—and then roughly quantified. By way of example, sea cucumbers scored very highly for income, very low for food and regulation, and had no cultural value at all.

The entire province was then divided into 15 zones or regions that were distinguished by the mix of drivers or threats to which their ecosystem assets and services were subject. The boundaries of these zones bore no particular relationship to the political boundaries between districts or LLG areas. For example, the ‘Dawson’ zone included the Koyagaugau island community from the Bwanabwana LLG area and a couple of other island communities from the neighbouring Maramatana LLG area, which happen to be those on which CI staff lavished most of their attention between 2004 and 2006.<sup>18</sup>

The drivers or threats were themselves divided between two main categories—climate change and ‘human population’. Population pressure was thought to include a number of more specific factors, including resource use, land use, pollution and contaminants. Human population density in each of the 15 zones was calculated separately for land area, coral reef area and sea area. For example, the Dawson zone was said to contain nine distinct islands, inhabited by 2,034 people in 2000, with a combined land area of 19 km<sup>2</sup> within a total area of 1,027 km<sup>2</sup>. It is not clear how the reef areas and sea areas were allocated to the populations of different island communities or how this allocation might have taken account of the ongoing territorial disputes between them.

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18 The Maramatana islands are Iabam, Pahilele and Nuakata. The first two belong to a single council ward.

An ‘asset-threat interaction matrix’ was then constructed for the whole province and each of its 15 zones, with predicted scores for 2030 and 2100. Perhaps not surprisingly, ‘human related threats’ had more of an impact by 2030, but climate threats had more of an impact by 2100. The assessment predicted that the current high rate of population growth across all 15 zones would decline with higher levels of education or migration levels as local ecosystems and their assets were increasingly over-exploited (Skewes et al. 2011: 98).

The document containing this assessment was a very long one—more than 100 pages—with numerous tables and graphs illustrating the calculations made by the scientists. How would it influence the decisions taken by local government planners and managers? In 2010, CI staff convened a workshop in Alotau, the provincial capital, which was meant to elicit the ‘tacit knowledge’ of 26 local stakeholders through a ‘rapid participatory assessment’ (Butler et al. 2014). The participants were apparently drawn from private companies and civil society organisations, as well as from government agencies, and represented five of the 15 zones identified in the ecosystem assessment, including the ‘Dawson’ zone but not the ‘Samarai’ zone that included most of the Bwanabwana islands.

A summary version of the ecosystem assessment was presented to the audience by CSIRO staff, and participants from each of the five zones were then asked to score the relative importance of ecosystem services identified in the assessment, to predict likely changes in ecosystem assets by 2030, and then to identify direct and indirect drivers of these changes and possible management strategies to deal with them. They were only asked to consider ‘provisioning’ services, not regulating or cultural services, because of the risk that they might get confused about the categories. Since they had less than two days in which to reach their conclusions, there was not enough time for ‘analysis of social-ecological system thresholds, the agency of decision-makers over drivers, future scenarios and trade-offs’ between different services (Butler et al. 2014: 4). Given the simplicity of the task, their conclusions were fairly predictable: the most significant direct driver of change was overfishing, and the most significant indirect driver was population growth. The CSIRO scientists who reported this outcome acknowledged our earlier argument that ‘monetisation of the local economy is driving materialism, erosion of traditional norms, institutions and leadership, plus drug, alcohol and debt problems among younger generations, and disputes over land and

sea tenure' (ibid.: 7), but these issues were not discussed in the workshop, possibly because the participants were not aware of the operation of these 'community-scale drivers'.

## A Broader Context

Despite the substantial investment of time and money in the second ecosystem assessment, there is no evidence that the exercise had a significant impact on decision-making at any level of political organisation. It certainly had less of an impact on the livelihoods of the people living on Milne Bay's numerous small islands than the continuation of the nationwide moratorium on the harvesting of sea cucumbers and production of *bêche-de-mer*. The moratorium was not lifted until 2017, despite protests from coastal communities around the country, was reimposed again in 2019, lifted again in 2020, and imposed again in 2021.

Jeff Kinch was able to observe its impact from the vantage point of Brooker Island, a very small and densely populated island in the Louisiade LLG area, which he has been visiting on a regular basis since conducting his PhD fieldwork there in the late 1990s (Kinch 2020). Kinch and his colleagues conducted a survey of Brooker and a number of other small islands in the same LLG area at the end of 2014, mainly in order to find out whether the harvest and sale of shark fins had enabled the islanders to compensate for the loss of income from *bêche-de-mer* (Vieira et al. 2017). They found that this had not happened because the two activities are mutually dependent, which might have been good news for the sharks that are highly vulnerable to this form of exploitation, but was not such good news for the islanders. On Brooker Island, they found that average household cash incomes had fallen by more than 90 per cent in the year following the imposition of the moratorium. The islanders responded to this dramatic fall by planting more food crops, rehabilitating old coconut plantations, engaging in more inter-island trade, making more use of traditional sailing canoes as opposed to motorised dinghies (see Figure 3.5), and spending less money on traditional feasting. When the moratorium was lifted in 2017, they were so keen to make up for lost opportunities that a large number of undersized sea cucumbers were harvested and a large proportion were not properly processed, which meant that the *bêche-de-mer* went to waste (Kinch 2020).



