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9 SEARCHING FOR A LIVELIHOOD: THE DILEMMA OF SMALL-BOAT FISHERMEN IN EASTERN INDONESIA

James J. Fox, Dedi S. Adhuri, Tom Therik and Michelle Carnegie

1 INTRODUCTION

Nowhere on earth is there a greater disparity in maritime environments than between northern Australia and the southern regions of Indonesia. Northern Australia's historically low population and its regulated fisheries management have—until now—provided relatively good protection for the rich and diverse marine resources of the Timor Sea. By contrast, the Arafura Sea, directly to the north of Australia, is among the most heavily fished regions in the world. As the marine resources of other Indonesian regions have progressively been overexploited, fishing vessels—both local and foreign—have shifted operations eastward. Under a ruling of the Soeharto period, trawlers banned elsewhere in Indonesian waters are allowed to operate legally in the Arafura Sea. A plethora of these fishing vessels, some legal and others illegal, vie with each other to exploit available resources. The increasingly sophisticated operations of these large fishing fleets have disrupted and diminished the opportunities for the small-boat fishermen of eastern Indonesia to derive a living from the sea. As these fishermen have seen their capacity to operate curtailed, they, too, have been forced to extend their voyaging.

Many of these small-boat fishermen, especially from South and Southeast Sulawesi where pressures on sea resources are particularly acute, have shifted, either permanently or on a seasonal basis, to strategic locations along the coasts of the southern islands of eastern Indonesia.

Limited by commercial vessels operating in the Arafura Sea, they have increasingly looked to Australian waters for key commodities that were previously plentiful in their own seas, particularly shark but also trepang and trochus.

As the number of small-boat fishermen has multiplied and the resources they seek in their own waters have diminished, the problem of illegal fishing in Australia's northern waters has become ever more acute. Under a memorandum of understanding (MOU) concluded with Indonesia in 1974, Australia permitted 'traditional fishermen'—those who relied exclusively on sail power—to fish within a demarcated sea area known as the MOU (or MOU74) Box. Until recently, however, the majority of small-boat fishermen have utilized motorized craft of various sizes to fish across the entire northern region of Australia and along the northern reaches of both the western and eastern coasts of the continent.

In response, Australia has mounted larger and more effective surveillance and apprehension operations. In 2004/05, these led to the apprehension of over 200 illegal vessels.[1] Australia's largest ever air and sea effort targeting incursions by foreign fishing vessels in northern waters, known as Operation Clearwater, was conducted in April 2005, and a similar operation, Operation Breakwater, was carried out in 2006.

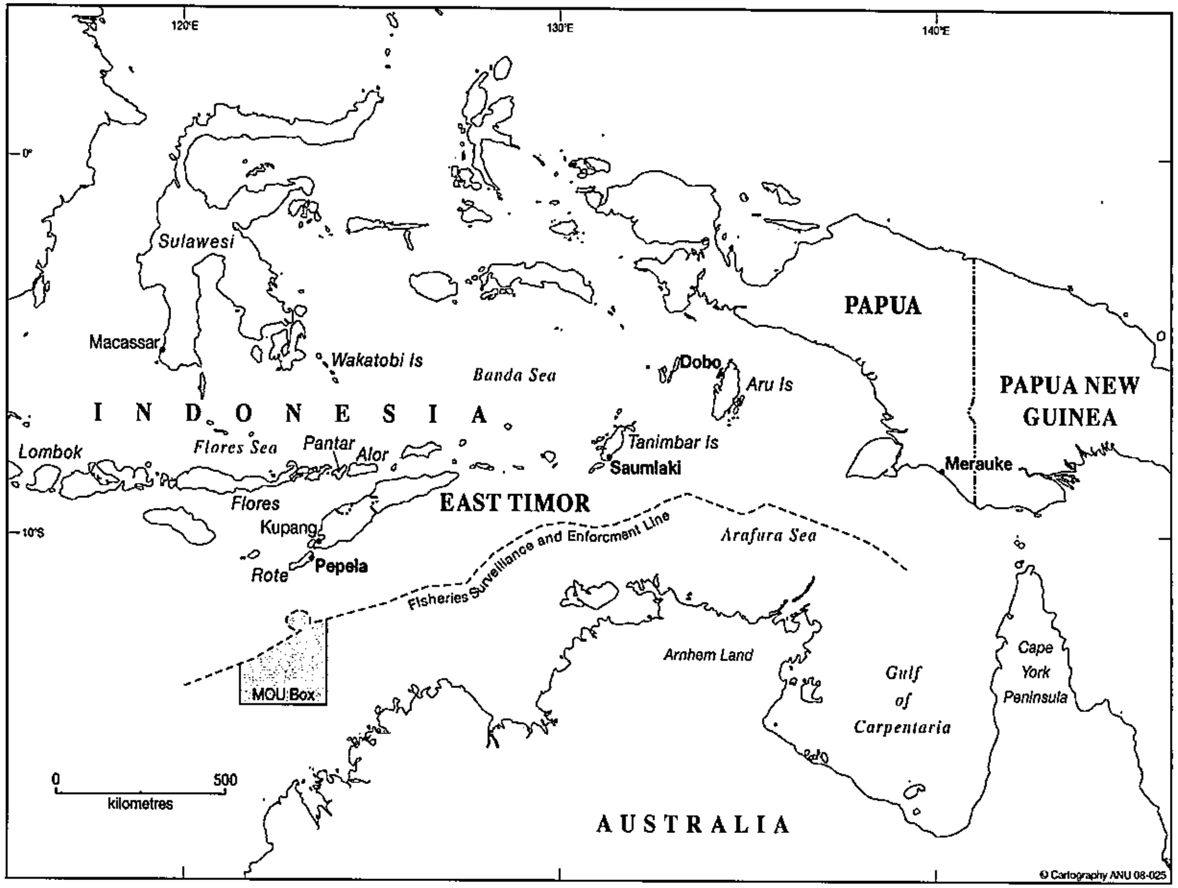
In this chapter we look at specific aspects of this considerable problem.[2] We concentrate primarily on the small-boat fishermen who fish for shark, taking fin to feed an almost insatiable Chinese market. We begin by considering the conditions in the Arafura Sea, which is one of the most overfished areas in the world, and Australian arrangements with regard to the 'traditional' Indonesian fishermen who are allowed to sail into Australian waters.

We then focus on the four small ports—Pepela, Saumlaki, Dobo and Merauke—from which most small-boat fishermen depart (see Map 9.1). Pepela is located on the eastern end of the small island of Rote just to the west of Timor in the province of East Nusa Tenggara. Saumlaki is situated at the southern end of the island of Tanimbar, and Dobo on the western coast of the island of Aru. Both of these islands are part of the province of Maluku. Merauke, on the southern Papuan coast, belongs to the province

1 There were 202 apprehensions, 176 legislative forfeitures and 1,480 persons detained between 1 July 2004 and 30 June 2005 (AFMA 2005: 97).