**Figure 3.5: Sailau undergoing renovation on Tubetube Island, 2005**

Source: Photograph by Simon Foale.

The moratorium seems to have had a somewhat different impact on the livelihoods and practices of people living on a collection of small islands located between the main island of New Ireland Province and the smaller but still big island of Lavongai (New Hanover). These are generally known as the Tigak islands since this is the name of the language spoken by most of their indigenous inhabitants. Jeff Kinch, Simon Foale and a number of colleagues investigated the impact within the context of a donor-funded project that aimed to encourage the residents of three islands in the group to experiment with the cultivation of the highly valued and hence endangered sandfish species (*Holothuria scabra*) in locally managed marine protected areas (Hair et al. 2016, 2019, 2020; Purdy et al. 2017; Hair 2020). Surveys conducted in 2004 and 2014 found that the moratorium had not resulted in a huge decline in household incomes, as it had on Brooker Island, but that islanders had responded by increasing their harvest of other hand-collected species closer to shore, with women doing more of the work (Purdy et al. 2017). These surveys also found an increase in the proportion of households enforcing communal territorial access rights, although this process of territorialisation might well have occurred without the moratorium, just as it had when the bêche-de-mer fishery was still thriving in Milne Bay.

The lifting of the moratorium in 2017 was based on a revised nationwide management plan that again set a ‘total allowable catch’ for each province, and allowed for the harvest of sea cucumbers to proceed until this limit was reached or for a maximum period of six months (April to September). As in other parts of the country, New Ireland’s limit was reached and exceeded well within the six-month period as the price of *bêche-de-mer* had risen during the eight years of the moratorium (Hair et al. 2019). The limit was exceeded by an even greater margin and in a shorter period in the 2018 fishing season (Hair et al. 2020). This did not bode well for the sandfish mariculture project as two of the three ‘sea ranches’ were invaded by poachers, most of whom were members of the island communities that were supposedly responsible for their protection. The failure of island communities to enforce this particular bundle of territorial access rights was ascribed to

a divided community and fragmented, conflict-ridden local leadership, resulting in a weak communal management system. Overlaying these social and cultural factors, exacerbating external forces were witnessed in the 2018 season including record BDM [*bêche-de-mer*] prices, strong pressure from buyers, a short open season and absence of control by government regulators.

(Hair et al. 2020: 7)

The apparent failure of the sandfish mariculture project in New Ireland Province, like the earlier failure of the MBCP, raises a broader question about the feasibility of ‘community-based’ approaches to the conservation of marine biodiversity or the sustainable management of marine resources. Some would argue that there is really no alternative to such approaches so long as the resources in question are subject to customary property rights (Ruddle et al. 1992; Cinner and Aswani 2007; Cinner et al. 2012; Purdy et al. 2017). Others would question whether customary institutions, and the local knowledge systems with which they are associated, have the capacity to produce sustainable outcomes when they are being undermined by the invasion of market forces (Foale and Manele 2004; Foale et al. 2011, 2016; Cohen and Foale 2013; Fabinyi et al. 2015). The commercialisation of marine resources may well encourage coastal communities to make stronger territorial claims and impose stricter controls over access to marine resources, but this process of territorialisation may not be sufficient to diminish the rate at which scarce or endangered resources are exploited by members of these communities (Carrier 1981; Otto 1997; Foale and Macintyre 2000; van Helden 2004; Cinner and Aswani 2007).

The regulations imposed by government authorities, like the *bêche-de-mer* moratorium, are more effective instruments of conservation (Steenbergen et al. 2019), but in some contexts these may also fail to be effective if local resource owners or alien intruders are able to subvert them, or if the regulating agencies themselves are corrupt or incompetent (Purcell et al. 2013; Eriksson et al. 2015). If the National Fisheries Authority were to cancel the licences of trading companies that purchase undersized *bêche-de-mer*, then fishers would soon discover that there is no market for this commodity and change their own behaviour accordingly, but this has not yet happened. Overfishing in low-income areas to supply high-value global markets is an example of a wicked problem in fisheries management, which means that no one group of actors can resolve it by themselves, and might fail to do so even if they can find new ways to collaborate with each other (Anderson et al. 2011; Barclay et al. 2019).