2 This chapter was originally prepared in 2006 when this problem was particularly acute. It describes fishing practices in 2004–05, prior to the Australian naval and customs operations that substantially reduced small-boat shark-fishing incursions into Australian waters.

Map 9.1 *The Southern Ports of the Shark Fishermen of Eastern Indonesia*



of Papua.[3] Under Indonesia's new regime of local autonomy, jurisdiction over these ports is vested in three different provincial governments.

Although these fishermen sail from just a few ports, most of them come from other islands in eastern Indonesia. In discussing differences among these ports, we set out to identify some of the home islands from which the fishermen originate. We then examine the distinguishing features of the vessels and technologies used in these ports; the changing patterns involved in this fishing; and the variety of on-shore owners, outfitters and local traders who provide the capital and equipment for voyages and then purchase the catch supplied by the fishermen. We consider the prices paid to fishermen for their efforts and the situation of debt that often ties them to particular traders. Finally, we attempt to give some indication of the size of this fishery.

It should be emphasized that small-boat shark fishermen represent only one of the groups of illegal fishermen now entering Australian waters. Other small-boat fishermen target trepang or trochus and fleets of larger vessels have begun to penetrate deep into Australian waters to fish for red snapper and other valuable species.

2 CONDITIONS IN THE ARAFURA, BANDA AND FLORES SEAS

The Indonesian government divides its national waters into nine separate regional fisheries. What in Australia is often referred to as a single region—the Arafura Sea—is considered by Indonesia to be two maritime zones: the Arafura Sea and the Banda Sea. The Arafura Sea extends around Papua/Irian Jaya. The island of Aru is considered part of the Arafura Sea, as is all of Papua. Thus, the ports of Dobo and Merauke belong to this zone. Tanimbar, however, is considered part of the Banda Sea, so Saumlaki belongs to the Banda Sea zone. The islands of Timor and Rote are included in the Indian Ocean; Pepela belongs in this zone. Official Indonesian information and statistics are organized according to these regional categories.

For each of these fishing areas, the Indonesian Ministry of Marine Affairs and Fisheries tries to conduct regular assessments of stock capacities.[4] However, because of the high level of illegal fishing and the signifi-

3 To this list one could add various other fishing settlements: those in the vicinity of Merauke; those on other islands of Maluku, such as the tiny port of Tepa on the island of Babar; and, most significantly, various ports on the Bay of Kupang (Tablolong, Oesapa and Sulamu).

4 These surveys are carried out by the ministry's Research Centre for Capture Fisheries (Pusat Riset Perikanan Tangkap), often in cooperation with LIPI's Research Centre for Oceanography (Pusat Penelitian Oseanografi).

cant tendency to underreport the level of catch to avoid taxes and fees (see Fegan 2003 and Chapter 8, this volume), these assessments depend upon independent research and oceanographic surveys to bolster their accuracy.

Despite the limitations faced in conducting these assessments, the scientific results of this research provide a sobering contrast to the general, often official, rhetoric about the enormous untapped potential of Indonesia's seas, particularly its eastern seas. Thus, for example, the stock assessment report for 2001 prepared in cooperation with the Indonesian Institute of Sciences (LIPI) indicated that there was little opportunity for a significant expansion of fishing in any of Indonesia's nine fishing areas, and instead called for the establishment of management strategies to set limits on fishing activities (MMAF and LIPI 2001; Fox, Adhuri and Resosudarmo 2005: 96–7). A similar statement is found in the conclusion to the ministry's technical report for 2003: 'A majority of fish resources in Indonesia's various fishing areas have experienced exploitation pressures that are beyond long-term sustainability' (MMAF 2004: 83).

For the Arafura Sea, the 2001 report called for limits on all large pelagic and demersal fish as well as shrimp. For the Banda Sea, it called for limits on all small pelagic and demersal fish. And for the Flores Sea, it called for limits on demersal fish and shrimp (MMAF and LIPI 2001: 192). A technical report for 2002 focusing specifically on the Arafura Sea noted indications of a continuing reduction in stocks, which it attributed to a combination of fishing vessels of under 150 gross tonnes operating directly along the shore and pair-trawling by a fleet of mainly Thai boats (MMAF 2003: 129–72).

Indonesia has taken steps to address its problems of illegal, unreported and unregulated fishing. In 1999, the Ministry of Marine Affairs and Fisheries was established by presidential decree to separate fisheries from the Ministry of Agriculture and provide it with a wider mandate.[5] The ministry initiated a program of re-registering fishing vessels and reflagging foreign vessels. But even as it carried out this new program to reduce and eventually eliminate foreign fishing fleets, new joint venture arrangements were put in place to allow the re-entry of many foreign vessels under the guise of domestic economic cooperation. A new law passed in 2004 (Law No. 31/2004 on Fisheries) increased the penalties for all fisheries violations, provided new investigatory powers and procedures for officials to deal with such offences and established local fisheries tribunals to hear cases and make judgments (see also Chapter 8).

5 Initially called the Ministry of Marine Exploration and Fisheries, its name was changed in 2000 to the Ministry of Marine Affairs and Fisheries (Departemen Kelautan dan Perikanan).

Table 9.1 Registered Fishing Vessels in the Arafura Sea by Gross Tonnage, 2000

	30–50 GT	51–100 GT	101–200 GT	201–300 GT	>300 GT	Total
No. of vessels	158	312	582	284	186	1,522

GT = gross tonnes.
Source: MMAF (2003: 139).

The new law has yet to be fully implemented, and in the meantime large-scale fishing continues to build up in the Arafura Sea. Various estimates exist as to the extent of this fishing. For example, the ministry's technical report for 2002 shows that 1,522 registered fishing vessels were operating in the Arafura Sea in 2000, many of them well above 200 gross tonnes (Table 9.1). These figures date from the period prior to the re-registration initiative but are nevertheless indicative of the levels of fishing in the Arafura Sea.

In contrast to these official figures for 2000, the head of the Marine Affairs and Fisheries Office of the province of Maluku estimated that in 2005 there were at least 1,400 illegal fishing vessels operating in the Arafura Sea (*Suara Merdeka*, 17 March 2005). On the basis of extensive field research carried out between 1998 and 2001, Fegan (2003: 21) estimated that there were '700–750 trawlers operating in the Arafura Sea'.

Whatever the number of vessels involved, all indications are that the level of overfishing in the Arafura and adjoining seas remains substantial. Small-boat fishermen repeatedly bemoan the fact that they can rarely put out their fishing lines without them being ripped away by larger vessels. In the face of such constraints, they have increasingly turned to fishing in Australian waters. Fishing by small-boat fishermen in traditional sailing boats is permitted within the area demarcated by the 1974 MOU, but from 2000 to 2006 the majority of small-boat fishing in Australian waters was carried out in motorized vessels, many of them specially designed to avoid apprehension. It is important to recognize the developments that occurred in the 1990s leading to these new forms of illegal fishing.

3 ASHMORE REEF AND THE AUSTRALIAN MOU

The MOU concluded between the Australian and Indonesian governments in 1974 identified five small areas on the northwest Australian continental shelf to which 'traditional' Indonesian fishermen would be given access. These areas were Ashmore Reef, Cartier Islet, Scott Reef, Seringapatam Reef and Browse Islet. The MOU allowed the fishermen to take trepang, trochus, abalone, green snail, sponges and all molluscs on the seabed adjacent to these areas, but not turtles of any species. It also permitted landings to obtain fresh water at two points on Ashmore Reef and allowed boats to shelter within the group without landing.

This simple document consisting of three pages plus a map provided the basis for traditional Indonesian fishing in Australian waters. It came into effect on 1 February 1975. However, the use of the term 'traditional' in the original document was considered ambiguous. Eventually, in 1988, both Indonesia and Australia agreed to a further advisory clarification that 'traditional' referred to fishermen who used non-motorized sailing vessels, generally *lambo perahu*, to access the MOU Box.[6] At the same time, Australia committed itself to work with Indonesia to provide assistance to fishermen in eastern Indonesia.

Ashmore Reef is the largest and most important of the five tiny areas designated in the MOU. It is a raised platform reef near the edge of the Sahul Shelf, approximately 120 kilometres directly south of the island of Rote. In 1983 the Australian government declared Ashmore Reef a National Nature Reserve, because of its remarkable biodiversity and because it is a staging point for migratory birds and a breeding ground for dugong and several types of turtles. This declaration banned the removal of all fauna and flora to a depth of 50 metres.

By the time the ban came into effect, trepang stocks were already depleted near all the reefs and islets identified by the MOU. A stock assessment undertaken by CSIRO Marine Research in 1998 reported that 'high-value species were either absent or at low abundances on all reefs' covered by the MOU and that local gathering efforts had switched to medium and low-value species—but even these were at low densities on most reefs (Skewes et al. 1999).[7]

By the mid-1990s, voyages to Ashmore and other reefs in the Australian Fishing Zone for the purpose of gathering trepang had already begun to decline. Only fishermen from Oelaba and Hundi Huk, the two neighbouring settlements located at the western end of the island of Rote, along with fishermen from the small islands of Tonduk and Raas

6 For a discussion of the MOU, its modification and the consequences of Australian policy, see Fox (1995, 1998).

7 The report by Skewes et al. (1999) and subsequent surveys by Smith et al. (2000, 2002) provided data for the preparation of the Commonwealth Management Plans for the Ashmore Reef National Nature Reserve and the Cartier Island Marine Reserve, published in 2001 (DEH 2001). The latest survey was conducted in 2005 (see Kospartov et al. 2006).

to the east of Madura, continued regular voyaging to gather trepang. Beginning in the early 1990s, fishermen from the port of Pepela shifted from trepang and trochus gathering to intensive shark fishing.[8] Joined by fishermen from other areas, they relied on access to the waters of the MOU Box to fish for shark fin.

As the price of fin rose and more vessels entered Australian waters in search of shark, fishermen inevitably began to venture beyond the permitted sea boundaries into better shark-fishing grounds. This resulted in a steady increase in the apprehension of vessels for illegal fishing in the Australian Fishing Zone and closer to the Australian coast. Beginning in 2001, fishermen in Pepela began to rely on the small, fast motorized vessels known as *bodi* to avoid apprehension while they continued their pursuit of shark. The number of *bodi* rose rapidly, with their area of operation extending well beyond the MOU Box area.

At the time that Pepela fishermen were shifting to shark fishing, other eastern Indonesian fishermen were doing much the same. An important fishing port for these initial changes was Dobo on the island of Aru, but other ports, particularly Merauke, were drawn into shark-fishing activities and have continued to develop their capacity to take shark.

4 THE FOUR SOUTHERN PORTS FOR INDONESIAN SHARK FISHING

The four ports from which the bulk of small-boat shark fishermen sailed into Australian waters—Pepela, Saumlaki, Dobo and Merauke—form an arc that extends from the western tip of the island of Timor across the Arafura Sea to the south Papuan coast (Map 9.1). Each of these ports has distinguishing features, including differences in the number of boats that utilize each one. The situation is a dynamic one. Conditions among and within these ports do not remain constant.

There are broad similarities in the arrangements between fishermen and their local outfitters, but there are also notable variations in specific

8 In the late 1980s, Bajau from Mola on Wanci Island began to move to Pepela, where they were given an area to settle. They used this as their base for shark fishing further to the south. The local fishermen in Pepela then began to learn shark fishing from the Bajau. Initially they did this by assigning young men from Pepela to *perahu* with Bajau captains and crew. By 1996–97, all *perahu* sailing from Pepela were targeting shark. Local Pepela fishermen quickly—and somewhat contemptuously—discarded the traditional Bajau methods and accompanying taboos and adopted more effective longline technology. Within five years they saw themselves as better shark fishers than their teachers. See Fox (1998, 2005: 48–53) for further discussion.

arrangements, and even differences from port to port in the prices paid for shark fin. These differences reflect the fact that the fishermen tend to access different fishing areas with varying species of shark, whose fins attract different prices. Another important difference between ports lies in the history of their involvement in shark fishing in Australian waters.

Dobo

Dobo is an 'old' port town. In the nineteenth century, it was the chief emporium for the trade in exotic commodities from the Papuan coast to Makassar. Alfred Russel Wallace sailed in a Bugis prau (*perahu*) from Makassar to Dobo in December 1856 and wrote a brief description of the trade at that time:

> More important than all of these [commodities from other parts of eastern Indonesia] is the trade to Aru, a group of islands situated on the southwest coast of New Guinea, and of which almost the whole of the produce comes to Makassar in native vessels. These islands [are] out of the track of all European trade ... Pearls, mother-of-pearl, and tortoiseshell, find their way to Europe, while edible birds' nests and 'tripang' or sea-slug are obtained by shiploads for the gastronomic enjoyment of the Chinese (Wallace 1869, Vol. II: 158).[9]

Although Dobo has since declined in importance as a trading port, it has retained its position as a local fishing port and as a key node in the network of fishing communities across eastern Indonesia. According to its fishermen, Dobo has a local fleet of 100–125 boats. In addition, the port is used seasonally as a staging point for small boats from other parts of Indonesia and thus the number of boats increases as the main fishing season progresses.

The diverse origins of the fishermen now living in Dobo reflect the importance of this port and its established social network within eastern Indonesia. One can find individual fishermen from all over eastern Indonesia in Dobo, as well as a number of established local communities from other islands. There are, for example, separate communities of fishermen from Bone Rate and from Batu Ata, tiny islands in the sea between Flores and Sulawesi, as well as a small community of fishermen who have come from the Bay of Maumere on the north Flores coast.