## Conclusion

The SMIP Program was attached to the MBCP in the expectation or hope that an assessment of the relationship between ecosystem services and human well-being on small, densely populated islands would help decision-makers to make better decisions about the management of scarce resources, and even encourage the islanders themselves to support the establishment of marine protected areas. It is commonly argued that this kind of approach to the management of small-scale artisanal fisheries is one that is likely to be more effective than the imposition of government regulations based on conventional assessments of stock levels because it leads to a higher level of community or stakeholder participation (Allison and Ellis 2001; Purdy et al. 2017). But it is hard to tell whether it has had any positive effect in the Bwanabwana islands or the rest of Milne Bay Province, first because of the demise of the MBCP in 2006 and then because of the imposition of the *bêche-de-mer* moratorium in 2009. While the moratorium might have made the livelihoods of the islanders more ‘sustainable’ by limiting the rate at which they were depleting the stock of sea cucumbers, it did nothing to enhance their sense of environmental justice because the stocks were still subject to poaching by Vietnamese ‘blue boats’ during that period (Song et al. 2019; Kinch 2020) (see Figure 3.6).





**Figure 3.6: ‘Blue boat’ moored at Kavieng Wharf, 2017**

Source: Photograph by Simon Foale.

Considerations of justice, fairness or equity are not easily accommodated in an ecosystem assessment for the simple reason that they are much harder to measure than variables like population pressure or the depletion of natural resources (Lau et al. 2020). But if social norms are left out of the equation, it is hard to escape the kind of Malthusian assumptions that seem to have informed the ‘rapid participatory assessment’ that was conducted in 2010 (Butler et al. 2014). It may well be true that the market value of marine commodities like *bêche-de-mer* will cause the members of small island communities to deplete the resource whenever they have the opportunity to do so (Purcell et al. 2018). And it is hard to see why they would choose to do otherwise if that is the easiest way for them to make the money they need in order to compensate for a reduction in the supply of other local ecosystem services to a rapidly growing population. But if the production of these commodities is unsustainable in its current form, then something else will sooner or later have to be done.

Participants in the 2010 workshop, who were not members of the small island communities under pressure, thought the only obvious solution to this problem was for more children to get a decent education, find

themselves jobs in the formal economy, and possibly keep the islands afloat, in an economic sense, by means of remittances. This certainly appears to have been the strategy adopted by members of several small island communities in Manus Province, where the value of remittances was only slightly lower than the combined value of timber and marine commodity exports in 2006 (Dalsgaard 2013). In the late 1970s, remittances are said to have paid for roughly 80 per cent of what the very small island community of Ponam spent on imported goods (Carrier and Carrier 1989: 167–8). However, relationships between donors and recipients are not without moral hazard, depending as they do on the capacity of migrants to negotiate the moral politics underpinning the demands made of them while they are employed, as well as maintaining adequate levels of knowledge of local kinship networks, land boundaries, customary feasting protocols and the local language.

In the long run migrants may become too disengaged from village affairs and thus no longer be regarded as taking part in their social reproduction. Then the impulse to educate children for future remittances may disappear.

(Dalsgaard 2013: 299)

The combination of low *voluntary* remittance flows to the Bwanabwana islands with the more explicit demands on urban relatives for assistance with school fees, as reported by the Ware village enumerator in 2010, may indicate a higher level of disengagement, and even the espousal of an ideology of ‘possessive individualism’, on the part of the urban relatives (Martin 2007). But the earlier *bêche-de-mer* boom seems to have reduced the demand, as well as the supply, and may well have been more egalitarian in its effects on local household incomes. It is hard to tell whether the subsequent closure of the fishery served to magnify tensions in the relationship between the islanders and their absent relatives, or whether these tensions were moderated by the national government’s adoption of a free education policy in 2012.<sup>19</sup> But we need to be wary of assuming that the pattern of migration and remittances fits neatly within a dualistic conception of the relationship between ‘modern’ (urban) and ‘traditional’ (rural) households, institutions or practices.

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<sup>19</sup> This policy was not implemented consistently across the country, and was partially abandoned in 2019, so most parents still had to contribute something towards the cost of their children’s education, even if the amount varied from place to place or year to year (Walton and Hushang 2021).

As Hayes remarked in 1993, there is more than one circuit or form of circulation whereby people, goods and ‘ecosystem services’ move across the boundary that separates a small island community from the rest of the world, and these boundary conditions can change in response to numerous factors or drivers aside from market prices or population pressure. This is evident in the way that Brooker Islanders, and no doubt other islanders, responded to the imposition of the moratorium. Our 2006 survey data also revealed the extent to which islanders in the Bwanabwana group have actively sought to maintain the option of moving from one island to another, or one community to another, even when they do not have the option, or even the desire, to migrate to an urban centre. There is strong evidence that this livelihood strategy evolved over many centuries, primarily as a response to the risk of periodic food shortages induced by climatic fluctuations (Macintyre 1983; Macintyre and Allen 1990). But we should not therefore conclude that its continued viability depends on the maintenance of customary institutions that are now being eroded by the forces of modernity.

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