The first substantial wave of shark fishers from Dobo began to sail into Australian waters in the early 1990s (Fox 1992). Fishermen from Dobo constitute a substantial number of the illegal fishermen who are

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9 For an extended discussion of the history of various maritime communities in eastern Indonesia, see Fox (2000).

regularly apprehended. Many fishermen who previously sailed from Dobo are, however, now shifting to Merauke.

Merauke

The port of Merauke is used by large commercial fishing vessels as well as small-boat fishermen. In recent years it has taken the 'spillover' of small fishermen from Dobo; many of the community of fishermen from the Bay of Maumere have moved to Merauke, for example. In the words of one fisherman from Dobo: 'Merauke is where our young men go if they can't make a living in Dobo'.

As a result, Merauke has a mix of fishermen from all over eastern Indonesia. A majority of them come from different parts of Buton in Southeast Sulawesi. As a port for small-boat fishermen, Merauke is growing rapidly and has—or may soon have—more shark-fishing boats than Dobo. Since 2004 the shift of boats from Dobo to Merauke has increased, and a number of boats, financed from Dobo, now prefer to sail from Merauke. Local fishermen estimated that in 2005, 150–200 shark-fishing boats were based in the Pintu Air area of Merauke.[10] According to them, their fishing endeavours had been concentrated in Australian waters for the past five years.

Merauke is located in relatively close proximity to a productive boatbuilding industry at Kumbe, about 60 kilometres from the town. Between 2003 and 2006 Kumbe is reported to have produced 30–50 boats of various sizes each year (Adhuri 2006).

Saumlaki

Saumlaki on the island of Tanimbar is a far smaller port than either Dobo or Merauke. Local fishermen claim that Saumlaki harbours approximately 30 boats capable of shark fishing but other estimates indicate there may be 50 such boats. For part of the year, many of these boats fish in nearby waters to supply the local market with fish. There is also a traditional fishing village on Tanimbar called Namtabung. Boats from Namtabung sail from Saumlaki to fish for shark and young men from the village join the Saumlaki boats as crew members. Whereas most of the fishermen in Saumlaki are Muslims who have come from elsewhere in eastern Indonesia, many of the fishermen from Namtabung are Christians.

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10 In addition, they estimated that there were as many as 50 larger boats (up to 60 gross tonnes) based in Merauke that regularly fished for shark using extensive nets rather than longlines.

Pepela

Pepela is located at the southeastern 'neck' of the island of Rote on a wide, protected bay that opens to the Timor Sea. The setting is beautiful but the settlement itself, built on limestone and coral sediment, is crowded, somewhat squalid and lacks a good source of water, particularly in the dry season. It is not clear when Pepela was founded. Local traditions recount the arrival and settlement of Muslim immigrants, on coastal land granted to them by the Rotinese *raja* of the domain of Ringgou, around the end of the nineteenth century or beginning of the twentieth century. These initial settlers are said to have come from Southeast Sulawesi, but over time they were joined by settlers from other islands in eastern Indonesia and Madura along with a number of Arab families of Haudramaut origin. The most recent arrivals have been Bajau from the Tukang Besi (Wakatobi) Islands, particularly Wanci, and fishermen from the Barnusa area of Alor and Pantar. The original settlement of Pepela was built near the sea and is still marked today by an old mosque near the harbour. The main concentration of houses is now in the New Settlement (Kampung Baru) built further away from the sea.

Most household heads (82 per cent) identify their occupation as full-time fishing. As such, Pepela is the largest fishing village on the island of Rote and certainly one of the largest in the Timor area. It is one of the principal organizational centres for crew recruitment for voyages into Australian waters.[11] It is also the initial marketing centre for the marine products obtained on these voyages. In addition to drawing on its own local manpower and that of neighbouring Rotinese villages, Pepela recruits captains and crews from other fishing villages on Rote, Flores, Alor and Timor. Pepela is also the site of a Bajau settlement known as Tanjung Pasir. It is clearly identifiable as a Bajau settlement by its houses, which are raised on poles and constructed of woven palm leaf on simple wooden scaffolding, whereas most other dwellings in Pepela are at ground level and built of more durable materials. The number of Bajau families living in Tanjung Pasir has more than doubled in the past 10 years.[12] Most continue to maintain regular contacts with their home villages in the Tukang Besi Islands.

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11 Based on data recorded at Ashmore Reef between 1986 and 1998, 85 per cent of all fishermen and 93 per cent of all vessels sailing to Ashmore came from small ports on the island of Rote. Most of the vessels came from just two ports on the island: Pepela (69 per cent of vessels) and Oelaba (Fox and Sen 2002: 18–19).

12 In September 1994, anthropologist Natasha Stacey conducted a survey of Bajau living in Pepela. At that time there were 42 Bajau houses in the settlement of Tanjung Pasir and '50 Bajo houses in all of Pepela, inhabited by at least 65 families or approximately 300 people' (Stacey 1999, cited in Stacey

Pepela has gone through successive transformations. In the 1990s, its fishermen changed over from trepang and trochus gathering to intensive shark fishing. Beginning around 2001, they adopted *bodi* to replace their traditional sailing *perahu* and used these boats to make more frequent incursions into Australian waters. As these changes occurred, the numbers involved in fishing increased, and the port of Pepela grew larger as a consequence. Official government statistics for 2000 listed 133 *lambo perahu* for Pepela plus a few motorized vessels (BPS 2001: Table V.5.3). By October 2005, Pepela was reported to have over 400 vessels, most of them fast *bodi*.

5 BOATS AND THEIR FISHING GROUNDS[13]

Pepela

In Pepela, sailing technology began to change rapidly in 2003 with the introduction of the *bodi*. These sleek, narrow vessels were equipped with high-powered engines. A smaller *bodi* could accommodate a crew of three or four and had either a 24-horsepower or a 33-horsepower engine. A somewhat larger version of the *bodi*, known as a *bodi susun*, could accommodate a crew of five or six and had two engines. These purpose-built, fast shark-fishing *bodi*, most of them constructed and brought to Rote from islands further to the north, quickly replaced Pepela's *lambo perahu* fleet for the purposes of shark fishing.[14]

Bodi were well designed for making quick incursions into Australian waters. During the first few years in which these boats operated, many boat captains relied on GPS for precise navigation, but as sailing patterns were regularized, less use was made of this technology. *Bodi* carried a full complement of lines (*tali*) and hooks (*mata*). The norm was 80 hooks, which generally meant five lines with 16 hooks each, although some *bodi susun* carried a sixth line or used longer lines with more hooks.

2007: 128). In May 2006, Tanjung Pasir was reported to have over 90 houses and 160–180 families. However, because so many of these families travel back and forth between Pepela and other Bajau settlements, it is difficult to put a number on how many families are actually 'settled' on the site.

13 The following sections describe fishing practices at the height of the shark-fishing incursions into Australian waters: 2003 to 2006.

14 The time and cost differences between building a *lambo perahu* and a *bodi* were considerable. A *bodi* could be built in just two months at a cost of less than Rp 10 million, including engine. For a *lambo perahu*, the building costs alone might run to Rp 21 million.

There were two patterns of sailing. The first involved shorter incursions into the region roughly coincident with the Timor Gap area, which fishermen refer to as the 'Enterprise' or 'Operations' (Perusahaan) area because of the presence of oil rigs. According to the fishermen, there is less Australian surveillance here than elsewhere. The second involved longer incursions beyond Scott Reef (Pulau Dato) to an area closer to the Australian coast, known as Bawa Pulau Dato. Some boats ventured even further south into waters near the Rowley Shoals and closer yet to the Australian coast.[15] This general area is referred to as Bawa Angin or Masor.

For shorter trips, *bodi* generally left in the morning planning to arrive on target around 10 pm. The fishermen then set out lines to catch bait, often in the vicinity of the oil rigs. By the next afternoon, they were able to bait their lines and set them for shark. Before dawn the next morning they would check their lines. If they had caught fewer than seven shark—the target for a profitable short trip—they set their lines again and would fish until they reached or exceeded their target. Generally a short trip required three to five days.

Longer trips might take from five to seven (possibly eight) days, because it took longer to reach the target area. The fishing target for these voyages was generally higher because of the need to cover the greater cost of fuel. The target might be set at 10 or more shark, but a lot of the profit came from the fact that, nearer to Australia, fishermen were able to catch a considerable number of the highest-value shark.

What made these *bodi* so effective was the quick turnaround time after each relatively brief incursion into Australian waters. Previously a sailing voyage might have taken two weeks or more. With *bodi* it was possible to make several voyages a month.

It was far more dangerous to serve as a crew member in a *bodi* than in a *lambo perahu*.[16] The fishermen referred to themselves as 'troops who brave death' (*pasukan berani mati*). Each year, particularly early in the season when cyclones occur, *bodi* were lost in rough weather. The cyclone

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15 The Rowley Shoals are located on the eastern edge of the Australian continental shelf only 260 kilometres west of Broome. The area is remarkable for its high concentration of shark.

16 The boats from Pepela drew their crews from different groups of fishermen. Across all these groups, it was generally the younger men from Rote, along with more experienced Bajau and Alor fishermen, who ventured to sea in *bodi*. The *lambo perahu* fleet was more likely to be manned by older fishermen from nearby villages, such as Daiama on the eastern side of the Rotinese domain of Landu. Many of these fishermen continue to sail to the MOU Box area either to gather trepang and trochus or to engage in shark fishing. This complex situation has been studied by Lintje Pellu, a PhD student at the Research School of Pacific and Asian Studies, Australian National University (see Pellu 2006, 2008).

period was referred to locally as the 'widows' season' (*musim janda*) because of the mortality among married men. In 2005, according to local officials, over 40 fishermen who sailed from Pepela were lost at sea.

Dobo and Merauke

The boats departing from Dobo showed less innovation than those in either Pepela or Merauke. These motorized vessels of approximately 5–7+ gross tonnes, all with cabin superstructure, exhibited (with some variation) what might be regarded as the standard boat form that has been common throughout much of eastern Indonesia for decades. They had five to seven crew members and roughly the same number of lines and hooks as most Pepela *bodi*.

Many of the boats sailing from Merauke were similar to those from Dobo, but many others showed various innovations. Merauke with its local boat-building industry began to produce larger, more powerful boats using double (or even triple) 23-horsepower in-board engines.[17] These boats had a distinctive 'bow winch beam', because they combined longline fishing with net fishing for shark. The winch beam was needed to haul in the net, and to be effective, these boats needed to operate closer inshore.

The boats ranged across the southern Arafura Sea, targeting in particular the Arnhem Land coast, the Gulf of Carpentaria and both the western and eastern sides of Cape York Peninsula. The near-shore waters of the Gulf of Carpentaria, which are particularly rich in the highest-priced species of shark, were a prime area for the use of nets rather than lines. Merauke fishermen, like those from Pepela, favoured frequent voyages of a shorter duration. Fuel was a critical factor in determining how far the boats ventured from their home ports and how long they would remain at sea. This became even more critical when the Indonesian government reduced fuel subsidies in October 2005.[18]

Fuel has now become the single most important factor affecting the activities of small-boat fishermen from all the southern ports of Indonesia. Traders and outfitters in each of the ports have had to take steps to gain control of the fuel supplies necessary to continue voyaging. Because of the problems with fuel costs and supply, in 2006, for the first time

17 The cost of these new boats with their additional gear is reported to have been around Rp 40–50 million.

18 Before the price rises, one captain from Dobo estimated the cost of a voyage at Rp 6.7 million (A$957) for fuel and supplies, while another captain from Merauke estimated it at about Rp 7.7 million (A$1,100). After the fuel price increases in October 2005, the cost of a single voyage for the new, larger Merauke boats is said to have almost doubled to Rp 15 million.

in three years, there was a significant increase in the number of *lambo perahu,* in place of *bodi,* sailing from the port of Pepela to take part in shark fishing.

6 THE FINANCING OF VOYAGES: THE OWNERSHIP AND OUTFITTING OF BOATS

Each of the ports of Pepela, Dobo, Merauke and Saumlaki has a slightly different system of boat ownership and varying procedures for the outfitting of boats and the division of catch shares. Each port has a small number of key middlemen who own or finance the ownership of the boats, outfit them with gear and supplies, and purchase the catch after each voyage. In 2005, there were roughly six prominent traders in Pepela, a similar number in Dobo, fewer in Saumlaki and as many as 18 in Merauke who owned or financed small boats and exported shark fin.

Most arrangements with the fishermen follow similar lines, with the boat owner's share and the operating costs of the voyage deducted from the value of the catch before the captain and crew are paid. The owner-trader determines the value (weight and quality) of the catch and the cost of all supplies including fuel.

In Pepela, for example, we found that 50 per cent of the return from the catch went to the owner of the *bodi.* The remaining half was divided equally among the crew, with an extra portion allocated to the supplier of the fishing lines, who was generally the owner/outfitter of the *bodi.* The crew then divided the cost of the diesel fuel with the owner who had supplied the fuel at a predetermined price. Thus the owner and the crew each paid half the cost of the fuel. From their individual portions, crew members paid for the supplies of food and cigarettes used on the voyage and any other supplies provided for their families before they left port. If for some reason a voyage did not return a profit, an appropriate portion of the debt was divided among the fishermen and added to the costs of the next voyage.

Dobo has what is called a *joki* (from the English word 'jockey') system of ownership. Simply put, a merchant or 'boss' provides the funds for someone (usually a trusted fisherman who becomes the captain) to buy a boat; that person is the 'jockey' until the boat is paid for. The boss also provides the funding for all supplies and fishing equipment (basically, lines, hooks and anchors) and he buys the entire catch when the boat returns to port. Expenses are deducted from the price of the catch and the remaining money is divided equally among the captain and crew, with the captain assigned two shares. If a boat is apprehended, the debt accrues to the captain as 'jockey', but the cost of the confiscated lines, hooks and anchors is borne by both captain and crew. This *joki* system thus transfers the risk of the loss of the boat from a boss to a particular fisherman. As a result, most of Dobo's *joki* fishermen are deeply in debt to their bosses and patrons: the captain of one boat calculated he had a debt of over Rp 37 million (about A$5,285), and another had debts amounting to over Rp 70 million.

While the *joki* system exists as a financing mechanism in Dobo, most boats are owned outright by traders. In this case, the owner is responsible if the boat is lost. Profits are divided in two: half to the owner and half to the captain and crew, with the captain receiving two shares, one from the owner's half and the other from the crew's half.

Beginning in 2006, some *bodi* owners in Pepela began transferring ownership of their boats to Bajau who worked for them, thus essentially instituting the same kind of *joki* system found on Dobo. These 'sales' were made possible by the creation of large debts owed to the original owners. Any loss of a *bodi* came at a cost to the Bajau owner, whose debt remained. Although the new owners gained a greater share in the value of the catch, they were obliged to sell their catch to the boss to whom they were deeply in debt.

In the last few years, financiers in Merauke have tried to offer a better share in the profits of a voyage as a means of attracting fishermen from Dobo and elsewhere to Merauke.

7 PRICES FOR SHARK FIN

The trader who finances a voyage is the person who judges the quality of the shark fin and sets its price. He also determines the cost of supplies, including fuel, and thus, in the end, controls what the fishermen receive for their efforts. Because of this, fishermen often complain that they have little control over their returns. In fact, though, they do have a means of redress, because they are the ones who unload and report the catch. Some fishermen have become quite adept at hiding a portion of their fin and selling it separately to trusted associates. There is considerable evidence of this secondary trade in Pepela, particularly among the Bajau.

In Pepela, the price of high-quality shark fin has risen dramatically. In 2002, about the time of the initial shift from *lambo perahu* to *bodi*, the price of the best grade of shark fin was reported to range from A$82 to A$125 per kilogram (dry weight) (Fox and Sen 2002: 33–4). By 2005, high-quality fin (much of it derived from areas close to the Australian mainland) could command prices up to A$171 per kilogram (Table 9.2). However, some caution is needed in considering these figures. Prices are negotiated based on local judgments. Both size and quality of fin are considered when determining the price paid to fishermen.

Table 9.2 The Price of Shark Fin in Rote and Kupang, 2005

	Rp per Kilogram	A$ per Kilogram[a]
Class I (> 60 cm)	1,200,000	171
Class II (40–60 cm)	800,000	114
Class III (< 40 cm)	200,000	29
Base (of shark tail)[b]	65,000	9

a The figures are based on a 2005 conversion rate of Rp 7,000/A$1. All figures have been rounded to the nearest dollar.

b All shark fin is exported but the base of the tail is used in the domestic market as a substitute for fin. The price of a bowl of 'shark fin' (alias shark tail) soup in Surabaya is Rp 300,000 (A$43).

Source: Authors' estimates, based on information provided by local traders on Rote.

By 2006, fishermen from Dobo claimed they no longer encountered the species of shark commanding the highest prices. The highest price offered to the fishermen of Dobo for the best quality shark fin was Rp 800,000 (A$114) per kilogram (dry weight). This was substantially below the prices paid on Rote. This may have reflected the lack of Class I shark fin or the lower prices set by traders in Dobo.[19] By contrast, in 2006, fishermen from Merauke operating in the Gulf of Carpentaria were still taking species of shark with high-value fin that had now become rare in other fishing areas.

8 CRITICAL VARIABILITY IN SMALL-BOAT SHARK FISHING

Hundreds of small-boat fishermen were involved in shark fishing in Australian waters until Australian naval efforts at interdiction began to take effect. They made voyages of varying duration, to a variety of fishing grounds, at different times of the year. They set out on vessels of all sizes with an assortment of equipment, either longlines or nets but

19 If one assumes an average price for shark fin on Dobo of Rp 600,000 per kilogram and costs of Rp 6–7 million per voyage, then it would take 10–11 kilograms of shark fin to cover the cost of a voyage. With a crew of six plus captain (a total of eight shares under the *joki* system, including two shares for the captain), 20 kilograms of shark fin should result in a profit of Rp 750,000 (A$107) per share. For those who divide shares with a boat owner, each share would be worth about Rp 425,000 (A$61), because the captain would take only one share from the crew's half (and another equivalent share from the owner). Thus a successful voyage for the fishermen would yield roughly A$60–100 per crew member.

sometimes a combination of both. The fishermen themselves had varying levels of experience; some were far more knowledgeable and, on the whole, successful than many novice fishermen who set out with great hopes but limited sailing or fishing ability. All these fishermen targeted a variety of shark species with fin of differing value. On each voyage, the catch varied in size, number and mix of species. It is important—indeed essential—to emphasize this variability when attempting to make generalizations about the catch and consequences of shark fishing. It is best to begin by viewing this shark fishing in terms of some general patterns.

The captains on every boat set sail from port with specific targets. On each voyage, they sailed to one fishing ground where they concentrated their activities, hoping to catch enough shark to return a profit to all crew members. Thus the more crew members, the higher the target catch. Many species of shark aggregate, so coming upon the 'right spot' could yield considerable success. Every captain and most crew members could tell amazing tales about some remarkable catch of shark. These tales would fire the imagination of other fishermen, particularly new recruits, with the hope of great gains. But fishermen also told sad stories of unsuccessful voyages. Such voyages occurred more often than the highly successful ones. The sea is particularly rough from December to March and sometimes well into April. Most fishing decreases during January and February and increases again in March and April, even though cyclones during this period make voyaging hazardous. Strong, gusty east winds normally arise during July and August. For the past few years, these winds seem to have begun earlier and to have been unusually intense. Thus weather, luck and the increasing possibility of apprehension were all factors in fishing success.

Most fishermen would say that they set their target for a successful voyage at 10 sharks, although some experienced fishermen claimed that they regularly succeeded in catching more than this. The targeted shark species, however, varied in size and possessed fin of varying value. Ten small blacktip sharks might not be as valuable as one normal-size pigeye shark. Thus, for the fishermen, the species of shark caught could be more important than the number of shark taken.

Fishermen from Pepela who relied exclusively on longlines sailed mainly to two fishing grounds: Perusahaan (the waters south of the oil rigs) and Bawa Pulau Dato (the waters beyond Scott Reef). Their main target species were blacktip or spot tip shark (*rante kolo*)—which are more numerous but smaller in size in the vicinity of the oil rigs—sandbar shark (*iu putih*) and hammerhead shark (*bingku*). Occasionally, if they were lucky, fishermen might take a good-size pig-eye shark.

Longline fishermen from Dobo and Merauke targeted the same species. However, they caught a greater number of high-value hammerhead sharks, particularly in the Gulf of Carpentaria. They were also able to take some shovelnose rays (*lontar* or *pandruk*) and sawfish shark (*iu gergaji*). Net fishermen from Merauke concentrated on catching shovelnose rays and sawfish sharks, whose fins commanded high prices.[20]

9 THE SIZE OF THE SMALL-BOAT SHARK FISHERY

It is virtually impossible to provide a reliable estimate of the size of the shark take by Indonesian fishermen. On the other hand, it is critical to make some attempt at estimation despite the difficulties of doing so.

Since much of the trade in shark fin goes unreported, local figures on interisland trade, even when available, tend to underrepresent the level of the catch. Nevertheless there are some figures for this trade: in 2005 Merauke is reported to have shipped, on average, 3 tonnes of shark fin per month, totalling 37,849 kilograms for the year (Adhuri 2006).[21] Although a portion of this came from Merauke's own—now declining—local fishery, the bulk of it (conservatively, 20–25 tonnes) is likely to have come from Australian waters. Anecdotal reports from Dobo's traders suggest that they may have shipped about one-third the amount that Merauke did, possibly 10–12 tonnes, while Saumlaki may have shipped about a third of Dobo's total, about 3–4 tonnes. (By 2005, however, some Dobo-based boats had begun using Merauke as their port of departure and return, and at least one trader carried out his operations in both ports.) Putting these various figures together to arrive at an approximate estimate, the shark fin catch by these small boats in Australian waters in 2005 would have been, at a minimum, 33–41 tonnes.

Translating these figures into numbers of sharks caught is even more uncertain because of the strikingly different conversion rates for different species of shark. Sandbar sharks, for example, are relatively small, so it may take two or more of this species to obtain a kilogram of fin. In contrast, just one hammerhead shark might yield a kilogram or two of fin and a pig-eye shark even more.

20 A study supported by the Australian Fisheries Management Agency (AFMA) aims to identify the shark species targeted by Indonesian fishermen in different fishing grounds. Research is at a preliminary stage and remains unpublished (Fox and Meekan 2006).

21 These data derive from the local Merauke Fishing Office (Dinas Perikanan Merauke). They were compiled by Dr Dedi Adhuri from the monthly reports on shark fin from Merauke destined for Jakarta, Surabaya, Makassar and Menado. Each month Merauke exported between 2,332 and 3,849 kilograms of shark fin in this interisland trade.

Table 9.3 Summary of Voyages and Catch Rates of Bodi from Pepela, 2004/05

Number of *Bodi*	Length of Voyage (no. of days)	No. of Voyages per Month	Months of Operation	Target Catch (no. of sharks)	Total Catch (no. of sharks)
125	4–5	4	6	5	15,000
100	5–7	3	6	8	14,400
Total					**29,400**

Source: Authors' estimates.

Estimating the shark catch from Pepela is a far more difficult task because of the lack of any official figures for this trade.[22] Nevertheless, it is possible to arrive at an estimate by taking account of the number of *bodi* in Pepela, the estimated number of voyages by these vessels during the course of a season, and fishermen's reports on their targets for voyages to particular areas within Australian waters.

In 2005, there was a progressive build-up of *bodi* registered by the port master of East Rote to well over 400 boats. However, problems with fuel began to arise even before the price rise in October because, for several months beforehand, local distributors attempted to restrict supplies or sell fuel at a premium in anticipation of a price rise. After October, fuel was available but its cost prompted many fishermen to reduce their more distant voyaging. Thus the months preceding the price rise may have represented the high point in the wave of *bodi* entering Australian waters.

For the purposes of estimation, one could conservatively set the number of *bodi* operating throughout the season at 225 (Table 9.3). Although some boats ventured to sea throughout the year, the normal shark-fishing season lasted for approximately eight months, from March/April to October/November. Conservatively for purposes of estimation, one could reduce operations to a six-month season because of the inevitable disruptions. Again conservatively, one could assume that a majority of *bodi* (125) were involved in shorter 4–5-day voyages rather than longer 5–7-day voyages, and that they spent at least three days in

22 No agency reports shark catches or keeps records of shark fin exports—not the provincial East Nusa Tenggara Fisheries Office (Dinas Perikanan dan Kelautan NTT), the equivalent district office, the Office of Maritime Industries (Perusahaan Daerah Kelautan), the Regional Development Planning Agency (Bappeda), its provincial Data Centre for Planning and Development Management (Pusat Data Perencanaan dan Pengendalian Pembangunan Daerah NTT), the Bureau of Statistics in Kupang or the Customs Office (Kantor Bea dan Cukai).

port before setting out again. This would allow for four short voyages a month and no more than three long voyages a month. Although fishermen claimed to set their target at 10 sharks per voyage, it might be better to assume a target of seven sharks for shorter voyages and nine for longer ones; or better still, to take account of the distinct probability of occasional lack of success, to reduce the target catch to five sharks for a short voyage and eight for a long voyage. We then have all the elements needed for a rough, but conservative, estimate of the number of sharks taken in Australian waters.

A single *bodi* making only short voyages over a six-month period would be able to catch at least 120 sharks. A *bodi* making longer voyages over the same period would be able to catch 144 sharks.[23]

The parameters of this simple model might be changed by altering the number of *bodi*, the success rate in achieving the target catch or the mix of vessels sailing to different fishing grounds. The present calculations do, however, indicate that the Pepela shark fishery was, before concerted Australian interdiction operations, at least of the same order as that of Merauke. Certainly, on existing evidence, the total catch of targeted shark species by small-boat fishermen from Pepela to Merauke was unsustainably high. The pursuit of shark for its fin was seriously depleting shark numbers and, in the process, had the capacity to alter the ecological conditions of Australia's northern waters.

10 WHY SHARK?

For small-boat fishermen, shark fishing would seem to offer the possibility of a considerable income. Yet most of these fishermen and their families remain poor—some desperately poor. While the fishermen provide their labour and risk their lives, a disproportionate share of the profits goes to the boat owners and outfitters who control the trade in shark fin. As a consequence, perhaps a majority of these fishermen remain in a state of continual debt, living in squalid, crowded settlements and unable to provide better prospects for their children. It is therefore not surprising to find that some eastern Indonesian fishing communities do not consider shark fishing to be an attractive alternative to other fishing activities.

A striking case in point can be found on the island of Rote, in the contrast in development between the villages of Pepela and Oelaba. Beginning in the early 1980s, the fishermen of Oelaba, located on the

23 To this total could be added the shark catch by *lambo perahu* from Pepela legitimately engaged in shark fishing in the MOU74 Box. A draft paper prepared by the Department of the Environment and Heritage estimates this at a minimum of 1.2 tonnes per annum.

northwestern coast of Rote, would regularly sail to the MOU Box area to gather trepang (and, to a lesser extent, trochus), first at Ashmore and later at Scott Reef. Other fishermen from the neighbouring settlement of Hundi Huk soon followed their lead. Unlike Pepela at the eastern end of the island, Oelaba (and Hundi Huk) did not undergo a transition to shark fishing. To begin with, Oelaba did not experience the migration and settlement of Bajau fishermen who led the way in this transition in Pepela. Although some Oelaba fishermen did engage in shark fishing in the 1990s, and some have occasionally joined Pepela shark boats as crew members, these efforts have been sporadic and unsustained. Instead, Oelaba fishermen continue to gather trepang and trochus, primarily from Scott Reef, in the MOU Box. Although the pressures on stocks have not abated and trepang continue to be overexploited, Oelaba fishermen have probably benefited in recent years from the shift of a large number of fishermen to the pursuit of shark.[24] Although trepang stocks have declined, the prices for the five main species that the fishermen gather have more than doubled since 2005, providing a better return than previously.

A host of other reasons can be cited for the different path taken by Oelaba. A key factor is its fishermen's deep involvement in interisland trade, buying products such as lontar syrup on Rote and selling them on other islands. Their voyages to Scott Reef must therefore be fitted into a three-month period within the cycle of other activities. Oelaba fishermen themselves cite other factors. Pepela has direct and open access to the Timor Sea, while the harbour of Oelaba, fronted by extensive mangrove stands and subject to strong tides, opens only periodically to the sea. Oelaba sailors also claim that they are unwilling to take the risks that Pepela crews take. They time their voyages to avoid storms and rough seas and they pride themselves on their village's record for following Australian regulations when accessing the MOU Box (Carnegie 2006, 2008). Oelaba has not suffered the death toll from boats lost at sea that is an annual feature of life in Pepela, nor are its young men detained in Australian jails for illegal fishing.[25] Oelaba has not grown to the same

24 Department of the Environment and Heritage data based on Australian Customs records from Ashmore Reef indicate a relatively steady number of vessels entering the MOU Box area from 2000 onwards, 57 per cent of them targeting shark, 22 per cent trepang and 12 per cent trochus. However, Coastwatch data indicate a significant number of vessels bypassing Ashmore and Cartier. Many of these vessels sail directly to Scott Reef where they are allowed to gather trepang (DEH 2006).

25 On the other hand, it is worth noting that it was adult men (and adolescents) from Oelaba that captained and crewed the boats that took refugees to Ashmore Reef between 1998 and 2001; the majority of them served prison terms as a result. So while Pepela successfully made the transition to shark fishing, Oelaba later developed its own niche in people smuggling.

extent as Pepela through the continuing semi-permanent migration of fishermen from other islands. Rather, it experiences short-term influxes of boat labour for the annual three-month trepang voyages. This labour supply is made possible by the historical relations of trade and intermarriage established between residents of Oelaba and the populations from specific villages on the islands of Pantar, Pura and Tereweng in the district of Alor. Today, Oelaba exists as a small, relatively prosperous settlement without the extremes of wealth and poverty evident in Pepela.

11 CONCLUSION

The dilemma faced by small-boat shark fishermen is clear. As shark continues to be targeted for its fin and populations continue to decline, not just in Indonesian waters but worldwide, the price of fin will continue to rise. China's increasing prosperity—and that of Taiwan, Hong Kong and Singapore—has created an insatiable market for shark fin soup as a celebratory delicacy. But as surveillance and apprehension by Australian patrols increase—as has already occurred with the Clearwater and Breakwater operations—and the penalties for illegal fishing rise, the risks to fishermen for shark fishing in Australian waters will also increase significantly. Yet, however unequal the returns from these voyages may be, there will continue to be poor fishermen drawn into the business as long as there are so few other ways for them to make a living and support their families. On present evidence, it seems likely that such fishermen will come mainly from particular pockets of poverty in eastern Indonesia—from a number of small islands where population pressure and a lack of alternative employment combine to produce a migrant group of fishermen who have now positioned themselves in ports with direct access to Australian waters.

While deterrence is essential to a policy to control and limit shark fishing, the targeted provision of alternative livelihoods for fishermen—though not a deterrent in itself—must be considered as part of any effective policy strategy. In its 1988 revision to the memorandum on the MOU Box, Australia committed itself to work with Indonesia on assistance to fishermen in eastern Indonesia. It is only in cooperation with Indonesia that such a program of assistance can be achieved.[26]

26 For the past several years, with grants from the Department of the Environment and Heritage, members of the Research School of Pacific and Asian Studies at the Australian National University have been involved in developing a small-scale experimental program of alternative livelihoods for fishermen on Rote and in the Bay of Kupang.

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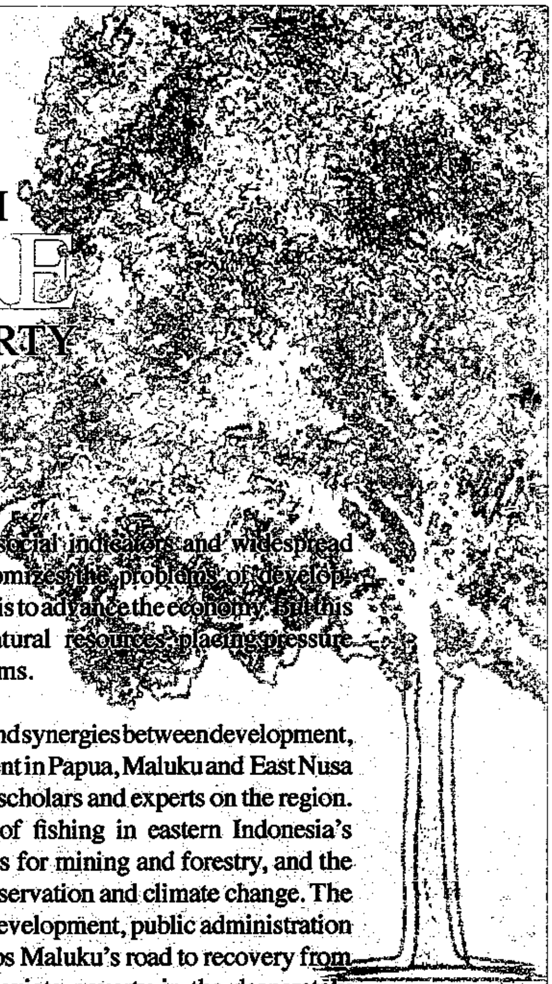

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